Proposal for

IT Professional Technical Services
Master Contract Program T#:902TS

Statement of Work
For Technology Services
issued by
Minnesota Department of Administration

Business Plan for Statewide Parcel Data Integration

Submitted by:
December 15, 2011

Fred Logman
MnGeo, Suite 300
658 Cedar Street
St. Paul, MN  55155

Re: Proposal for Business Plan for Statewide Parcel Data Integration

Dear Mr. Logman,

Enclosed please find the proposal for Pro-West & Associates, Inc. (PWA) of Walker, MN and Applied Geographics, Inc. (AppGeo) for the above-referenced project.

PWA and AppGeo have partnered to create a project team that is unsurpassed in expertise with Minnesota GIS parcel data and practices, knowledge of Minnesota counties (rural and metro) and GIS parcel planning. We each have long standing relationships with the State and Minnesota counties, and will strive to develop a plan that works in the best interest for all stakeholders.

It is not our plan it is your plan, and our goal is to ensure that the Plan has the highest chance for support, consensus, investment and sustainable implementation. We are committed your success.

Thank you for considering our proposal. We have enjoyed working with the Minnesota Geospatial Office on past projects. We look forward to the opportunity to work with you again to develop the Business Plan for Statewide Parcel Data Integration.

Sincerely,

Annette Theroux
President & CEO

PWA acknowledges receipt of addendum 1 and addendum 2 for the Statement of Work.

Expiration date of the contractor’s master contract (with OET)   June 30, 2014
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Section 1: Introduction
Introduction

This proposal details the project team, tasks, business plan development methods, project management, and cost for developing a Business Plan for Statewide Parcel Data Integration. The focus of the proposal is to develop a detailed business plan for acquiring and integrating parcel data from the authoritative local government source to create a statewide parcel data solution. The proposal lays out a process that is intensely targeted and acutely cost effective.

Successful business plan development for statewide parcel data integration will require expertise for three (3) key components:

- Intimate GIS and parcel data knowledge of Minnesota’s GIS history, existing documents and processes, legal requirements, and GIS needs on the grass roots level.
- Building solid relationships with local government, and between state and local government that can be leveraged for future efforts
- Parcel data business plan expertise

Pro-West & Associates, Inc., (prime contractor), has teamed with Applied Geographics, Inc. (subcontractor) to create a project team that is unsurpassed in its knowledge of Minnesota parcel data, data practices and data sharing. Our proposal builds on the strong foundation of prior planning efforts to complete the roadmap process started in 2003.

The cost effective process is accomplished through the use of seven (7) strategic tasks. Each task gathers information, provides deliverables, and applies input toward Business Plan development. Tasks will build on each other and result in analyses and recommendations in a real time manner to facilitate an efficient plan process.

<table>
<thead>
<tr>
<th>Task 1</th>
<th>Project Kick-off and Discussion with Project Stakeholders</th>
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PWA and AppGeo have worked with MnGeo, other state agencies, and local government organizations in Minnesota on past projects. Our goal is always to deliver services that exceed your expectations. We are committed to the success of the Minnesota Geospatial Office in undertaking this effort, and we are committed to the success of the Business Plan for Statewide Parcel Data Integration.
Section 2:  
Company Overview
Company Overview

Pro-West and Associates, Inc. (PWA)
Prime Contractor

Corporate Office Address:
8239 State 371 NW
PO Box 812
Walker, MN 56484
Telephone: (218) 547-3374
Fax: (218) 547-3375

Point of Contact:
Annette Theroux
Email: atheroux@prowestgis.com
Phone: (218) 547-3374 ext. 108

Website: www.prowestgis.com
Form of Company: Corporation
Established: 1987

Applied Geographics (AppGeo)
Subcontractor

Corporate Office Address:
24 School Street, Suite 500
Boston, MA 02108
Telephone: (617) 447-2472
Fax: (617) 259-1688

Point of Contact:
Michael Terner
Email: mgt@appgeo.com
Phone: (617)447-2468

Website: www.appgeo.com
Pro-West & Associates, Inc. (PWA)

Pro-West & Associates, Inc. (PWA), has been providing highly specialized GIS consulting, application development and data management services to local and state government since its founding as a partnership in 1987, and its subsequent re-organization as a Minnesota Corporation January 1, 1995. PWA is one of the Upper Midwest’s longest-established private firms devoted entirely to assisting public and private entities with the integration of Geographic Information Systems (GIS) technology.

PWA’s current clientele consists primarily of local, state, federal governments and private industry, some of whom have had business relationships with PWA for decades. PWA is unique in the total number and longevity of our relationships with Minnesota Counties. Our knowledge of local government data needs and data sharing opportunities is unparalleled in the state.

PWA is committed to providing our clients with quality GIS data and solutions that meet both short-term and long term business needs. Our areas of expertise include GIS consulting and analysis, spatial data development, customized GIS application development, data integration, mobile solutions, integrated web and mobile solutions, custom training, database management, geodatabase design and aerial photography.

PWA’s current staff is comprised of 25 full time Consultants, Programmers, Analysts and Technicians who have over 200 years of combined GIS development and implementation experience. PWA believes strongly in employee development and has 10 certified GIS Professionals (GISP’s) on staff. PWA also has on staff a certified Project Management Professional (PMP), Licensed Professional Civil Engineer, and a Professional Forester/Remote Sensing Specialist.

PWA has been an ESRI business partner since 1990 and has twice been awarded ESRI’s Foundation Partner of the Year (2000 & 2006), and twice been awarded ESRI’s Partner of the Year (1994 & 2010). PWA was recently recognized by ESRI as being one of only twelve worldwide business partners that has partnered with ESRI for 20 years or more.

PWA is unique in the GIS industry with over twenty-four (24) years of experience in cultivation of relationships with Minnesota Counties, and knowledge regarding data development, data sharing and State needs. With PWA’s long standing relationships with Minnesota County and Municipal Governments, PWA is well acquainted with the principles and practices of Minnesota local government data management. During our 24 years serving Minnesota GIS, PWA has preformed GIS or technology related work for over 70 of the 87 Minnesota counties.
Applied Geographics (AppGeo)

Applied Geographics, Inc. (AppGeo, www.appgeo.com) is a company dedicated to the provision of state-of-the-art GIS (geographic information system) services and solutions. In business since 1991, AppGeo is a recognized national leader in the GIS field.

AppGeo’s corporate mission is to empower its customers to put GIS to work through the intelligent use of geographic data and applications that improve work flows and increase services.

All of our work is tailored to the needs of our clients. In all of our work, we bring an independent and objective view to determine the best fit between your situation (goals, resources, business drivers, and legacy investments) and available GIS/IT technologies (state-of-the-art methods, best practices, software platforms, system architectures, development environments, data resources, and costs).

We maintain expertise in a range of GIS and GIS-related IT technologies, including Esri and Open Source GIS software. We evaluate new technologies, and maintain our own geospatial applications code base and innovative solutions. AppGeo is innovative and state-of-the-art in its approach to designing and building GIS systems, databases and applications using the latest Web, mobile and IT ideas, methods and technologies. We are an award-winning Esri Business Partner.

AppGeo services and solutions cover the entire lifecycle of Geographic Information System (GIS) implementation:

- **Strategic Planning** - Needs assessment, requirements analysis, work process automation and re-engineering, financial analysis/return on investment, implementation planning, budgeting
- **System Design** - Enterprise GIS, tiered and service oriented architectures, GIS integration with other IT systems, workflow automation
- **Spatial Data** – Development, conversion, standardization, database design, metadata, integration with non-spatial data, quality control, technical oversight support for photogrammetry and data collection efforts
- **Custom Applications and Tools** – For Web, desktop, and mobile platforms, including application training and installation support
- **Web hosting** – Secure hosting infrastructure for long-term hosting
- **Cartography, Analysis, Spatial Modeling** – Award-winning cartography and map products
- **Technical Support and Training** – Onsite support, Training

AppGeo experience applying GIS technology covers a number of key markets and industries:

- Federal, State, Regional and Local Governments
- Public Works, Utilities, Infrastructure and Facility Management
- Environmental Management, Resource Conservation, Land Use Planning, Parks and Recreation
- Transportation
- Telecommunications and Broadband
- Economic Development, Regional Planning, Real Estate
- Public Health and Health Care
- Non-profit and private sector businesses
AppGeo is a privately held business, incorporated in the Commonwealth of Massachusetts. AppGeo has no parent corporation or other corporate affiliations.

Specific Experience in Minnesota

AppGeo has a track record of work in Minnesota that provides it with an understanding of the GIS environment at the state, county and regional levels of government. AppGeo has completed a statewide strategic GIS plan for the State, worked on several projects for the Metropolitan Council and MetroGIS that were focused on systems for streamlining the collection and standardization and maintenance of street centerlines and addressing data across the region, several projects for Minnesota Department of Transportation, and GIS consulting services and Web application deployment for Washington County. Thus AppGeo is prepared to work effectively with Pro-West in all aspects of the current project.

Overview of Experience in State GIS Assessment and Planning

AppGeo has a substantial (and we believe unmatched) background in GIS strategic, business, enterprise design, marketing and implementation planning services at the State level that includes 29 statewide projects in 20 states, plus Washington DC, and the US Virgin Islands. This background reflects a fundamental corporate commitment to providing to assisting states to meet the ongoing challenge and opportunities presented by GIS implementation.

AppGeo’s leadership in state strategic and business planning for GIS is both broad and deep, and dates back more than seven years. AppGeo’s initial statewide planning projects for Massachusetts (2001) and for Maine (2002), respectively, contributed to these states’ success in developing exemplary state GIS operations with sustained funding, political support and a strong user community. AppGeo has gone on to support Massachusetts’ goal of developing statewide framework data layers by preparing a strategic plan for the Commonwealth in 2007 (funded through the CAP Grant program). One of the results of this plan is a focused statewide parcel standardization business planning effort that is now underway.

AppGeo has provided GIS planning to states similar to Minnesota that have both urban centers and a dispersed, rural population, and economies including a mix of industry and agriculture. These include: Alabama, Arizona, Arkansas, Colorado, Kansas, South Carolina, Utah, and Wyoming. From these projects, we have gained an appreciation for the challenges and opportunities posed to state GIS by settlement patterns, population size and density, resource concerns, and funding availability.

AppGeo also has a deep understanding of the process of developing the strategic and business plans. In 2006, AppGeo won a competitive award to develop GIS Strategic and Business Plan Templates as contractor to the National States Geographic Information Council (NSGIC) on behalf of the Federal Geographic Data Committee (FGDC). This project required AppGeo to review existing strategic and business plans for many states, and to iterate with a Steering Committee having representation from 17 states, the National Association of Counties (NACO), and the Geospatial Information Technology Association (GITA). The Templates quickly became a standard guide for GIS planning promoted by NSGIC through the FGDC-administered Cooperative Agreement Partnership (CAP) Grant Program and Fifty States Initiative.
In 2008, AppGeo won a competitive award from the USGS to further advance and support the Fifty States’ Initiative. The scope of the project was to review progress in statewide GIS strategic and business planning, to promote participation in the Initiative, and to revise the GIS Strategic and Business Plan Templates. This project refined the Templates to create the FGDC GIS Strategic Plan Guidelines based upon a review of statewide planning experience since 2006. For this project, AppGeo led a team that included the internationally recognized firms of Grant Thornton, Inc. and Michael Baker Jr., Inc.

Since 2006, AppGeo has completed or begun a total of 27 statewide GIS planning projects in 19 states, Washington DC, and the US Virgin Islands. Most of these projects have been FGDC CAP Grant-funded strategic and business planning projects that used the GIS Strategic and Business Plan Templates. The following table summarizes this state-level experience. It also illustrates how we have worked with several states (CO, CT, MA, and ME, plus Washington DC) on multiple projects to help them to fulfill a series of planning objectives strategic to business to enterprise GIS, and to further advance their state GIS implementation.

Each of these projects involved information gathering, synthesis, and reporting based on some combination of document review, consultation with state GIS committees and leadership, facilitated workshops and interviews with stakeholders in government and the private sector, and in many cases, online surveys.

And, each project resulted in written summaries, analysis, planning documents, and formal reports and executive summaries that were reviewed and accepted by the state.
Section 3: Project Team
Project Team

Strength of the PWA / AppGeo Project Team

Pro-West & Associates, Inc. has assembled an expert team to address the tasks requested in the Statement of Work for the Business Plan for Statewide Parcel Data Integration Project. The complex nature of the project involving multiple levels of government and parcel data integration planning requires the highly specialized expertise of a team of GIS professionals.

Pro-West & Associates, Inc. (PWA) and Applied Geographics, Inc. (AppGeo) have a history of working together to complete successful projects. The Project Team would apply their diverse professional expertise to exceed the expectations of the Minnesota Geospatial Office for the project. The Project Team is known for completing projects within budget and in a timely manner.

The PWA / AppGeo Project team provides the expertise in Minnesota local government that extends through all 87 counties, both rural and metro.

- **Parcel Data Development** - PWA and AppGeo have both developed parcel data for local government. In some cases, starting with parcel data development using GIZMO files 20 years ago, migrating up through multiple data formats, to the present day coordinate geometry (COGO) data and enterprise cadastral fabric. Our experience will lend credibility and knowledge to recommendations made in the Business Plan for integrating parcel data from counties in varied circumstances.

- **Data Sharing Expertise Between Local and State Government** - PWA has been active in all areas of GIS throughout the state of Minnesota, including volunteer and leadership positions for the Minnesota Governor’s Council on Geographic Information and the Minnesota GIS/LIS Consortium. Participation in service to GIS in the State is an important factor to understanding the unique challenges faced by all agencies, State, County, non-profit and private.

- **Parcel Data Standards** - PWA has participated in developing parcel data standards as a member of the Minnesota Digital Cadastral Data Committee. PWA and AppGeo have provided GIS and other related services for over 70 of the 87 Minnesota counties.

<table>
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<tr>
<th>Demonstrated Expertise</th>
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<tr>
<td><strong>Minnesota Local and State Government:</strong></td>
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<tr>
<td>* Parcel data development</td>
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<tr>
<td>* Data sharing expertise between local and state government</td>
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<tr>
<td>* Parcel data standards</td>
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<tr>
<td>* Leveraged relationships</td>
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<tr>
<td>* History of involvement with Cadastral and MSDI efforts</td>
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<tr>
<td>* Conducted first Statewide Parcel Mapping Inventory (SPMI)</td>
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| **State GIS Assessment and Planning:** |
| * Parcel data standard development |
| * GIS Strategic and Business Plan Templates |
| * Extensive GIS planning for states |
| * State of Minnesota, *A Program for Transformed GIS in the State of Minnesota: Program Design and Implementation Plan* |
• **Leveraged Relationships** - PWA and AppGeo have long standing relationships with county and state agencies that can be leveraged to facilitate strategic conversations for parcel data integration.

• **History of Involvement with Cadastral and MSDI Efforts** - Throughout the last decade and longer, PWA has been involved on the County level and the State level to plan cadastral data implementation, seek out funding sources for local government parcel data creation, and contribute to the Minnesota GIS community as an active participant in committees and workgroups focused on GIS planning and statewide integration.

• **Conducted First Statewide Parcel Mapping Inventory (SPMI)** - In 2003, PWA provided database design, local government contact information, and contacted key GIS personnel in local government offices to compile information for the original Statewide Parcel Mapping Inventory (SPMI). Staff worked with Mn/DOT staff to plan the project and delivered a database that has been updated and maintained by MnGeo, then the Land Management Information Center.

• ** Parcel Data Standard Development** – PWA and AppGeo understand the business needs for parcel data in local government and state organizations. Our experience will contribute to an objective and knowledgeable review of the draft parcel data standard from the Minnesota Digital Cadastral Data Committee.

• **GIS Strategic and Business Plan Templates** – AppGeo has developed templates as a contractor to the National States Geographic Information Council (NSGIC) on behalf of the Federal Geographic Data Committee (FGDC). A comprehensive understanding of the variety of state GIS plans will provide a wealth of options for Business Plan development for Minnesota.

• **Extensive GIS Planning for States** – AppGeo has provided planning to state similar to Minnesota. They are accustomed to providing innovative solutions to the technology and institutional barriers that are unique to states with metropolitan and rural areas.

• **State of Minnesota, A Program for Transformed GIS in the State of Minnesota: Program Design and Implementation Plan** – AppGeo completed the statewide strategic GIS plan for Minnesota. Based on this report the Land Management Information Center received the go-ahead from the Governor’s Office to draft legislation to create the Minnesota Geospatial Information Office (MGIO) within the Department of Administration.

*Both PWA and AppGeo have been recognized through numerous awards from ESRI for their GIS professional application and data development work. As partners in high standing with ESRI, PWA and AppGeo maintain a strong partnership with industry professionals and software specific experts.*
Project Organization

**Project Owner**
*Minnesota Department of Administration*

**MnGeo**

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**Pro-West & Associates, Inc.**

**Project Manager**
Annette M. Theroux, PMP, GISP
President and CEO

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**Key Personnel**
*Pro-West & Associates, Inc.*

**Local Government Consultant**
Jennifer L. Ward, GISP

**Parcel Data Development Manager**
Lisa L. Schaefer, GISP

**Programming Technology Manager**
Josh L. Marsh, GISP

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**Subcontractor**
*AppGeo*

**Key Personnel**
*Applied Geographics, Inc.*

**Project Lead**
Michael Terner, GISP

**Supporting Analyst and GIS Consultant**
Kate Hickey, GISP

**Supporting Analyst and GIS Consultant**
Morgen Healey
## Project Team Roles and Responsibilities

<table>
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<tr>
<th>Team Member</th>
<th>Roles and Responsibilities</th>
<th>Billing Rate</th>
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</table>
| Annette M. Theroux  | • Project Manager – plan and conduct meetings  
• Collaboration with MnGeo and project stakeholders  
• Developing Business Plan  
• Quality Assurance, Scope/Budget/Timeline management | $90 per hour  |
| Jennifer L. Ward    | • Contact local government organizations  
• Develop and implement surveys  
• Data compilation for Business Plan | $80 per hour  |
| Michael Terner      | • Collaboration with MnGeo and project stakeholders  
• Develop Business Plan  
• Assess strategies, expectations, and milestones | $165 per hour |
| Kate Hickey         | • Enterprise architecture development  
• Funding strategy development  
• Review of MetroGIS model and state-county models for parcel data sharing | $135 per hour |
| Lisa L. Schaefer    | • Expertise for parcel databases and spatial data  
• Provide support for cadastral data technology recommendations | $90 per hour  |
| Josh Marsh          | • Expertise for data sharing mechanisms and development  
• Provide support for data sharing strategies and recommendations | $90 per hour  |
| Morgen Healey       | • Enterprise architecture development  
• Funding strategy development  
• Review of MetroGIS model and state-county models for parcel data sharing | $115 per hour |

## Project Team Qualifications and Resumes

| Annette M. Theroux, PMP, GISP | • 20 year GIS career working with local and state government in Minnesota  
• Certified Project Management Professional (PMP)  
• Conducted County Parcel Data and Practices Survey for MnGeo 2011  
• Research Partnership Award 2004, awarded by University of Minnesota, Center for Transportation Studies, for the Mn/DOT project Statewide Parcel Mapping Inventory  
• Past Member of the Minnesota Governor’s Council on Geographic Information  
  ▪ Past Co-Chair of the Data Committee, which developed the publication “Making the most of geospatial data exchange: a guide for data distribution”  
  ▪ Past Member of Minnesota Cadastral I-Team and Land Records Modernization Committee | |
| Jennifer L. Ward, GISP   | • 17 year GIS career working with local government in Minnesota  
• Coordinates with city, county, state, and tribal governments regarding streamlined data sharing  
• Conducted County Parcel Data and Practices Survey for MnGeo 2011  
• Member of the Digital Cadastral Data Committee of the Minnesota State Government Geospatial Advisory Council which has been responsible for developing statewide guidelines for digital mapping of cadastral-related data  
• Serves as technical consultant and GIS advisor for County GIS needs | |
### Michael Terner, GISP
- 26 year GIS professional consulting career including all levels of government
- Co-author of GIS Strategic and Business Planning Templates for FGDC
- Expert in strategic planning, business analysis, implementation and system architecture including project leadership for 15 GIS planning projects in several states: AR, DE, MA, ME, MN, NE, NY, PA, RI, UT, USVI
- Regional GIS planning for Southern California Association of Governments (SCAG) and Calgary Region Planning Council (CRPC), and MetroGIS/Metropolitan Planning Council
- Extensive GIS consulting for counties and municipalities

### Kate Hickey, GISP
- 10 years experience as a GIS professional
- Expertise with projects involving geospatial data, parcel data, data integration
- Specific expertise with parcel data standardization and conformance, and parcel automation workflows and technologies
- Information gathering, research and review, and analytical support for statewide GIS strategic and business planning projects for the following states: Arizona, Hawai’i, Minnesota, New York, Pennsylvania, Alabama, South Carolina, Utah, plus the US Virgin Islands.
- FGDC Fifty States Initiative – Support for state strategic and business planning CAP grant program including workshop presentations, program analysis, and progress reporting

### Lisa L. Schaefer, GISP
- 11 year GIS career working with local government to develop cadastral and right of way data
- Management of over 20 Minnesota local government parcel data development projects
- Expertise in tax parcel databases and geospatial data
- Assisted in conducting County Parcel Data and Practices Survey for MnGeo 2011

### Josh L. Marsh, GISP
- 8 year GIS career developing County web mapping and data distribution mechanisms
- Lead programmer for Mn/DOT (RW)2 Data Sharing Web Application for data sharing between Mn/DOT and local government for Mn/DOT District 3 & 4

### Morgen Healey
- 8 years experience as a GIS professional including experience as a consultant and as a County GIS Manager
- Expertise with projects involving geospatial data automation, standardization, data integration
- Specific expertise with parcel data standardization and conformance, and parcel automation workflows and technologies
Annette M. Theroux, PMP, GISP – President and CEO

Ms. Theroux serves as President and CEO of PWA. As President, Ms. Theroux is responsible for developing and implementing business strategies and policies for PWA.

Through the years, Ms. Theroux’s responsibilities have included GIS consulting, technical advising and training. She works with clients to understand their business activities, workflows, and needs; determine how GIS technology can help meet those needs and formulate and implement cost-effective GIS-based solutions.

Ms. Theroux facilitates project initiation and progress meetings with prime contractors and stakeholders. She is also responsible for addressing daily questions and concerns, project reports, ensuring resource allocation, assuring budget and schedule control, and working with team members to ensure contract compliance with all deliverables.

Professional Strengths

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<th>Project Management</th>
<th>Organizational Development</th>
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<tr>
<td>Cost Containment</td>
<td>Resource Allocation</td>
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<tr>
<td>GIS Implementation &amp; Integration Planning</td>
<td>Project Planning and Development</td>
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Credentials and Education

Project Management Professional (PMP)
Certified Geographic Information Systems Professional (GISP)
Graduate Coursework toward Master of Science in Environmental Studies, Bemidji State University, Bemidji, MN
Bachelor of Science in Geography, Bemidji State University, Bemidji, MN
Past Adjunct Professor GIS, Bemidji State University

Awards and Committees

Polaris Leadership Award Recipient 2005 recognizing GIS leadership excellence
Research Partnership Award 2004, awarded by University of Minnesota, Center for Transportation Studies, for the Mn/DOT project Statewide Parcel Mapping Inventory.
Past Co-chair of the Minnesota Governor’s Council on Geographic Information, Data Committee, which developed the publication “Making the most of geospatial data exchange: a guide for data distribution”
Past Chair – MN GIS/LIS Consortium Board

Relevant Experience (20 years)

• Conducted County Parcel Data and Practices Survey for MnGeo 2011
• Project Management of multi-year, multi-million dollar projects as a prime contractor and a sub-contractor.
• Serves as the project manager for data development and migration projects to assist with database design, quality assurance procedures, and contract compliance. Works closely with the technical supervisors to ensure technical requirements are met and testing procedures are implemented.
• Manages and supervises web-based application development of several city and county applications using ArcGIS Server, including intranet, internet and department specific applications.
Jennifer L. Ward, GISP – Local Government Consultant

Ms. Ward has participated in various community outreach projects, compiling information and data to incorporate into streamlined datasets and web accessible data sharing applications. Additionally Ms. Ward Regularly develops and instructs customized hands-on GIS trainings for City and County staff.

Ms. Ward’s responsibilities also include geodatabase design and development, assisting with quality assurance plans and topological standards, as well as performing duties as technical lead for data conversion and compilation projects.

Ms. Ward has wide-ranging experience with geodatabase models and technology. Her experience includes assisting clients with initial geodatabase design, as well as conversion of existing data from multiple formats (CAD drawings, shapefiles, coverages, paper) to a geodatabase format, training and technical support. Ms. Ward works primarily with the ESRI ArcGIS suite of products and also has extensive experience with CAD and various database software applications.

### Professional Strengths

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<tr>
<th>Community Outreach</th>
<th>Data Compilation and Conversion for GIS Implementation</th>
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<tr>
<td>Documentation/Training Manual Creation</td>
<td>Spatial Data Development</td>
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<tr>
<td>Geodatabase Design &amp; Development</td>
<td>GIS Software Training /Technical Support</td>
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### Credentials and Education

Certified Geographic Information Systems Professional (GISP)

Coursework towards Bachelor of Science degree in Geography, Bemidji State University, Bemidji, MN

### Committees and Workshop Instruction

MnGeo Digital Cadastral Data Committee Member

Past Private Sector Representative of the Black Hills Digital Mapping Association

Instructor of “Advanced Editing in ArcGIS”

Instructor of “ArcGIS Tips and Tools”

On-going Presentations and Workshops – MN GIS/LIS Consortium; ILGISA (Illinois GIS Association); WLIA (Wisconsin Land Information Association); ND GIS Users Conferences; SD GIS Conferences

### Relevant Experience (17 Years)

- Conducted County Parcel Data and Practices Survey for MnGeo 2011
- Coordinated with city, county, state, and tribal governments regarding streamlined data sharing
- Spatial data development using ArcInfo COGO and CAD software packages
- Serves as technical consultant and GIS advisor for County GIS needs
- Enterprise geodatabase model creation and data conversion
Michael G. Terner has been applying Geographic Information Systems (GIS) to environmental, municipal, utility, transportation and business sector since 1985. Mr. Terner’s comprehensive GIS experience includes GIS strategic planning, needs assessments and data evaluations, designing databases, programming user-interface applications, designing web-based architectures and implementing and managing systems. Mr. Terner has been instrumental in the design and development GIS systems and applications at all levels of government, including major cities, county and regional government, state agency and federal agency, and the private sector. He co-authored GIS Strategic and Business Planning Templates for the National States Geographic Information Council on behalf of the FGDC. Prior to founding AppGeo in 1991, Mr. Terner served in state government where he managed the project that developed MassGIS (the Commonwealth of Massachusetts state GIS office) in the late 1980’s, and subsequently he managed MassGIS for three years within the Executive Office of Environmental Affairs.

**Education**
- MCP, City Planning with Environmental Policy & Planning and GIS focus, 1993, Massachusetts Institute of Technology, Cambridge, MA
- BA in Environmental Studies and Biology, 1985, Tufts University, Medford, MA

**Work History**
- 1991-present, Founder and Executive Vice President, Applied Geographics, Inc.
- 1985-1988, GIS Project Manager, Hazardous Waste Facility Site Safety Council, Commonwealth of Massachusetts and USGS

**Selected and Relevant Project Experience**
- **GIS Strategic Planning, Business Analysis, Implementation Planning, System Architecture** – involving facilitation of workshops and stakeholder meetings, departmental interviews, case studies, system architecture, cost analysis, benefit analysis, governance and organizational change assessment, applications and data assessment and requirements analysis, workflow analysis, recommendations and report preparation
  - Utah DOT – enterprise GIS planning, integration strategies, software migration strategies
  - US DOT - Transportation for the Nation (TFTN) strategic planning initiative, 2010
  - Since 2005, managed and/or participated in statewide strategic planning projects for the following states: Arkansas, Colorado, Connecticut, Delaware, Kansas, Maine, Massachusetts, Minnesota, New Hampshire, New York, Pennsylvania, Rhode Island, South Carolina, Utah, Virgin Islands, plus Washington DC
    - 2008 Southern California Council of Governments (SCAG)
    - 2008 USGS – support for revision of original strategic and business planning templates
    - 2006 National States Geographic Information Council (NSGIC) - co-author for development of strategic and business planning templates for Statewide GIS Coordination Councils
    - 2003 Massachusetts Department of Public Health
    - 2002 Massachusetts Port Authority (MassPort)

- **Other GIS Data and Applications and Implementation Support** – Since founding AppGeo in 1991, led or oversaw as Principal in Charge dozens of application development and GIS data development projects, including parcel and public works data automation, custom Web and desktop application design and development, including all levels of government, such as represented by the following projects:
  - New York Natural Heritage Program – implementation support for iMap Invasive Species Project
  - City of Baltimore, MD – city web mapping capability for various departments to promote city services, planning and tourism, 2010
- USGS, National Biological Information Infrastructure (NBII), GAP Program – design and development of landcover viewer for nationwide landcover data sets, 2009
- National Recreation and Parks Association (NRPA) – development of standardized data model for park, trail, and facilities data, 2009, oversees development of web-based data uploading and mapping application, 2011
- Minnesota Department of Transportation (Mn/DOT) 2011 – Principal in charge of major initiative to design and deploy an enterprise IT infrastructure for mobile applications for the Department
- Minnesota Department of Transportation (Mn/DOT) 2009 – Geoenabling workflows associated with the Department’s Right of Way Electronic Acquisition and Land Management System (REALMS) using AppGeo’s configurable web mapping technology, GPV.
- GreenInfo Network – Protected Areas Database for the US (PADUS) project to define data model for national protected areas spatial data, 2008
- City of Boston, MA – implementation support, custom GIS Web application 2008, enterprise GIS needs assessment 2007
- State of Colorado Department of Local Affairs (DOLA) 2006 – Contributor to project to provide emergency management application needs assessment and architecture design for state agencies
- City of Cambridge, MA - implementation support for AppGeo’s GPV® configurable GIS Web mapping software
- County of Albemarle, VA – needs assessment, technical support, custom web mapping application, ongoing support through 2008-09
- Mid-America Regional Council (MARC), MO – 2008 HealthNet clinics mapping application using innovative ArcGIS and Google Maps mashup
- Massachusetts Department of Environmental Protection – 2007 statewide web application for watershed protection and status mapping and data retrieval
- Vermont Department of Economic Development, 2005 – Principal in Charge and contributor to design and deployment of site suitability web mapping application for Vermont.
Kate L. Hickey is a Senior Geographic Information Systems Analyst and Project Manager with ten years of experience as a GIS professional. Ms. Hickey is primarily focused on managing State and Local Government GIS projects and supporting statewide strategic and business planning projects. These responsibilities include strategic and implementation planning, ongoing implementation support and training, data automation and systems integration, quality control, and deploying municipal web and desktop applications. Prior to joining AppGeo, Ms. Hickey worked for the Town of Brookline as a GIS Analyst, and for the Center for Cultural and Environmental History at UMass Boston as a GIS Specialist. She has extensive experience with ArcGIS products including ArcINFO and ArcSDE for Cultural and Environmental History at UMass Boston as a GIS Specialist. She has a B.A. in Anthropology from the University of California at Berkeley, an M.A. in Environmental Archaeology from the University of Massachusetts at Boston, and a Certificate in Geographic Information Technology.

**SELECTED AND RELEVANT PROJECT EXPERIENCE**

*Hands on GIS data development, cartography, modeling, and analysis, combined with GIS strategic planning, project management and oversight:*

- Project management –web application design and deployment- for broadband availability mapping projects at the state level funded through the ARRA for the following states: Vermont, Massachusetts
- Information gathering, research and review, and analytical support for statewide GIS strategic and business planning projects for the following states: Arizona, Hawai‘i, Minnesota, New York, Pennsylvania, Alabama, South Carolina, Utah, plus the US Virgin Islands.
- FGDC Fifty States Initiative – Support for state strategic and business planning CAP grant program including workshop presentations and program progress report.
- GreenInfo Network - Database design support and documentation for planning the first nationwide protected areas database.
- Appalachian Mountain Club - Project Manager for development of web-based hike planning system. Responsible for documenting user needs, interactive map design, user interface design, and all quality control testing.

*Extensive hands-on experience as GIS analyst and project manager for local government GIS projects involving planning, data development and applications:*

- **County of Albemarle, VA** – Project Manager for review and design of web application redesign and upgrade, 2010
- **Town of Groton, Groton, MA** - Project Manager for townwide GIS needs assessment, ongoing implementation support and training, GIS web application development, annual parcel maintenance
- **Town of Ayer, Ayer, MA** – Project Manager for townwide IT and GIS needs assessment and implementation plan.
- **Town of Acton, Acton, MA** – Project Manager for townwide permitting system workflow analysis and technical assessment.
- **Town of Ipswich, Ipswich, MA** – Project Manager for townwide parcel automation and update to townwide GIS needs assessment.
- **Town of Norwood, Norwood, MA** - Project Manager for townwide GIS needs assessment and implementation plan.

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**Education**

- Certificate in Geographic Information Technology, 2001, University of Massachusetts Boston, Boston, MA
- M.A., Environmental & Historical Archaeology – Emphasis on GIS Applications, 2000, University of Massachusetts Boston, Boston, MA
- B.A., Cultural Anthropology, 1994, University of California Berkeley, Berkeley, MA

**Work History**

- 2001-present, Project Manager/Senior GIS Analyst, Applied Geographics, Inc.
- 2000-2001, G.I.S. Technician, Town of Brookline, MA
- 2000-2001, GIS Specialist, UMass Boston – Center for Cultural & Environmental History
- Technical Writer/Research Assistant, TECSA Technical Services, Santa Barbara, CA
- Assistant, TECSA Technica
- Professional Services, Santa Barbara, CA
- 1994, B.A. in Anthropology, University of California Berkeley, Berkeley, MA

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**Pro-West & Associates, Inc.**
- **Town of Smithfield, Smithfield, RI** - Project Manager for townwide GIS needs assessment and implementation plan and GIS web application development.
- **Town of Manchester-by-the-Sea, Manchester-by-the-Sea, MA** - Project Manager for townwide GIS needs assessment and implementation plan.
- **Town of Norfolk, Norfolk, MA** - Project Manager for townwide storm utility system development; townwide parcel automation; utility tracing application; web application development; GIS training and ongoing implementation support.
- **City of Waltham, Waltham, MA** – Project manager for Citywide GIS Needs Assessment, Quality Control Assessment of 40 scale Planimetric Data, Parcel Automation, Citywide Permitting implementation and training, and web-based GIS application development. Ongoing support.
- **Parsons Brinckerhoff (PB Power), Boston, MA** - Project Manager for GIS support of ALCOA dam relicensing projects in NC and TN including data development and maintenance; web-application development and development of web-based Metadata portal; Ongoing implementation support.
- **Town of Grafton, Grafton, MA** - Project Manager for Water, Sewer, and Drain utility system data development projects; parcel maintenance; GIS web-application development, Zoning data development; development of RFP for photogrammetry and planimetric data development project. GIS and permitting system work-flow analysis for entire town; Ongoing implementation support.
- **Town of East Longmeadow, East Longmeadow, MA** - Completed Townwide Permitting System Workflow Analysis and Software Requirements Specification and ongoing implementation assistance; Ongoing implementation support.
- **Town of Duxbury, Duxbury, MA** - Project Manager for parcel automation project and development of web-based GIS application. Ongoing implementation support.
- **Town of Brookline, Brookline, MA** - Project Manager for “Where Am I?” municipal resident web-based GIS application.
- **Town of Nantucket, Nantucket, MA** - Project Manager for web-based GIS application development; data development and maintenance projects; ongoing GIS implementation support.
- **Town of Prospect, Prospect, CT** - Project Manager for townwide GIS Needs Assessment and Implementation Plan.
- **Town of Ramapo, Ramapo, Rockland County, NY** - Project Manager for Townwide GIS Needs Assessment and Implementation Plan development.
- **Town of Canton, Canton, MA** - Data Integration Assessment and Recommendation, Public Safety GIS application, data conversion, GIS data development, and implementation assistance.
- **Rhode Island Public Transit Authority (RIPTA)** - Project Manager for urban area public transit map development.
- **Town of Chelmsford, Chelmsford, MA** - Project Manager for Townwide GIS Needs Assessment and Implementation Plan; On-going Implementation Assistance including parcel conformance with MassGIS Level II standards, GIS applications, and on-site training.
- **City of Quincy, Quincy, MA** - Developed methodology to update FEMA and FIRM data with planimetric and contour data; Created hazard Mitigation Maps for Planning Department.
- **City of Beverly, Beverly, MA** - Citywide Street Centerline Map; Project Manager for Citywide GIS Needs Assessment and Implementation Plan.
- **Town of Cumberland, Cumberland, RI** - Project Manager for Parcel Automation project; Customized GIS Training Courses; Zoning data layer development.
Lisa L. Schaefer, GISP – Data Technology Manager

In her current position as Data Technology Manager, Ms. Schaefer is responsible for the management and supervision of PWA’s largest division. Her primary responsibilities include parcel data development, data development and management, supervision of numerous GIS Technicians, and client project coordination. She is also responsible for the creation, conversion, and/or analysis of data for various projects.

Ms. Schaefer is experienced with COGO data development, parcel geodatabase models, developing topology, and assigning subtypes and domains to feature classes within the geodatabase framework. Creation of new data in the geodatabase environment and conversion to and from other formats comprise a great deal of Ms. Schaefer’s role.

Ms. Schaefer is experienced with many software packages. Her primary software in current projects is the ESRI suite of ArcGIS products including ArcView and ArcInfo. Ms. Schaefer also has many years of experience with CADD software, namely AutoCAD and MicroStation. She has been an AutoCAD user for ten years and is familiar with AutoCAD, the Land Desktop extensions, and more recently the AutoCAD Civil 3D package. Ms. Schaefer has used Bentley’s MicroStation software primarily for transportation projects involving roads and rights of way acquisition.

Professional Strengths

<table>
<thead>
<tr>
<th>Parcel Data Development</th>
<th>Geodatabase Design and Development</th>
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<tbody>
<tr>
<td>Spatial Analysis</td>
<td>Data Conversion and Migration</td>
</tr>
<tr>
<td>Community Outreach</td>
<td>SDE Data Management</td>
</tr>
</tbody>
</table>

Credentials and Education

Certified Geographic Information Systems Professional (GISP)

Master of Science in Environmental Geology, Eastern Kentucky University, Richmond, KY

Bachelor of Science in Geology, Minors in Geography and Space Studies, Bemidji State University, Bemidji, MN

Relevant Experience (11 Years)

Assisted in conducting County Parcel Data and Practices Survey for MnGeo 2011

Enterprise geodatabase model creation, conversion and spatial data development

Hydrology data development and realignment

Rural parcel and right of way data development

Municipal parcel and right of way data development

Geodatabase parcel and right of way creation and maintenance training

AutoCAD parcel and right of way creation and maintenance training

Utility data conversion
Josh L. Marsh, GISP – Senior Programmer

Mr. Marsh is responsible for managing the development of complex GIS and mobile programming projects. He possesses communication and conceptual skills, allowing him to translate end-user needs into a well-defined application design. He organizes all stages of application development, from design to delivery. Mr. Marsh also analyzes existing systems, providing alternative solutions and enhancements that optimize efficiency and minimize overhead costs. Mr. Marsh is also a participant and presenter at the annual MN GIS/LIS conferences, keeping up to speed with current GIS technology and sharing ideas with others.

**Web Development:** ASP.NET (C#, VB), Flex, Silverlight, PHP, Java, HTML, JavaScript, AJAX, XML, XSL, FOP, SVG, CSS, ArcGIS Server, ArcObjects

**Desktop Development:** Visual Studio.NET, Microsoft Access, MapObjects, ArcObjects, Avenue

**Mobile Development:** Visual Studio.NET, ArcGIS Server ADF, ArcPad Application Builder, ArcGIS Server Mobile ADF

**Database Servers:** Microsoft SQL Server, Oracle, MySQL

**Web & Networking Systems:** Microsoft IIS, Apache, Samba, Active Directory

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**Professional Strengths**

<table>
<thead>
<tr>
<th>Client Communication</th>
<th>Data Analysis &amp; Integration</th>
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<tr>
<td>ESRI Software Application Design and Development</td>
<td>System Architecture</td>
</tr>
<tr>
<td>Project Documentation</td>
<td>Quality Assurance/Quality Control</td>
</tr>
</tbody>
</table>

**Credentials and Education**

Certified Geographic Information Systems Professional (GISP)

Bachelor of Science in Computer Science, Bemidji State University, Bemidji, MN

Minor in Mathematics, Bemidji State University, Bemidji, MN

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**Relevant Experience (8 Years)**

**Web-based Applications**

- Mn/DOT system architecture (RW)²
- Web-based parcel and web-based utility tracking system
- Web-based data management application
- Emergency management applications

**Data Integration/ Migration**

- Silverlight Data Access & Analysis
- ArcSDE geodatabase setup, installation and configuration
- Cook County, IL address verification
- Data collection, analysis & distribution
- County recorder workflow application design
- Mn/DOT system architecture (RW)²
- Land portal system architecture
Morgen Healy is a Project Manager and Senior GIS Analyst for the State and Local Government Team in AppGeo’s Boston office. Ms. Healy has eight years of experience as a GIS professional including experience as a consultant and as a County GIS Manager. At AppGeo, she manages a wide range of GIS projects, including website development, Utility Geodatabase design and automation, parcel automation and maintenance, ongoing implementation assistance and Staff Training. She is a graduate of Colgate University with a double major in Mathematics and Geography.

**Selected and Relevant Project Experience**

- **National Recreation and Parks Association**: Ms. Healy is currently working on a project with NRPA to develop a national GIS data standard for parks, trails and recreation facilities.
- **Statewide Broadband Mapping Projects**: Ms. Healy is currently working with both Washington State and Oklahoma State to help manage the Mapping, Analysis, and Website Development for the State Broadband Data and Development Grant Programs.
- **City of Lebanon, NH**: Ms. Healy is currently working with the City’s GIS Coordinator to assist in steering the GIS program, including Website Design, Utility Automation, and custom GIS and document management solutions for various City departments.
- **Town of Dedham, MA**: Ms. Healy worked with the Engineering department and DPW on all aspects of the town’s extensive GIS program. This included General Implementation Assistance for all GIS projects in the town, the GIS and DPW websites, custom web applications, Sewer and Stormwater data QAQC and upkeep, Flyover project management and QA/QC, ongoing parcel updates, and as-needed mapping for town initiatives.
- **Manchester-by-the-Sea, MA**: Ms. Healy managed the town’s GIS website and data, annual parcel updates, as-needed GIS data layer development, as well as automation of Sewer, Water and Stormwater.

**Work History**

- **Applied Geographics, Inc., 2009**
  - Project Manager/Senior GIS Analyst

- **Rockland County, NY, 2007-2009**
  - GIS Technician

- **Applied Geographics, Inc., 2002-2007**

**Education**

- **BA Mathematics and Geography, 2002, Colgate University**
Section 4: Similar Projects
Similar Projects

County Parcel Data and Data Practices Survey
Minnesota Geospatial Information Office (MnGeo)

Contact: David Arbeit
MN Chief Geospatial Information Officer
MnGeo - Minnesota Geospatial Information Office
Suite 300
658 Cedar Street
Saint Paul, MN 55155

Size: 87 Counties

Project Date: 2011

Scope: PWA surveyed Minnesota Counties and regional GIS related organizations to identify spatial parcel data and tabular tax parcel database status, and County data practices. A master database was created to collect information regarding primary contacts for data related activities, data availability, data accessibility, and data sharing policies.

PWA staff compiled a comprehensive list of County contacts for parcel data development, data distribution and maintenance, tabular data distribution, and data distribution policies. PWA worked with MnGeo staff prior to contacting the counties to develop a series of comprehensive survey questions. Additionally, PWA contacted regional organizations to request any known information pertaining to data sharing on a regional level.

PWA utilized various contact information sources such as existing PWA County client database, Association of Minnesota Counties (AMC) 2011 County directory, internet research and additional regional GIS organization contact information. Initial contact was made with telephone calls to each of the 87 Minnesota counties. Completing the survey required follow-up calling, emails and web site review.

PWA created a database and interface to facilitate survey information collection. The final database contained responses from 83 of the 87 Minnesota. The database and interface provided standardized data entry, and a mechanism for information query by various criteria.

Project Relevancies:

- The survey provides significant input for developing the Business Plan for Statewide Parcel Data Integration
- Local government outreach for data collaboration
- Leverage existing relationships and promote cooperation between state and local government
Cadastral and Right of Way Data Sharing Project
Minnesota Department of Transportation (Mn/DOT)

Contact: Richard Morey
Asst. Dir., Office of Land Mgmt.
395 John Ireland Blvd
St. Paul, MN 55155
(651) 366-3504
Richard.morey@dot.state.mn.us

and

Lowell Schaefer
State Aid for Local Transportation
395 John Ireland Blvd
St. Paul, MN 55155
(651) 366-3835
Lowell.Schaefer@state.mn.us

Size:
- 25 Counties
- 14 Cities
- 2 Tribal Governments
- Mn/DOT Districts 3 & 4
  (Approx. 1/3 of MN)

Project Date: 2003, 2008-2009, 2010

Award: 2004 Univ. of MN Research Partnership Award

Scope: PWA conducted the original Statewide Parcel Mapping Inventory (SPMI) project in 2003 to inventory land records data in Minnesota counties, cities, and Tribal Government. MnGeo (then LMIC) has updated the inventory twice since that time and provides access to the inventory through their web services.

2008-2009, a subsequent data sharing project was conducted as a proof of concept to overcome technological and institutional barriers that prevent efficient data sharing. An innovative web-based application, (RW)² – (titled Right of Way/Right A Way), was developed to remotely access and consume geospatial data, databases, and imaged recorded documents to be served from local government agencies to Mn/DOT, and from Mn/DOT to local government agencies. PWA conducted well over 100 meetings with local government agencies, the project PAT – (Project Advisory Team for local govt. and Mn/DOT), and Mn/DOT offices, in an effort to develop the relationships and technology to share data valuable for each agency's work.

2010, a follow-up data sharing project was conducted to integrate counties, cities and tribal governments within Mn/DOT’s District 3 & 4 that were not integrated during the 2008-2009 project. Outreach and online trainings were provided for all local government organizations. A survey was conducted following online trainings to acquire input on data sharing needs and acceptance. PWA created a work plan and Return on Investment (ROI) report related to the expansion of data sharing statewide to the remaining 6 Mn/DOT Districts, 62 counties, 50+ cities, and 6 Tribal Governments.

Contract Compliance: The project required compliance with the Minnesota Office of Enterprise Technology ITTSS Master Plan. Interview methods and data transfer protocols were developed to meet the varied needs of Mn/DOT and local government agencies. PWA leveraged existing relationships and built new relationships that facilitated data sharing via
remotely accessing data between the agencies in a SOA (Service Oriented Architecture). PWA’s experience with local government and Mn/DOT provided unique insight into efficient and effective data sharing options.

**Technical Skills:** Developing an SOA web-based application to share data required state of the art programming. (RW)$^2$ remotely consumes multiple data sources, such as WMS, ArcIMS & ArcGIS Server map services, proprietary document imaging systems, proprietary tax parcel and CAMA databases, and hosted mapping environments. The secure web application was developed in three versioned timelines to accommodate new software, hardware and services throughout the project. Step-by-step application training was provided to Mn/DOT and local government agencies during training sessions in 5 locations in Minnesota, and remotely through net meetings.

**Unique Solutions & Client Satisfaction:** PWA developed and maintained the SOA web-based application (RW)$^2$ during the three year data sharing project timeline. Remotely consuming services between agencies allows the authoritative source to develop and maintain data, eliminating redundant data creation and storage, which substantially reduces Mn/DOT research time and data development, and local government research assistance and data development. The project has set a precedent for data sharing in the State of Minnesota.

**Project Relevancies:**

- Local government outreach for data collaboration via on-site and remote meetings
- Leverage existing relationships and promoted cooperation between state and local government
- Legacy data incorporation
- Understanding SQL/Oracle database administration
- ESRI ArcGIS Server integration for varying data and map services (V 9.1, 9.2 and 9.3)
- System architecture assessment and compliance with Minnesota OET ITTSS Master Plan
- Training and technical support for state departments and local government organizations
Title: GIS Parcel Data Development Services and Multi Department Land Information Portal

Owner: St. Louis County, MN

Contact: Darren Jablonsky
Planning, Research & GIS Manager
St. Louis County
227 West First Street, Suite 100
Duluth, MN 55802
218-725-5011
jablonskyd@co.st-louis.mn.us

Size: +196,400 parcels
202 congressional townships
124 jurisdictions
7,000 square miles

Scope:

PWA worked closely with numerous departments at St. Louis County over the last seven (7) years to develop and implement an efficient, accessible GIS system. Data development began with building a base of accurate, highly function parcel data. PWA developed a parcel data model for the project that has since been recognized nationally. Over the course of five (5) years, PWA developed spatial parcel data, implemented a project discrepancy tracking system, and worked with the County to research and resolve parcel discrepancies.

As part of the comprehensive GIS data process, PWA has been assisting the County with creating an extensive data infrastructure with several levels of data including roads, hydrology, utilities, planimetrics, zoning, and a master street address geodatabase framework. Data development has been performed entirely in an enterprise SDE geodatabase format and in the structure of ESRI’s ArcInfo environment. During the project timeframe, the software was migrated through several versions - from 9.0 through and into 10.

In conjunction with the data development, St. Louis County Planning staff developed a functional specification for a web-based land portal application that would meet the needs of various St. Louis County departments and agencies. The application developed by PWA was designed to be scalable, extensible and easily secured so that access to sensitive data could be allowed or denied easily by system administrators. The application allows employees to query, review, map, and analyze data from any legacy system within the St. Louis County infrastructure as well as any external source from which map services could be consumed.

Contract Compliance: This project required compliance with specific national data standards, integrated and on-going quality control/maintenance procedures, communication procedures and a centralized enterprise geodatabase design that efficiently supports the ArcGIS Land Records GIS Portal and County business processes. PWA provided strategic and skillful teams of management/development staff to provide timely data development/conversion, which kept the project within budget and on schedule. Detailed project scopes and web-based project tracking also contributed to fulfilling contract requirements in a cost effective manner.

Technical Skills: Data development involved accessing and manipulating numerous source documents into seamless, topologically correct spatial datasets. Examples are: GPS data, CADD drawings, existing GIS data, Microstation files, legal descriptions, appraisal databases (CAMA), hand-drawn building profiles, and hand-drawn field sketches. Pilot projects,
detailed data development standards, and customized geoprocessing scripts to increase technical staff efficiencies have led to complete, accurate datasets, as well as development standards which will be used by County staff in the future.

**Web Application Development:** The application was designed to allow employees to query, review, map, and analyze data from any legacy system within the STLC IS infrastructure as well as any external source from which map services could be consumed. The application was designed to be extremely intuitive so that only minimal training would be required by County staff prior to full implementation. The application also needed to be scalable, extensible, and easily secured so that access to sensitive data could be allowed or denied easily by system administrators. This was accomplished by programmatically connecting the portal to the County’s existing IS Active Directory Structure (additional login and passwords were not required). The functional specifications also required that the user interface be customizable by individual staff which allowed those staff with special needs to tailor the application to their own particular needs (ex. color-blindness). Various components of the Portal were designed so that they could be made available to the general public (and public subscribers) with minimal, additional, programming effort.

**Project Management:** PWA has managed over 7 complex data development/conversion projects involving over 40 communities within the County as well as multiple sub-contractors. Managing data and staff across multiple locations requires documented and supported management and quality control practices.

**Similar Project Relevancies:**

- Communities outreach for data collaboration via on-site and remote meetings
- Leverage existing relationships and promoted cooperation between county and city government
- Legacy data incorporation
- Enterprise level data development
- ESRI ArcGIS Server integration for varying data and map services
- System architecture assessment
Case Studies of Statewide GIS Planning Projects

The following are short descriptions of several state planning projects completed by AppGeo that demonstrate our experience with GIS planning in Minnesota (and in other states) and with statewide parcel planning that the State of Minnesota seeks through this project. The state business and strategic planning projects conducted for New York, Massachusetts, and Arkansas deeply explored the issues involved with assembling statewide parcels.

**State of Minnesota**

A Program for Transformed GIS in the State of Minnesota: Program Design and Implementation Plan

*Completed February 2009*

(with Minnesota-based Rowekamp Associates as a subcontractor)

For Minnesota (2009), we conducted more than 23 interviews covering 17 agencies and several key stakeholders, supplemented by an online survey, and two workshops for state and non-state government stakeholders, respectively. AppGeo’s program for transformed GIS for Minnesota developed a program design and implementation plan and included a detailed “cost to government” analysis of the current way of doing business and identified cost savings associated with the proposed plan. Based on this report the Land Management Information Center received the go-ahead from the Governor’s Office to draft legislation to create the Minnesota Geospatial Information Office (MGIO) within the Department of Administration. House and Senate bills were prepared and on May 7th, the Senate Bill passed 59-2, with an effective date of July 1, 2009.

Reference Contact: David Arbeit, CGIO, State of Minnesota, 658 Cedar Street, Room 300, St. Paul, MN 55155, (651) 201-2460, david.arbeit@state.mn.us

**State of Arkansas**

State Business Plan for Statewide Framework Funding Of Geographic Information Systems Data

Prepared for the Arkansas Geographic Information Office, *completed January 2010*

Applied Geographics, Inc. (AppGeo) worked with the Arkansas Geographics Information Office (AGIO) to prepare a Geospatial Strategic Business Plan for the further development and maintenance of four categories of spatial data: orthophotography, parcel lines, political and administrative boundaries, and road centerlines. This project focused on assessing the current status of these data layers and building a business case for sustainable funding of statewide, framework data.

The project scope covered three sets of tasks/deliverables:

1. Fact finding and inventory of the status of each data layers, including identifying stakeholders and critically reviewing the capacity and resource constraints facing main institutions
2. Workshops and interviews with legislators and key stakeholders to assess common interests, differences among stakeholders, and needs, and determine strategies for further development and maintenance of the spatial data (the chart shows the broad distribution of types of stakeholders attended the four workshops totaling 160 participants)
3. Strategic business plan development and report that covers status of data layers, issues, uncertainties, inefficiencies, needs, estimates costs and benefits, and makes recommendations for institutional arrangements and improved coordination, funding, and technical solutions
Main project activities include:

- Project kick off and planning meeting with Executive Team
- Review Historical Documents and current status of state GIS programs
- Finalize strategy for business plan development that engages key leaders one-on-one and engages stakeholders in the regional forums
- Develop regional stakeholder forum agenda
- Facilitate five (5) regional forums throughout the state
- Conduct one-on-one interview with key leaders
- Prepare written Business Plan for review by State GIS Board, Board Advisory Panel and AGIO
- Present business plan to GIS Board
- Provide Executive Summary Briefing to key individuals.
- Provide Executive Summary Presentation to Joint Committee on Advanced Communications and Information Technology Committee Hearing
- Finalize Business Plan

The project was funded through the Cooperative Assistance Program (CAP) administered by the Federal Geographic Data Committee (FGDC), which funds projects that support the National Spatial Data Infrastructure (NSDI) and the objectives of the Fifty States Initiative Action Plan. The project used the GIS Strategic and Business Planning Templates and Process Guidelines developed by AppGeo in 2006 for the National States Geographic Information Council (NSGIC) on behalf of the FGDC.

Reference Contact: Shelby Johnson, State Geographic Information Officer, State of Arkansas – One Capitol Mall, 2nd Floor 2B 900, Little Rock, AR 72201; (501) 682-2767; shelby.johnson@arkansas.gov

**State of New York**

**Business Plan for Centralized Access to Consistent Cadastral Data for NY**


*(New York-based firms of MRB and Oswald and Associates acted as subcontractors)*

The Office of Cyber Security (OCS) identified the development of a statewide parcel layer as one of the highest priority recommendations resulting from the 2008 GIS Strategic Plan that was prepared by AppGeo. This business plan provided the analysis and plan for achieving this goal and describes the business case for investing in a statewide parcel data layer in New York. Parcel data exists in some electronic form for all counties in the state, but current challenges addressed through the project included:

- Data exist in a variety of formats and are of varying quality making it difficult to assemble a statewide data set
- Several counties are reluctant to give up revenues generated from the sale of parcel data.

To achieve the objective of a publicly available, statewide parcel data layer, this plan focused on practical, *first steps* that can be pursued and completed during the next two years. Primary recommendations and programs presented through the Business Plan included:

- Initiating a pilot project to test the methods proposed in this plan and to initiate the development of a multi-county parcel data set
- The pilot will initially focus on outreach to counties that *currently* and *willingly* share parcel data with the goal of incrementally increasing the volume of voluntary contributions over time.
• To alleviate any perceived burden on counties, the parcels will be collected “as is” and OCS will take responsibility for harmonizing these disparate data sets into a seamless parcel data layer that will eventually cover the entire state.

• The data created from the pilot will be made available in a variety of formats including data download and consumption as a web-service

GIS Strategic Plan, Completed August 2008

AppGeo assisted the State to conduct a statewide GIS strategic planning process overseen by the New York State GIS Coordinating Body and New York Office of Cyber Security and Critical Infrastructure Coordination (CSCIC) which houses the state’s GIS coordination program. This work was funded by a United States Geological Survey (USGS), Federal Geographic Data Committee (FGDC), Cooperative Assistance Program (CAP) grant.

The project had three main phases. First, AppGeo conducted six GIS stakeholder workshops throughout the state aimed at collecting direct stakeholder input into strengths and weaknesses and the priorities for improvement. Stakeholder workshops were conducted in the following regions of the state: New York City, Long Island, Hudson Valley, Capital District, North Country and Central/Western New York. Second, AppGeo then engaged in deliberations with both the Coordinating Body and CSCIC management aimed at identifying recommendations that would leverage existing strengths and address weaknesses. Third, AppGeo authored the Plan and worked with the State through the approval process, initiating a consensus building process through the solicitation and incorporation of broad-based feedback on an initial draft of the plan.

Findings included identification of strengths and weaknesses of geospatial programs. Significant geospatial strengths were found:

• Mature, statewide GIS coordination program with broad stakeholder support for, and engagement in that program
• Rich, statewide, core geospatial data assets
• Widespread public sector data sharing through the Data Sharing Cooperative
• National leadership for statewide aerial imagery program
• National leadership in executing a multi-governmental program for the development and maintenance of streets and address data.
• Strong geospatial educational programs

Geospatial weaknesses were identified, among which included:

• Gaps and weaknesses in key data layers:
  – Elevation: statewide elevation data is inadequate for many required uses such as flood planning, prevention and response.
  – Parcels: although there is wide availability of county-based parcel information, the data are not consistent and it is very difficult to assemble parcels on a regional or statewide basis, in spite of huge demands for this data set.
  – County and municipal boundaries: are not mapped accurately and this hinders the accuracy of other data layers such as parcels and other administrative boundaries (e.g. school districts)
• The utility of the data sharing cooperative is undermined by significant pockets of dated information and the overall usability of the web-site
• Local governments require access to non-technical GIS information that would support their efforts to programmatically build local GIS capacity. Examples of the types of information that are required includes: return on investment (ROI) case studies and GIS best practices information.

Key recommendations from this project created, among other results, the momentum for the 2010-11 Business planning process for statewide parcels. Recommendations covered the following topics:
1. Leadership in the development and maintenance of the state’s core, basemap layers of streets, addresses, and orthoimagery
2. Strengthen the existing Data Sharing Cooperative:
3. Further focus CSCIC’s statewide GIS coordination role
4. Formally pursue a program to improve the quality of statewide elevation data
5. Strengthen and expand the existing statewide orthoimagery program to include a wider variety of products such as elevation and oblique imagery
6. Formally pursue a program to develop a statewide parcel data layer including active outreach and coordination with the Office of Real Property Services (ORPS)
7. Develop a plan for systematically improving the accuracy of the state’s administrative boundary data
8. Continue to align geospatial programs to gubernatorial priorities.

Reference Contact: William F. Johnson, Assistant Deputy Director & CIO, NYS Office of Cyber Security & Critical Infrastructure Coordination, 30 Pearl Street, Floor P2, Albany, NY 12207-3425, (518) 473-5861, WJohnson@dhses.ny.gov

**Commonwealth of Massachusetts**

**Business Plan for Standardized Assessors Parcels**

Prepared for the Executive Office for Energy and Environmental Affairs, MassGIS

**Completed 2011**

AppGeo contributed to a planning process that was undertaken by the Commonwealth. The Plan prepared by AppGeo focused on documenting the progress that has been made, summarizing the business case for completing parcels on a statewide basis and identifying the funding and implementation path necessary to complete the job, as well as existing challenges and resource constraints. This Plan also documented the positive experiences of other states that have pursued similar efforts.

Based on the cost of current parcel automation and standardization efforts, the Plan calculated the expected cost to finish the statewide parcel data layer beyond state fiscal year 2012.

The Plan also addressed issues of sustainability. Earlier MassGIS grant programs have shown that just converting parcels into digital format is not enough. Parcel data that is converted into digital format with statewide funding will not necessarily get updated and maintained in that form. To protect the Commonwealth’s investment in statewide parcels, AppGeo recommended that MassGIS and DOR work together to encourage community adoption of the digital parcel standard and annual submission of standards-compliant data.

The project was funded through the Cooperative Assistance Program (CAP) administered by the Federal Geographic Data Committee (FGDC), which funds projects that support the National Spatial Data Infrastructure (NSDI) and the objectives of the Fifty States Initiative Action Plan.

**Strategic Planning for Spatial Data Infrastructure**

**Completed October 2007**

AppGeo prepared strategic recommendations for the further development and maintenance of four categories of spatial data: assessor’s parcel lines, color orthoimagery, road centerline network, and critical infrastructure locations at the
The first three data layers are on the list of framework spatial data layers published by the FGDC and the project will bolster Massachusetts participation in the National Spatial Data Infrastructure (NSDI).

The project was funded through the Cooperative Assistance Program (CAP) administered by the Federal Geographic Data Committee (FGDC), which funds projects that support the National Spatial Data Infrastructure (NSDI) and the objectives of the Fifty States Initiative Action Plan.

**Study to Define Shared GIS Services for the Massachusetts E-Government Initiative**

*Completed 2002*

AppGeo prepared a study to define, design and initiate the construction of a shared GIS service for Mass.Gov, the overriding Massachusetts E-Government initiative. The study built on the strategic plan for an expanded Massachusetts E-Government presence that was created by Accenture in 2001. Accenture recommended the creation of a “shared GIS service”. The AppGeo study defined and designed what those services should look like, and provided a blueprint for MassGIS to follow. MassGIS’s existing web-services architecture is a direct result of the recommendations made in this study.

The study involved conducting extensive interviews with state personnel, completing a comprehensive survey and reviewing the experience of other states involved with developing GIS capabilities as part of an E-Government initiative. Ultimately, 11 other state programs were reviewed and assessed. This project also involved developing an on-line web-based survey for MassGIS to collect information on the extent of GIS development within the Commonwealth, particularly for data development. Another key component of the study was assessing the feasibility of assembling communal data resources, such as a statewide parcel data layer, by combining the efforts of multiple municipalities.

The study involved detailed research into state-of-the-art web services architectures and emerging industry standards. The final report provided a conceptual design for shared GIS service and described the technologies required to realize the design and the supporting system infrastructures. Additionally, the report identified a governance structure for managing E-Government driven web mapping, and the evolving role of MassGIS as the official “state office of GIS”.

Subsequently, many of the study’s recommendations have been carried out as MassGIS has built an exemplary web services infrastructure and has pursued facilitating a statewide parcel data layer through the innovative use of grant funding to municipalities in combination with strong parcel data standards.

Reference Contact:  Christian Jacqz, Director, MassGIS, 251 Causeway St., Suite 500, Boston, MA 02108, (617) 626-1056, christian.jacqz@state.ma.us
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1/ AppGeo is leading a strategic planning project for the State of North Carolina that is funded by the Library of Congress and is focused on statewide strategic planning for archiving of geospatial data, the GeoMAPP program. 5/ AppGeo is providing consulting and planning support for enterprise GIS for UT DOT.
Section 5:

Project Understanding
Project Understanding

PWA and AppGeo understand that the Minnesota Geospatial Office, Minnesota Department of Administration requires a Business Plan for Statewide Parcel Data Integration to acquire and integrate parcel data as a statewide parcel data solution.

The purpose of the project is to develop a detailed business plan for Minnesota to guide parcel data acquisition, integration, management and access statewide. The plan must address County and State business needs for a cost effective method of utilizing parcel data developed and maintained by the authoritative county source. The plan must take into account the need for reliable, accurate, and current parcel data (both spatial and attribute) from counties with varied circumstances for parcel data integration.

It is crucial for the project to understand the history of prior GIS planning efforts in the State and the wealth of information that exists as a base for the Business Plan. Minnesota has been moving toward integration of statewide data, particularly parcel data, for well over a decade. These efforts have systematically laid the groundwork for data integration and will provide a significant return on investment for this project.

In addition, PWA and AppGeo recognize the key role that relationships between Minnesota counties and the State contribute to this project. Our project team is uniquely qualified to leverage relationships created through decades of GIS service to the counties, both rural and metro. The Business Plan will identify and focus on these critical relationships between agencies, and investigate possible funding and cost sharing strategies to ensure that the plan for statewide parcel data integration is sustainable.

The climate in the State of Minnesota for data sharing is encouraging at this time. Counties have received approximately eight (8) years of funding for technology improvement in recording legal documents. Many counties have relied on this Recorder’s Compliance Fund and technology funding to improve land records management systems (LRMS) for documents, tax parcel database systems and, of special interest for this project, Geographic Information Systems for parcel data/land records. Counties have or are investing in representing land records as digital spatial data that can be linked to other county systems, such as LRMS, tax parcel systems, E911 and NG 911 roads, State facilitated imagery and LiDAR, as well as other publicly available spatial data.

Based on the 2011 County Parcel Data and Practices Survey, Minnesota counties are willing to share parcel data with the State, and are looking for guidance and assistance in doing so. Counties are looking for ways to leverage the investment they have made in land records related data and find mechanisms for distribution and enhancement.

At the same time, State agencies are redundantly acquiring, storing and distributing county parcel data within their agencies at substantial cost for each agency. In an effort to develop an innovative solution for county/state data sharing Mn/DOT funded a proof of concept project (2008-2010) to leverage existing relationships between Minnesota counties and Mn/DOT, and share data via a web application. This pioneering effort has yielded significant information on the possible mechanisms for parcel data integration statewide, and the complex issues that accompany data integration between the 87 Minnesota counties and the State. These lessons learned, along
with the information collected from efforts to develop a Cadastral Implementation Plan, the Minnesota Spatial Data Infrastructure (MSDI) Plan, and the recent strategic plan for transforming GIS in Minnesota will all contribute greatly toward a functional, sustainable Business Plan for Statewide Parcel Integration.

AppGeo’s extensive experience developing parcel data plans and GIS plans for states has yielded an effective methodology that will be employed for this project. The proposed methodology begins with the preparation of written recommendations based on information gathering, analysis of the 2011 county survey results, project meetings, a State agency survey and a county workshop, followed by an in-depth discussion with the State. This comprehensive review and discussion of findings and recommendations creates the groundwork for the draft Business Plan. The final Business Plan is then developed by incorporating State reviews and feedback from the draft plan.

The project timeline is short, requiring fast turnaround of project deliverables in an organized effective manner. The proposed work plan details seven (7) tasks that begin at the State project stakeholder level, incorporate input from State agencies and county representatives, and are delivered in a succession of focused analyses and recommendations. Each analysis and recommendation, as it is accepted, contributes to the comprehensive development of the Business Plan. This method identifies issues that are of high priority and proposes recommendations that fit the specific business needs for parcel data integration statewide.
Section 6:

Work Plan
Work Plan

PWA and AppGeo are proposing a work plan that recognizes the importance of the work that has been accomplished in Minnesota toward statewide parcel data integration and accessibility thus far.

The work plan is divided into seven (7) tasks that progressively build on one another through meetings, surveys, conversations and recommendations:

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<td>Presentation on Written Recommendations</td>
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<td>Task 6</td>
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<td>Task 7</td>
<td>Finalize Written Business Plan</td>
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Work Plan Tasks

Task 1  Project Kick-off and Discussion with Project Stakeholders

A half-day project kick-off meeting will be conducted on-site to meet with project stakeholders, including MnGeo Project Managers, the Project Advisory/Steering Committee, and other stakeholders as identified by the Project Managers. The focus of the meeting will be to discuss the methods that will be employed during project outreach, research and business plan development, finalize the schedule, and allow for the exchange of ideas and opinions concerning the Business Plan and planning process.

Discussion will include the important lessons that have been learned through prior efforts that will inform the overall business plan strategies and recommendations. The challenges and obstacles that are unique to Minnesota provide important information for further planning. An advantage of our Team is our participation in past efforts and direct knowledge of many issues and opportunities that are relevant to this project.

- PWA staff will conduct the meeting, provide materials and gather information about stakeholder expectations, critical County / State relationships, project priorities and business plan goals.
- PWA and AppGeo staff will review the systematic process that will be conducted during the project to ensure buy-in from the stakeholders for the process, and provide clarification for any questions or concerns.
- Meeting minutes, follow-up questions, and other meeting related documentation will be provided to stakeholders within three (3) business days of the kick-off meeting.
• PWA staff will conduct the meeting on-site and AppGeo staff will assist with conducting the meeting remotely.

The State will be required to provide a conference room with video conference capabilities and solicit project stakeholders to participate.

**Task 2 Outreach**

Outreach to individuals and groups, outside the project stakeholder group, requires a specially targeted and very effective communication strategy. Communication strategies for outreach during the project will be comprised of surveys and key strategic conversations focused on leveraging existing relationships and knowledge.

**Project Survey**

A project survey will be created for distribution to the State Agencies and State Offices that utilize parcel data (spatial and tabular) produced by local government. The State Government Geospatial Advisory Council will be tasked with identifying the technical users and data managers within their agencies that should receive the survey.

The survey will include, but is not limited to questions about which staff, business or operational units are using parcel data from one or many counties, whether and how staff collect, compile or otherwise add value to the data they use, which business work flows currently require or could benefit from parcel data, how the data is accessed and distributed, and what types of data agreements are utilized with local government agencies.

The survey will be developed in Survey Monkey and be available for two (2) weeks online. A reminder will be sent after one week to remind those who have not filled out the survey to do so.

**Workshop**

A half-day workshop will be conducted to review the results of the 2011 County Parcel Survey with County stakeholders and further discuss issues related to data sharing. The workshop will focus on Minnesota counties as the authoritative source for parcel data, the successes and barriers to data sharing experienced by counties currently, strategies for leveraging resources, the business needs of counties for accurate parcel data, and other key strategic issues and concerns related to funding, cost sharing, staffing, technology, data standards and so forth.

• Workshop participants will attend the workshop on-site and remotely.

• Workshop participants will be selected through invitations issued to the Minnesota Counties GIS Association (MCGISA), MnGeo Digital Cadastral Data Committee, and the Statewide Geospatial Advisory Council.

• PWA staff will conduct the workshop, provide materials and gather information about local government expectations for data sharing.

• PWA staff will review the systematic process that is being planned for the project and respond to questions and concerns.
Materials will be distributed via email at least one week prior to the workshop. Workshop documents and follow-up questions will be provided to workshop participants within three (3) business days of the kick-off meeting. PWA staff will conduct the meeting on-site with preparation support from AppGeo staff.

The State will be required to provide a conference room with video conference capabilities and County stakeholder group contact information.

**Task 3 Research**
A plethora of practical and constructive GIS planning efforts have been conducted in Minnesota that will provide a solid foundation for developing the business plan. PWA and AppGeo will conduct research to mine and incorporate information from prior and ongoing efforts:

- 2003 Cadastral Implementation Plan
- 2004 Strategic Plan for an integrated Minnesota Spatial Data Infrastructure (MSDI)
- MetroGIS Parcel Data Sharing Strategy
- 2009 A Program for Transformed GIS in the State of Minnesota: Program Design and Implementation Plan
- 2010-2011 MnGeo Digital Cadastral Data Committee draft parcel data standard
- 2011 County Parcel Data and Practices Survey
- Processes established by State agencies to integrate local government parcel data and publicly available data to meet their internal business needs.
- Outreach to the four (4) non-responsive counties to the June 2011 parcel data survey
- Minnesota’s Data practices Act pertaining to data access and cost recovery
- Statewide Parcel Mapping Inventory (SPMI) and other tools used by Minnesota agencies

**Task 4 Business Plan Development**
AppGeo is intimately knowledgeable of the FGDC’s GIS Strategic and Business Plan Guidelines\(^1\) – AppGeo authored them and has applied them to GIS planning projects in many states through the FGDC CAP Grant Program as presented in this proposal in detail. These Guidelines will provide a useful framework upon which to draw for this project, such as identification of important topics, key question types, and approaches, but it is also our understanding that the final form of the business plan in this case is not dictated by these Guidelines. As a matter of method, we would plan to refer to the Guidelines to ensure that important topics were identified early to improve the process of project outreach and research, and to inform the survey development and the workshop, and other conversations, for example.

\(^1\) The Business Plan Guideline can be found at: [http://www.fgdc.gov/policyandplanning/revbpsp](http://www.fgdc.gov/policyandplanning/revbpsp).
Three-step Iterative Approach

Our methodology involves a three-step iterative approach to the business plan development that starts with the preparation of written recommendations (based on the information gathering, analysis of county survey results, and other research and outreach) followed by an in-depth discussion with the State. This comprehensive review and discussion of preliminary findings and recommendations sets the stage for preparing the draft Business Plan. Review by the State and feedback leads to the finalization of the Business Plan document.

This approach saves time. Issues of high priority, scale and emphasis, and recommendations that do and do not fit are quickly identified in the in-depth initial discussion, thereby making the drafting of the Business Plan more focused and effective.

Business plan development will be broken down into smaller deliverables that will be discussed during bi-weekly project meetings with the State.

1. Matrices of County Capacity

   The 2011 Parcel Data and Practices Survey will provide base information to develop matrices for assessing the counties’ capacity for statewide parcel data integration. Follow-on surveys and workshops will further focus the assessment.

2. Archetypal Groupings

   Information gathered during the 2011 Parcel Data and Practices Survey will be utilized to group the counties in archetypal categories that will provide a framework for developing enterprise architecture, a state-county-model agreement, funding and other strategic recommendations. The grouping will be derived from the results of the county survey, supplemented by additional outreach and research conducted through this project. Grouping factors will include such things as:
   
   • Current status of digital parcel data – currency, quality, completeness, standardization, documentation, etc.
   • Capacity to maintain parcel data (staff, funds, technology)
   • Size of county in terms of area, population, and other characteristics that are determined to affect the ability, motivation, and capacity of the county to participate in supporting a statewide parcel program

3. Enterprise Architecture Recommendations

   We will develop recommendations for a technical architecture that can support the compilation and maintenance of statewide parcel data. The enterprise architecture design process will take into account the different (archetypal) models for counties that are developed through this project. This may take the form of systems that can handle data coming in different formats and different frequencies, for example. The enterprise architecture will describe the components and functions with respect to county and state levels.
The overall enterprise architecture will take into account that the role of the state may differ with respect to counties based on their resources and sophistication in the use of GIS technologies for managing their parcel data. We anticipate that these differences can be accommodated in an enterprise design that will be flexible and tailored to the specific models (circumstances) of counties. We will also take into account and make recommendations concerning how counties may adapt and improve their circumstances to better integrate with the enterprise architecture. Thus the overall perspective will look at solving the problem by making adjustments and improvements at both the county and state levels.

4. **State-County Model Agreement**

Based on the outreach and engagement with stakeholders, we will have a good idea of the range of issues, constraints, and opportunities for sharing data that can inform the formation of a model agreement. We will also incorporate relevant information and guidance into the Model Agreement based on our review of the Minnesota Data Practices Act, Minnesota Statutes Chapter 13. We will also draw on our experience in other states to inform this process, reviewing models and procedures that have worked elsewhere. This model agreement may have different parts that are tailored to specific (and differing) circumstances of counties or county archetypal groups so that it can be flexibly applied.

5. **Other Strategy Recommendations**

We will formulate additional strategy recommendations that address key issues identified in the Statement of Work and discovered through the project, including but not limited to:

- Cost sharing
- Funding mechanisms
- Organizational Roles and Responsibilities
- Legal requirements
- Data Standards
- Technology
- Data Access and Sharing
- Other, to be determined

Recommendations in each of these areas will be developed keeping in mind the differences among counties across the State. In some cases, such as cost sharing or roles and responsibilities, the circumstances of counties or groups of counties will influence the range of recommendations. In other cases, such as standards, legal requirements, and data access and sharing, the recommendations will apply uniformly to the counties to create a consistent framework for success.

The above elements are components of the overall Business Plan. They will be delivered in draft form to the State for review and feedback as they are developed.

All deliverables for the business plan will be delivered within a two month timeframe.
• One or more business plan deliverables will be distributed to project stakeholders one week prior to a scheduled bi-weekly teleconference meeting with the State.

• Business plan deliverables that require editing following a bi-weekly meeting will be edited and redistributed along with the next deliverable one week prior to the next scheduled bi-weekly teleconference meeting with the State.

In addition, the Project Team will convene a presentation and review of project findings, draft Business Plan components and strategic recommendations with the State as described below.

Task 5  Presentation on Written Recommendations
PWA and AppGeo will present written recommendations to the State after at a meeting that includes a review of the findings of the project, a review of the major business component draft materials, and strategic recommendations. This discussion with the State and key stakeholders will allow for all parties to refine and prioritize and further develop elements for the Business Plan. PWA will facilitate the meeting.

Task 6  Written Draft Business Plan
PWA and AppGeo will author the Business Plan based on the results of the discussion with the State. A draft version will be presented to the State for review and acceptance. We assume that the State will manage the process of distributing the draft Business Plan for review and will compile all feedback to present to the Project Team.

Task  Finalize Written Business Plan
PWA and AppGeo will finalize the draft Business Plan based on the feedback from the State, including making adjustments and finalizing all components and recommendations.

Before document publication, we will provide a final version of the Plan to the State Project Representative for final review and sign-off. We believe that it is critical that the State review the final version and agree with the Plan recommendations and details. It is not our plan it is your plan, and our goal is to ensure that the Plan has the highest chance for support, consensus, investment and successful implementation. Upon acceptance, we will publish the final Plan and provide a complete document in electronic and hard copy format as desired. We will also prepare an Executive Summary (for inclusion in the Final Complete Document and as a stand-alone document)
Additional Business Plan Communication Options

An optional additional task (to be priced separately) is to further summarize the Business Plan so as to create a clear description of the current situation and opportunities, and a compelling case for investment and implementation based on tangible, understandable needs and benefits that are specific to the State of Minnesota. Types of summary documents or presentations that we propose include:

- A 10-15 slide PowerPoint presentation that is organized to meet the State’s objectives for communication about the project results and recommendations
- Presentation or facilitated workshop for State Government officials and decision-makers concerning the project recommendations and scope and next steps, or tailored to other audiences, such as legislators, county officials, other stakeholders, and funders
- Preparation of marketing materials such as a brochure suitable for distribution to stakeholders

States Staff Participation

In addition to direct project meeting participation, State staff will be required to provide the following participation during the business plan development process:

1. State staff would be required to review all draft deliverables and provide comments. If review includes a wider circle of participants, then state staff would be responsible for distributing the draft materials, and compiling the feedback from those parties.

2. State staff would be available for consultation on key business plan decisions and high-level strategy in the course of the project.

3. State staff would be available to encourage and support the participation of various groups – counties, professional organizations, state agencies – in the information gathering and business planning as required for the project.
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Section 7: Project Management
Project Management

Pro-West & Associates, Inc. approaches management procedures on a project-by-project basis by customizing the structure and responsibilities of each key personnel based on contract requirements. Personnel management is divided into project administration, project management, and technical leads. Each level is designed to ensure contract compliance, cost control, daily project and technical support, and client satisfaction. PWA’s success with this model has been proven through its repeat clientele and its ability to remain within budget and on schedule.

PWA has managed projects utilizing subcontractors for two decades. Management of the PWA Project Team would include rigorous project expectations, regular recurring Project Team meetings, and quality control / quality assurance of all products prior to delivery to client.

PWA and AppGeo have successfully completed several projects in the last five years. Both GIS firms are committed to the success of the Business Plan for Statewide Parcel Data Integration project.

Point of Contact

PWA would provide a Project Manager who would be the primary point of contact for project questions, deliverables, analyses, recommendations and other project documentation. The Project Manager would be directly available to State project personnel during the project.

PWA and AppGeo staff would be required to report to the Project Manager on a weekly basis throughout the lifecycle of the project to ensure timelines, needs and budgets were in line with the scope of the project. Internal project tracking systems would track project tasks, timelines and status. A change in the project would be immediately communicated to the State Project Manager.

Bi-weekly Project Meetings

PWA would conduct formal bi-weekly meetings between the State Project Manager (and key stakeholders) and the PWA Project Manager (other staff may be requested to attend based on meeting agenda) every other week during the project timeline. These meetings would be conducted to discuss project issues encountered in the previous two week period, review task deliverables, incorporate additional information into the project process and address questions or concerns. Once a month a project progress report would be delivered and would be reviewed during the meeting. These meetings would be approximately 1 hour to one hour in length.
Reporting

A project specific form would be devised for this project that would be submitted at monthly intervals to the State Project Manager. This form would state the work plan tasks completed, work plan tasks for the next reporting period, and any dependencies or issues that had arisen or remained unresolved.

The form would also include comments from the project manager that would further explain decisions made and actions taken regarding specific items. The form would be modified as requested to meet the needs of MnGeo and the Department of Administration.

PWA will also complete State mandated reporting forms as required for invoicing purposes.

Cost and Schedule Control

The cost and schedule would be reviewed throughout the course of the project. The Project Manager would maintain sufficient resources to stay on schedule and to support change processes that would detect possible issues during the project’s development, and would resolve them in a timely manner. The schedule, as well as bi-weekly meetings with the team Project Managers, would track project progress and make early resource problem detection possible.

Contract / Change Management Plan

PWA would facilitate communication about requested changes among the stakeholders and provide a common process for resolving requested changes and reported problems, and reduce the uncertainty around the existence, state, and outcome of a change that has been requested in a work product.

Change management procedures would ensure that changes to resources, costs, schedules, and deliverables are managed. All stakeholders would be notified of approved changes.
Section 8: Budget and Timeline
Total Cost for the **Business Plan for Statewide Parcel Data Integration** project

$24,600

The Total Cost is a “not to exceed total cost” for the project to the State including all time, materials and other contractor expenses.

The State will be invoiced for the project at the completion of the deliverables to the State.
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Section 9: Appendices
Appendix A

Conflict of Interest Statement

It is the policy of Pro-West & Associates, Inc. (PWA) that all employees and sub-contractors avoid any conflict between their interests and those of the Minnesota Office of Enterprise Technology. The purpose of this policy is to ensure that PWA’s honesty and integrity, and its reputation, therefore, are not compromised. The fundamental principle guiding implementation of this policy is that no PWA employee and subcontractor should have, or appear to have, personal interest or relationships that conflict with the best interest of the Minnesota Office of Enterprise Technology.

Affidavit of non-collusion
(see attached pages)

Certification regarding lobbying
(see attached pages)

Veteran-owned/service Disabled Veteran-owned Preference Form
N/A

Appendix B

Example business plans and strategies developed
(see attached pages)

- Business Plan for Statewide Parcel Development and Maintenance for the Commonwealth of Massachusetts
- Business Plan for Centralized Access to Consistent Cadastral Data
STATE OF MINNESOTA
AFFIDAVIT OF NONCOLLUSION

I swear (or affirm) under the penalty of perjury:

1. That I am the Responder (if the Responder is an individual), a partner in the company (if the Responder is a partnership), or an officer or employee of the responding corporation having authority to sign on its behalf (if the Responder is a corporation);

2. That the attached proposal submitted in response to the Data Integration Request for Proposals has been arrived at by the Responder independently and has been submitted without collusion with and without any agreement, understanding or planned common course of action with, any other Responder of materials, supplies, equipment or services described in the Request for Proposal, designed to limit fair and open competition;

3. That the contents of the proposal have not been communicated by the Responder or its employees or agents to any person not an employee or agent of the Responder and will not be communicated to any such persons prior to the official opening of the proposals; and

4. That I am fully informed regarding the accuracy of the statements made in this affidavit.

Responder's Firm Name: Pro-West & Associates, Inc.

Authorized Representative (Please Print) Annette M. Theroux

Authorized Signature: Annette M. Theroux

Date: December 14, 2011

Subscribed and sworn to me this 14th day of December

Notary Public Virginia T. Stanko

My commission expires: 01/31/2014
STATE OF MINNESOTA
AFFIDAVIT OF NONCOLLUSION

I swear (or affirm) under the penalty of perjury:

1. That I am the Responder (if the Responder is an individual), a partner in the company (if the Responder is a partnership), or an officer or employee of the responding corporation having authority to sign on its behalf (if the Responder is a corporation);

2. That the attached proposal submitted in response to the MN Dept. of Admin's Request for Proposals has been arrived at by the Responder independently and has been submitted without collusion with and without any agreement, understanding or planned common course of action with, any other Responder of materials, supplies, equipment or services described in the Request for Proposal, designed to limit fair and open competition;

3. That the contents of the proposal have not been communicated by the Responder or its employees or agents to any person not an employee or agent of the Responder and will not be communicated to any such persons prior to the official opening of the proposals; and

4. That I am fully informed regarding the accuracy of the statements made in this affidavit.

Responder's Firm Name: Applied Geographics, Inc.

Authorized Representative (Please Print): Richard Grady

Authorized Signature: [Signature]

Date: December 13, 2011

Subscribed and sworn to me this 13th day of December, 2011

Notary Public

My commission expires: 4/20/17

1/07
CERTIFICATION REGARDING LOBBYING
For State of Minnesota Contracts and Grants over $100,000

The undersigned certifies, to the best of his or her knowledge and belief that:

(1) No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any agency, a member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

(2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, Disclosure Form to Report Lobbying in accordance with its instructions.

(3) The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31 U.S.C. 1352. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

Pro West & Associates, Inc.
Organization Name

Annette M. Theroux
Name and Title of Official Signing for Organization

By: Annette M. Theroux
Signature of Official

December 14, 2011
Date
CERTIFICATION REGARDING LOBBYING
For State of Minnesota Contracts and Grants over $100,000

The undersigned certifies, to the best of his or her knowledge and belief that:

(1) No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any agency, a member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

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Applied Geographics, Inc.
Organization Name

Richard Grady, President
Name and Title of Official Signing for Organization

By: [Signature]
Signature of Official

December 13, 2011
Date
NEW YORK STATE

Business Plan for Centralized Access to Consistent Cadastral Data

FINAL

October 2011

State of New York Office of Cyber Security
The project described in this publication was supported by Cooperative Agreement Number G10AC00171 from the United States Geological Survey. Its contents are solely the responsibility of the authors and do not necessarily represent the official views of the USGS.
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EXECUTIVE SUMMARY

The New York State GIS Coordinating Body (CB) and New York State Office of Cyber Security and Critical Infrastructure Coordination (now the Office of Cyber Security, or OCS) identified the development of a statewide parcel layer as one of the highest priority recommendations resulting from the 2008 Strategic Plan. This business plan lays out the steps required to achieve this goal and describes the business case for investing in a statewide parcel data layer.

At a national level, the assembly and standardization of statewide parcel data is increasingly being recognized as an important and achievable goal with wide-reaching benefits to stakeholders. In New York, statewide parcels would provide a variety of benefits to different GIS stakeholders, including:

- Eliminating duplicated efforts to collect, process and store parcel data by multiple state agencies
- Improving access to parcel data by allowing one-stop shopping vs. the current practice of needing to visit individual counties.
- Improved availability and access to parcel data better supports planning, decision making, and management particularly for land and facilities.
- County and local governments that maintain the source parcel data and have fewer technological resources will benefit from the state providing parcel data hosting and through increased opportunities for shared web applications
- Data availability to support regional and multi-jurisdictional issues such as watershed planning, transportation planning, economic development, and emergency response

This plan recognizes, and aims to address existing challenges that have so far prevented universal sharing of parcel data in New York. In spite of the fact that parcel data currently exist in some electronic form for all counties in the state, current challenges include:

- Data exist in a variety of formats and are of varying quality making it difficult to assemble a statewide data set
- Several counties are reluctant to give up revenues generated from the sale of parcel data.

While the long term objective remains a publicly available, statewide parcel data layer, this plan focuses on the practical, *first steps* towards realizing that goal that can be pursued and completed during the next two years. The proposed process includes:

- Initiating a pilot project to test the methods proposed in this plan and to initiate the development of a multi-county parcel data set
• The pilot will initially focus on outreach to counties that currently and willingly share parcel data with the goal of incrementally increasing the volume of voluntary contributions over time.

• To alleviate any perceived burden on counties, the parcels will be collected “as is” and OCS will take responsibility for harmonizing these disparate data sets into a seamless parcel data layer that will eventually cover the entire state.

• The data created from the pilot will be made available in a variety of formats including data download and consumption as a web-service

The measurement of long-term success of the program can be better calibrated following the completion of the pilot project that is proposed. The initial goal is to achieve participation by 95% of counties within a 5 year timeframe.
1 VISION PROGRAM & GOALS

1.1 BACKGROUND

During 2007 and the first half of 2008 New York completed a comprehensive, statewide GIS strategic planning exercise that produced a Strategic Plan that set a vision and priorities for the next five years. Based on the deliberations of New York State GIS Coordinating Body (CB) and senior management at the New York State Office of Cyber Security and Critical Infrastructure Coordination (formerly CSCIC and now the Office of Cyber Security, or OCS), it was determined that “formally pursuing a program to develop a statewide parcel data layer” was one of the two highest priority programmatic recommendations from the Strategic Plan (see Section 5.2 of the Strategic Plan1) and that the next step was establishing a detailed business plan for that activity. Subsequently, OCS received a second Cooperative Agreements Program (CAP) grant from the USGS/FGDC to produce such a Parcel Business Plan.

This Parcel Business Plan provides key details of this recommendation, as further clarified by the State’s solicitation for this work, and presents a business case that supports the state and other levels of government making investments in implementing these recommendations. Several factors support OCS’s and the CB’s shared interest in statewide parcels:

- In New York, parcel data exist in some electronic form, or are in the process of being automated for all counties in the state. However, these data exist in a variety of formats and are of varying quality thereby limiting the utility for regional or statewide projects.

- Nationally, assembling statewide parcel inventories is becoming increasingly important and there is an emerging body of experience on both the utility of statewide parcels and approaches for constructing this kind of data resource.

In addition to these positive factors, there are several known challenges that are inhibiting progress towards a statewide parcel data resource in New York:

- Several counties obtain revenues from the sale of cadastral data and are concerned about losing this revenue source.

1 The strategic plan is available at: [http://www.nysgis.state.ny.us/coordinationprogram/stratplan/](http://www.nysgis.state.ny.us/coordinationprogram/stratplan/)
Many counties fear the loss of “control” over their data by sharing it with other government entities, especially the State. In particular, there is concern about the state further sharing their data to other parties without their knowledge or involvement.

1.2 CONTEXT & OBJECTIVES

Free, universal sharing of parcel data within New York has remained elusive in spite of several efforts to encourage and promote this kind of data sharing. The challenges with existing approaches are well understood and achieving this goal will not be an easy task. As such, this plan aims to lay out a pragmatic approach that generates near-term progress if not a comprehensive solution for the short-term. The approach presented in the plan aims to address stakeholder concerns directly and to the extent possible builds on existing data sharing mechanisms, such as the New York State Data Sharing Cooperative.

While it is important to acknowledge the sovereign responsibilities of counties and local municipalities regarding parcel data, it is also important to recognize the broader regional uses of parcel data and the local benefit and efficiencies that are derived by such applications. Examples include multi-jurisdictional watershed plans; efforts to address combined sewer overflow consent orders; meeting the requirements of municipal separate storm system regulations; addressing regional greenhouse gas emissions, including regional inventory requirements; metropolitan planning organization transportation planning, which includes regional analysis of land use patterns; and regional economic development initiatives in which robust and easily accessible parcel data affords a competitive edge. In addition, the challenge of emergency response in relation to natural disasters, severe weather events, and terrorist incidents are greatly assisted by the use of regional-scale, accurate, and accessible parcel data. All of these examples, though regional in scope, provide local benefits and economies of scale and efficiency that otherwise would not exist without a seamless statewide parcel data. Given the current economic climate, the sharing of data is an essential component to creating and maintaining such a data set.

Furthermore, this plan supports the vision for the National Spatial Data Infrastructure (NSDI) by creating a process where local, authoritative cadastral is compiled into a statewide data set and, in turn, can be integrated at a national level. Benefits at the national level echo those gained at the local and regional levels as NSDI will reduce duplication of effort and ensure that the best available cadastral information is used in decision making.
While the long term objective remains a **publicly available, statewide parcel data layer**, this plan focuses on the **practical, first steps** towards that goal that can be pursued and completed during the two year timeframe. This approach includes short-term pilot studies that leverage existing progress as well as encouraging further voluntary data sharing.

- **Process of building a statewide parcel data layer will be incremental** and will unfold over time. The process will begin with outreach aimed at counties that **willingly** share their data at present.

- **Further voluntary contributions of county data will be sought from all counties.** To encourage further contributions, parcels will be sought and accepted by OCS in an “as-is” format so that counties do not need to perform preparatory work to share their data with the state.

- **OCS will be responsible for taking on the work necessary to harmonize county contributions into a seamless data layer.**

The resulting parcel data collection will be **publicly available**; both as consumable web services and for data download.
2 REQUIREMENTS & COSTS

2.1 ORPTS SURVEY OF DIGITAL PARCEL DATA & TAX MAPPING STATUS

ORPTS conducts an annual survey to collect information on existing parcel data holdings at all levels of local government. Overall, the 2010 survey had excellent, but non-universal response from the counties and other jurisdictions (Westchester municipalities and the five boroughs of New York City were surveyed separately). Outside of NYC, 46 out of 57 counties participated (see map below).
In Westchester County, 24 out of 43 municipalities participated (see map below).

2.1.1 Survey Findings

The following overview of the 2010 survey aims to characterize parcel data, maintenance, and distribution practices throughout the state. These details about existing conditions ultimately helped inform the recommendations in this plan. Statistics presented in this section represent percentage of respondents, not percentage of the entire state.

* **Data Format:** While a majority of parcel data is most frequently maintained as Geodatabase polygon features (57%), other data formats and features types are widely used for digital
parcel maintenance including Geodatabase lines (25%), DWG polylines (25%) and lines (16%), Shapefile polygons (48%), Shapefile lines (16%), Coverage polygons (16%) and coverage lines (9%). Some counties maintain data in multiple formats.

★ **Data Update Frequency:** Respondents indicated that map updates are occurring on a daily basis for a majority of the state (66%), weekly for another 10% and an additional 24% are updating on a monthly basis. A backlog of map corrections and updates is virtually non-existent in the state with no respondents indicating a delay of more than 90 days.

★ **Source Materials:** County Real Property Directors were asked to describe the materials received from their local assessor for the purposes of map updates. Nearly 80% of respondents indicated that they receive a copy of a deed for parcel splits. Other common source materials include copies of revised tax maps, sketches, copies of index cards, and surveys.

★ **Completeness of Metadata:** Metadata maintenance appears to be a weak point in the parcel update process. A majority (60%) of respondents indicated that they do not maintain metadata in conjunction with tax maps. Of those that do maintain metadata, approximately 50% are conforming to the FGDC standard.

★ **Labor:** For departments maintaining parcel data in-house, an average of 2 staff and as many as 10 staff are assigned to this task. Often contract staff are hired to supplement in-house parcel maintenance efforts. Nearly 80% of respondents indicated that a vendor was used for the initial automation of parcel data.

★ **Map Extent:** Seamless local parcel data is an essential step toward statewide parcel data and it appears that most local data is maintained as either a seamless municipal-wide or countywide data set. However, nearly 60% of respondents indicated that digital data was maintained as individual map sheets. One cannot discern from the question whether map sheets are then aggregated into a seamless layer as a matter of course or whether current data only exists as disparate data files.

★ **Linking to Assessment Roll Information:** Nearly one-third of respondents skipped the question aimed at understanding which unique identifier allows linking to local assessment roll information. While this may indicate that the respondent simply did not know the answer off-hand, it may also indicate that parcel data is not consistently coded with an
attribute that will allow linking to the tax roll (such as an SBL format or Print Key). This perhaps explains the fact that nearly 60% of respondents could not identify the match rate between their parcel data and their assessment rolls.

- **Public Availability**: Most respondents indicated that assessment information is available online, and a majority of these (54%) provide access via an online web mapping application. Other types of public access include a variety of published map services, direct data download, or electronic distribution (via email, CD, or DVD). A handful of respondents are specifically using ImageMate Online to publish tax assessment information without maps.

- **Cost**: While 83% of respondents indicated that they charge for access to their tax assessment data, it is unclear from the survey whether agencies are charging fees for online access versus charging fees for distribution of actual data via download/CD/DVD. Thus, it is not clear whether the results represent the full set of counties that charge for data.2

## 2.1.2 Survey Assessment

A large percentage of the tax directors are fully versed on the range of technical options that can be implemented for efficient maintenance and access to parcel data. Most data is maintained in a seamless, modern data format that may be easily integrated into a statewide parcel data layer. The level of spatial accuracy and match rate to tax roll information is more difficult to extract from the survey as many respondents were not able to assess these characteristics and ORPTS does not provide any quality control for tax maps after their initial digital conversion.

Most counties provide some degree of access to tax maps via the Internet, with 57% of survey responses indicating they use GIS viewer applications for this purpose and a handful of respondents providing access to web map services. While the majority of respondents indicated they do not charge for data access (83%), several counties are collecting fees for access to their data.

After working with the 2010 survey data it is apparent that some improvements could be made to the structure of the survey questions to enable a more thorough analysis. For instance, most questions required the respondent to select one of multiple choices but offered no “other” option or room for

---

2 The ORPS survey question regarding fees for access was limited in that it did not differentiate between charging fees for online access vs. charging fees for distribution of actual data. In addition, it did not force counties to answer “Yes” or “No” on the question about charging for data and it is unclear whether the 8 positive responses represent the full set of counties that charge for data. Thus, results do not support detailed analysis of the type of access provided for free, or for fee.
comments. Ultimately, this may have skewed results or allowed for the loss of nuanced information that did not necessarily fit into one of the options. In addition, some information key to informing the implementation plan presented here was not captured in an optimal fashion. For instance, with regard to map extent, respondents were not asked to definitively describe the seamless extent of their data. If they responded that parcel data is maintained at both the county level and tax map sheet level, does this indicate that tax sheets are generated from seamless countywide data or that individual data files are maintained for each tax map sheet? This needs to be clarified in future surveys. Also, as mentioned above, the survey does not capture whether agencies are charging for online access versus charging for distribution of data files.

2.2 OVERVIEW OF APPROACH

The following general approach emanated from project team analysis and extensive discussions between the consulting team, OCS and the New York State Coordinating Body (CB). The CB, which includes stakeholders that create and manage parcel data as well as other stakeholders that have strong needs to consume parcel data, provided an excellent venue for exploring both the benefits that a statewide resource would provide as well as the legitimate concerns of county and local data custodians. The following approach emanated directly from a CB proposal made during a special meeting of the Coordinating Body explicitly on the topic of this project. This approach was designed to lower the barriers to parcel data sharing while also providing some tangible benefits to counties that are not currently sharing their parcels.

- Process of building a statewide parcel data layer will be incremental and will unfold over time. The process will begin with outreach aimed at counties that willingly share their data at present.

- Further voluntary contributions of county data will be sought from all counties. To encourage further contributions, parcels will be sought and accepted by OCS in an “as-is” format so that counties do not need to perform preparatory work to share their data with the state.

- OCS will be responsible for taking on the work necessary to harmonize county contributions into a seamless data layer.

The resulting parcel data collection will be publicly available; both as consumable web services and for data download.
2.3 DETAILS OF RECOMMENDED APPROACH

2.3.1 Organizational Approach

The Office of Cyber Security that operates the Statewide GIS Coordination Program will be responsible for leading this effort. The New York State Coordinating Body will continue to be briefed on this initiative and provide advisement on improving the program.

Given that New York state agencies are involved in overseeing county tax assessment and are also major consumers of parcel data it is recommended that OCS seek a broad-based and coordinated approach across state government. Potential collaborators include, but are not limited to:

★ The New York State Office of Real Property Tax Services (ORPTS) which has historically worked with counties on parcel mapping and tax assessment. The survey information presented above in Section 2.1 provides an example of ORPTS’s regular communications with the county tax mapping community. This kind of outreach could be extended in the context of a statewide parcel mapping initiative and regardless, ORPTS’s dialog with communities surrounding tax mapping should be aimed at electronic parcel mapping and not the historical hard copy orientation. For example, ORPTS maintains hard copy parcel mapping standards but does not maintain digital parcel mapping standards. The recent reorganization of ORPTS under the New York State Department of Taxation & Finance (NYSDTF) provides the potential for ORPTS’s role in parcel mapping to be reassessed and to evolve further. It should be noted that ORPTS has been engaged throughout the statewide parcel business planning process and is supportive of the concept and the plan.

★ The New York State Division of Budget (NYSDOB) is responsible for managing the state’s portfolio of “state owned parcels” and has strong internal needs for electronic parcel records. There has been recent outreach between OCS and NYSDOB and this should continue as NYSDOB could be a forceful advocate for statewide parcels and could potentially influence NYSDTF to consider reevaluating the potential for ORPTS to help catalyze broader parcel data sharing with the state.

★ The State Agency Advisory Group (SAAG) has identified strong needs for parcel data across many agencies as well as overlapping and redundant efforts aimed at collecting the data from counties on an individual basis. This group should be kept informed of the statewide
rather than specific parcel initiative and to the extent possible can help advocate for the initiative both within their agencies and via their interactions with local government.

Finally, there should be additional levels of active outreach and coordination between state government and county GIS programs. Generally, it will be more beneficial to persuade counties to participate than to try and compel their participation. Ultimately, further outreach and communication should help to highlight the opportunities and benefits of data sharing while also attempting to address legitimate local government concerns.

2.3.2 Standards

Accepting data from counties in an “as-is” format is a core element of the chosen approach as it will make broader participation more feasible. With this approach, there is not an immediate requirement to develop and implement a new, formal and comprehensive standard that counties need to meet. Rather, the Cadastral Data Work Group, with input from relevant stakeholders (e.g., counties, the CB) will develop a “statewide parcel data schema” which will be published and made available to stakeholders. This schema will act as a container for receiving county data that is obtained in a wide variety of formats. The development of the schema will be based on the existing, preliminary and basic NYS Cadastral Data Standard but will, at least initially, only require that parcel data are represented as a closed parcel polygon attributed with a unique parcel identification number. Section 2.3.4 provides a more detailed explanation of this approach.

Although the short term focus will be on collecting and harmonizing existing “as-is” data into the statewide parcel data schema, there is a longer term goal of encouraging the improvement of parcel data quality across the state. Articulating these improvements could take the form of an expanded data standard that goes beyond “parcel data formatting” and identifies data content, data accuracy and data documentation standards. This expanded data standard would benefit stakeholders by providing a consistent framework for the management and maintenance of parcel data, a format for the exchange and aggregation of tax parcel mapping and associated attributes, and minimum specifications for mapping accuracy and for the implementation of consistent and complete attribution. Planning and development of such a standard should be pursued in parallel with initial data collection and harmonizing activities. Such a standard might include guidelines for:

- **Data content** for both geometry and attributes
- **Data quality** for accuracy and consistency with an identified base map
- **Metadata** that describes the origin and lineage of parcel data sets
To the extent possible, any new New York State cadastral data standard should be consistent and compatible with existing standards such as federal standards promulgated by the Federal Geographic Data Committee (FGDC). These include:

- FGDC Metadata Standard
- FGDC Cadastral Data Content Standard

In the short term, OCS should promote the parcel schema as a feasible first step toward achieving the benefits of statewide parcels. After initial benefits have been realized, OCS should begin encouraging counties to adopt the more expanded parcel standard.

### 2.3.3 Existing Data Characteristics

The following enumerates the current characteristics of New York state parcel data. Please note that as described in Section 2.1, limitations in the ORPTS survey prevent a comprehensive quantification of the condition of county parcel characteristic.

1. **ORPTS Compliance Level**: Tax maps in New York, outside of New York City, have been determined by NYS ORPTS as having either full compliance or substantial compliance with Part 189 of the Rules and Regulations established by ORPTS. Substantial compliance was given to tax maps that were created before the Assessment Improvement Law was passed in 1970, and after they were upgraded to meet a reduced standard. In most cases, that reduced standard involved grid ticks being transcribed (usually from USGS quadrangle maps) onto the existing tax map sheets. Coordinate locator dots (centroids) were placed in the visual center of each tax parcel and coordinate values digitized or scaled from the grid ticks for each parcel centroid. The counties or municipalities were then required to provide the parcel numbers and associated coordinate values for each municipality to ORPTS. Generally, the counties and towns that received substantial compliance had non-standard parcel numbering and were not spatially accurate. Some of these have been upgraded to full compliance as part of digital conversion projects and some have not. The compliance level should be specified in metadata for each tax parcel data set.

2. **Digital Conversion**: Almost all of the counties in New York were converted from paper maps to digital between 1995 and 2007. ORPTS developed a parcel model for use with Esri Arc/Info in the mid-1990s as part of a contract with NYC DEP to manage a tax parcel conversion within the
NYC Watershed. In addition to the eight counties in the watershed, a few other counties adopted that parcel model, with the largest being Monroe County. Of the remaining non-watershed counties, approximately three counties were converted using the Microstation CAD software and most of the remaining counties were converted into an AutoCAD format, with GIS layers being exported using AutoCAD Map or Esri ArcCAD. Since 2003, counties have been upgrading their tax maps to Esri Geodatabase format with at least half of the tax maps now in that format, including New York City. The NYS GIS Coordinating Body adopted a parcel standard in 2007 which has been adopted by several local governments; however, most conversions to Geodatabase have not used a standard schema. In some instances, data on the original tax maps, such as easements and original subdivision information, were dropped during the conversion process.

3. **Tiling Structure:** ORPTS approved a “seamless municipal tax map” format in 1997 which allowed tax maps to be published from digital files tiled by municipality, rather than having an individual digital file for each tax section map. Most of the counties eventually adopted this format. As desktop computer capabilities evolved, some counties adopted a seamless countywide tax map format, although the actual data maintenance process is still usually organized by municipality. Some counties continue to maintain individual section map files and aggregate those files periodically for GIS applications.

4. **Boundary Issues:** As tax maps were digitized, it became apparent that many potential boundary issues existed between municipalities and counties. Some of these issues were reconciled when the conversions were being completed and some still exist. A few of the existing issues can only be resolved by boundary surveys and may require legislative action.

### 2.3.4 Statewide Data Aggregation

The initial approach for data aggregation will be to encourage counties to voluntarily share their parcel data in an “as-is” format. Participants will be asked to provide minimal parcel content such as a closed parcel polygon attributed with a unique parcel identification number, but will be strongly encouraged to include all tax map data layers and attributes with which they are comfortable sharing, in particular the minimal and suggested additional attributes listed in the NYS Cadastral Data Standard. Accepting data in “as-is” format means that those responsible for tax map maintenance will continue to manage their data using the technology and tools that they are familiar with and best meet their needs.
This approach recognizes that not all counties or municipalities have the same willingness to share parcel data:

- Some willingly share all data for free
- Some share data to public partners via the NYS Data Sharing Cooperative
- Some sell data for fees and have legitimate concerns about potential lost revenues
- Many share only access to data via web viewers, but not to the data themselves

Over time, participation should increase as counties better understand the program.

It is recommended that tax parcel map layers and ownership data be handled independently from tax assessment data. In most counties, assessors manage data locally (town, village, or city) and periodically provide assessment updates to their respective counties and to ORPTS. It is less often the case that assessment data is managed centrally with each assessor accessing their assessment data on a county server through a Citrix server arrangement or similar technology. This means that statewide, the assessment data only matches the tax maps on the taxable status date for each municipality – which may be March 1, May 1 or June 1 of each year. In many cases, by the time the ORPTS data is merged with parcels, the tax assessment information can be up to 1½ years out of date.

In all instances except Westchester County and New York City, tax maps are maintained by the County Real Property Tax Service. ORPTS requires each county to also maintain ownership history for each tax parcel for at least five years. In most counties, this ownership history is joined to the tax parcels for GIS applications because it almost always matches the tax map.

The recommended approach for statewide aggregation of parcel data is to:

1. Obtain the digital tax map and ownership data from counties and municipalities that are willing to participate (e.g., NYC, Ontario County, etc.). Assemble those data into a multi-county aggregation that will be published as a service and available for download. In addition, assemble and publish links to existing, individual parcel map services as a supplement to the data collection and aggregation effort. It is expected that over time, contributions to the aggregated model will increase as benefits are demonstrated.

2. Focus initial data management activities on standardizing the tax map layers ownership data obtained from counties
3. Perform a linkage and reconciliation QA/QC test on assessment data (i.e. attributes) that are obtained from ORPTS on an annual basis with the data being current to the respective taxable status dates.

4. Provide quality control reports on the success of linking parcel geometry and ORPTS assessment data to the Directors of Real Property Tax Services in the respective counties, including Westchester.

It should be anticipated that the data provided to ORPTS by the assessors will have some flaws, both spatial and attribute-related. The most likely problems will be tax parcels that do not have a corresponding assessment record or assessment records that are not reflected on the tax maps. Those errors, once identified, will need to be addressed at the county level. Spatial issues such as centroid values that do not fall within the appropriate tax parcels should also be identified and resolved. OCS should work with ORPTS to develop the QA/QC processes needed to identify these shortcomings and attempt to improve the data where feasible. Some issues will require local knowledge and will need to be resolved at the local level. This will require a sustained effort over time, but incremental progress should be possible.

2.3.5 Technological Approach

The approach described above will require the development and deployment of two classes of technology that are detailed in the sub-sections below:

1. Creation of a **repeatable process for extracting, transforming and loading (ETL)** the data received from counties in an “as-is” format into the “statewide parcel data schema” (described above in Section 2.3.2).

2. Creation of various **data services for publishing** and making the data available.

**2.3.5.1 COUNTY DATA ETL ENGINE**

The process of creating and running ETL routines and workflows is becoming increasingly common in a variety of information technology contexts such as data warehousing. The OCS is familiar with these technologies as they have become heavily engaged in ETL as part of their support of statewide broadband mapping. In general, ETL workflows are straightforward and involve:

* Obtaining source data
★ Documenting its “as-is” format

★ Identifying the target format for the translation (which in this case will be the “statewide parcel data schema” described above in Section 2.3.2)

★ Developing tools/scripts that will “transform” the data from the “as-is” format into the target schema. Ideally, the ETL routines are developed so that they can be run in a repeatable, automated way.

★ Validating that the transformation has been completed accurately

In order to develop parcel-specific ETL workflows the OCS will need to undertake the following tasks:

★ Identify appropriate staff for working on parcel data that are voluntarily supplied

★ Choose the appropriate ETL tools for parcel data (e.g., FME, Esri ArcGIS Interoperability Extension, etc.)

★ Perfect ETL routines on a county-by-county basis. ETL routines will vary based on the condition of the “as-is” data and may include but not be limited to the following types of transformations:
  ▪ Coordinate/projection/datum adjustments
  ▪ Feature class and attribute field re-mapping and re-naming
  ▪ Conversion into the statewide parcel data schema format
  ▪ Consolidation of individual tiles/municipal data sets into seamless, countywide data sets
  ▪ Application/correction of polygon topology and unique feature numbering by SBL

★ Assemble individual county data that has undergone ETL into a composite, multi-county data set that will potentially house statewide data over time

★ Develop a strategy for accepting “as-is” data updates from counties and re-running the ETL processes and re-integrating the results into the multi-county data set. A key component of this element is to work with counties to ensure that they can provide the same “as-is” data on a regular basis. If the “as-is” data changes format, then the ETL routines will need to be adapted and this can consume significant amounts of time.

Once the ETL routines are complete, OCS should plan on supplying the final, transformed data back to the counties. In some cases the ETL process may add value to the counties. For example if a county had
tiled CAD files and seamless GIS parcel data didn’t previously exist, the ETL process would provide a seamless GIS data set. Similarly, in other cases parcel data may not have previously been linked to assessment data. If this is the case, some counties may elect to utilize and update the transformed data going forward. In these cases, the OCS would be providing a valuable data processing service to counties that had not previously been able to achieve this level of seamless GIS data. Having counties adopt the “improved” post-ETL data would help simplify future data submissions from those communities and would potentially provide a value-add for their own internal operations. In other cases, returning the data to the counties would simply enable counties to validate that content was not lost during the ETL process.

For the long term, OCS should work towards a parcel data replication model. Under this model, counties would maintain a version of their parcel data in the statewide parcel data schema and updates could automatically be completed through server-to-server replication communications. When this technology can be established it will provide a data update capability with the lowest labor costs for both the counties and OCS and would thereby enable more frequent updating.

2.3.5.2 DATA PUBLICATION

One of the most fundamental elements of this program is that the state’s multi-county parcel data collection will be in the public domain. As such, an approach and infrastructure is needed to make the data publicly available. There are a variety of technologies that can be used to share statewide data sets:

- Providing a physical copy of the data for download
- Providing access to the data via a consumable web service
- Providing access to the data via a web viewer

While some counties already provide their data via web viewers and are mainly interested in fostering their own user communities, many communities would welcome state support for the hosting of web viewers to help reduce costs to local governments. Therefore it is recommended that, at least initially, OCS pursue implementation of the first two options and commence planning for the development and hosting of a shared, multi-county parcel web viewer to be implemented following the first year of the program. Given that OCS already publishes other data sets for download, services consumption, and web hosting this should not involve any significant new investments in technology or the development of new tools. Rather, this will require a series of decisions on the types of capabilities these services should supply. Potential options include:

- Data download unit(s):
- Entire data set (eventually statewide) and/or
- By county and/or
- By user defined area (e.g. clip box)

**Data download format(s):**
- Native Esri format (e.g., Geodatabase, file Geodatabase) and/or
- Simplified Esri format (e.g., SHP) and/or
- CAD format (e.g., DXF), etc.

**Type(s) of supported consumable services:**
- Open Geospatial Consortium (e.g. WMS, WFS)
- Native Esri ArcGIS Server
- KML (e.g., for consumption by Google Earth)
- Cached map/tile based services (e.g., parcel depictions on top of orthophotos)

Understanding that it will likely be some time before the state is able to publish a statewide service, it is appropriate to consider other supplemental activities that can help GIS end users both within, and outside of state government to locate the parcel data they need (i.e., those data sets that are not yet part of the multi-county data set). Thus it is recommended that OCS also construct a parcel data/services directory that can be easily accessed from the same place that multi-county parcel data set is published. This directory would be a simple inventory, including web-links to direct users to existing county resources, such as OCS’s “Online GIS Parcel Data Resources Inventory” spreadsheet, for obtaining both parcel data and access to consumable parcels services and data download/ordering. Absent having a single location to obtain all required data, a road map to finding existing data resources can be extremely valuable.

### 2.3.6 Human Resource Requirement

Given that OCS would take on the responsibilities for harmonizing “as-is”, voluntary contributions, the chosen approach will require some level of dedicated staff time devoted to obtaining the raw data, assembling and managing contributed parcel data. The amount of staff time required is hard to predict due to the fact that the number of counties that will voluntarily participate is unknown at present. A reasonable estimate is that 15-20 of the 62 counties (including NYC) would participate in the first year.

The activities that need to be staffed include, but are not limited to:

* Outreach and communication with stakeholders to identify and develop the statewide parcel data schema and to address any issues/concerns
After the first year, ongoing outreach to encourage additional counties to consider contributing their data and to encourage counties to contribute more than the minimal data content (e.g. additional attribute information)

- Liaison with county data providers
  - To collect existing data from voluntary contributors; and to return post-ETL data sets to contributors
  - To collect information on existing parcel data services and download capabilities from counties that choose not to contribute data

- Technology development and deployment
  - Development and execution of ETL scripts to transform contributed data into the statewide parcel data schema
  - Effort to integrate the multi-county data set with ORPTS assessment information and to develop QA/QC reports that can be returned to both ORPTS and counties
  - Deploying and managing the state’s own web services for mapping and download.

2.3.7 Risks

Implementing statewide parcels is not easy nor without risk. Currently, only a small minority of states – notably Montana, Tennessee and Delaware - have completed statewide parcel automation. The following provides an overview of the major risks that need to be avoided:

- **Failure to gain a critical mass of initial voluntary contributions and to gain momentum in obtaining new contributions over time.** Given that nearly all parcel data is maintained at the county level, steadily increasing participation from all counties is essential to constructing a statewide resource.

- **There is a reluctance to share digital parcel data with the state.** Even counties that have successfully created and maintain parcel data may not be willing to share these data with the state. This reluctance can emanate from several sources and will require active effort to overcome. Reasons for a reluctance to share include:
  - There is an inconsistent understanding and lack of awareness about the Freedom of Information Law (FOIL) and as a result the digital geospatial data distribution practices of counties and local governments vary widely. This can cause some confusion and frustration when people are trying to obtain these
types of public records. There is no clear precedent to follow when a county is establishing its data distribution practices. Ultimately the FOIL statute itself contains language that guides the process and it also sets up a process for both exemptions and challenges. While FOIL does not make a distinction between records and geospatial data, it should be made clear to counties and local governments that geospatial data is included in this statute. Until this is made clear, this issue will be addressed on a case by case basis via the FOIL challenge process, and potentially, litigation. Some communities “sell” their data and generate revenues that exceed the cost of duplication called for under FOIL. These communities may fear that freely sharing data will lead to lost revenues and understand that it is up to data requesters to initiate FOIL challenges.

* Concerns and potential misconceptions about the spatial accuracy of parcel boundaries and associated liability. In other words, some parcel data maintainers understand that their data are imperfect and are concerned about exposing information that is known to have problems. Experiences elsewhere have shown that proper disclaimers can alert users to the limitations of data, and more importantly that active use of data by others helps expose errors so that they can be corrected.

* There can be legitimate concerns over privacy issues related to property ownership information and related data in municipal tax parcel data. While these concerns may be made in good faith, these data are public records, including owner names (except in a few cases specified by legislation). Ultimately, property ownership involves asserting rights to property and the public is entitled to validate ownership claims via public access to the records. The technology to preserve privacy for the small number of legislated exceptions to this open data norm should be employed.

* Failure to successfully engage ORPTS in this effort and to sustain state government stakeholder support. One of the biggest challenges with GIS data in general is performing ongoing work to keep the data current in light of constant administrative and environmental changes. Parcel ownership changes and parcels get subdivided frequently. The program’s success will not be realized unless the processes are in place to help ensure that the parcels are kept current. Hence, it is critical that the support of ORPTS, who communicates with parcel data custodians on at least an annual basis, and other state government stakeholders is sustained as the program evolves.
3 PROGRAM BENEFITS & JUSTIFICATION

Parcel data are essential to GIS practitioners at all levels of government throughout the state. These data are useful in municipal and county operations, whether in planning and zoning, public health, building inspections, assessing, education, conservation, public safety or other departments. Parcel data are also used by county and state programs with regional goals or with involvement in specific sites, such as economic development, transportation infrastructure, broadband infrastructure planning, natural resource protection, land use and environmental permitting, large-scale emergency response and disaster recovery, energy facility siting, property management and other state agency missions. In short, investments in parcels will benefit a very broad cross section of government stakeholders at multiple levels of government.

3.1 TO GIS STAKEHOLDERS, IN GENERAL

- **Removal of duplication of effort within state government:** The 2008 Statewide Strategic Plan documented that at least 11 separate state agencies have a variety of needs for parcel data and spend their own agency resources collecting, processing, and storing these data.

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<thead>
<tr>
<th>AGENCY</th>
<th>PARCEL USE</th>
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<tbody>
<tr>
<td>Criminal Justice</td>
<td>▪ Geocoding</td>
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<td>▪ Crime prevention analysis</td>
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<td>DEC</td>
<td>▪ Property management</td>
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<td>▪ Abutters notification</td>
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<td>DEC Water</td>
<td>▪ Natural resource modeling</td>
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<td>▪ Drought management</td>
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<td>DEC Fish and Wildlife</td>
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<td>▪ Identifying land access for wildlife survey</td>
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<td>NY Canal Corporation</td>
<td>▪ Management of activities in right-of-way</td>
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<td>▪ Abutter notification</td>
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<td>▪ Economic development opportunities</td>
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<td>NY Thruway Authority</td>
<td>▪ Land holdings assessment</td>
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<td>NYS DOT</td>
<td>▪ Right of way assessment</td>
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<td>Public Health Research</td>
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<td>Secretary of State, Division of</td>
<td>Identification of non-point source pollution</td>
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<td>Coastal Resources</td>
<td>Open space acquisition</td>
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<td>State Museum</td>
<td>Identifying owners of oil and gas wells</td>
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<tr>
<td>State Parks</td>
<td>Open space land acquisition</td>
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Given that the Strategic Planning process did not comprehensively contact all state agencies (i.e. participating in the planning process was voluntary), it is likely that there is an even broader requirement for parcels. Assembling parcel data once for the benefit of all state government users will remove duplication of effort and will provide efficiencies. In addition, further efficiencies will be gained in the process of establishing the appropriate data sharing agreements.

* Federal government agencies also have business requirements for gaining access to parcel data for New York State and these agencies are currently expending resources to collect and process NY parcel data on a county-by-county basis. Several examples from the USDA include:

  o Farm Service Agency
    ▪ Provides efficient service to landowners receiving agency benefits
    ▪ Assists with updates to FSA GIS database of cooperator lands
  o Natural Resources Conservation Service
    ▪ Agency outreach for National Farm Bill programs through landowner notifications
    ▪ Development of landowner environmental conservation plans
    ▪ Assist Soil Survey planning and field work
    ▪ Identify contacts for National Rapid Carbon Assessment program spot check locations
    ▪ Provides efficiency in management of national easement initiatives

* Improved planning and decision making: Agencies require parcel data for activities as diverse as crime prevention and analysis to open space land acquisitions to right-of-way abutters’ assessment. Having these data readily available across the state will improve the ability of all levels of government to properly plan and manage these activities.
• **Improved management of state owned facilities**: The New York State Division of Budget manages the state’s own parcel holdings and has indicated that parcel data would be useful for assisting in the management of the state’s own real estate portfolio.

• **Improved quality of data**: Increased parcel data availability and accessibility will lead to increased use of data by wider numbers of people and, in turn, **increased use will lead to additional geometric/geographic data issues being uncovered as users report errors**. As supported by Jason Baum, GIS Coordinator for the Town of Bethlehem, “We all know how making the data visible can often lead to its improvement.” In addition to geometry improvements, OCS may complete quality control checks on the success of linking ORPTS data obtained from assessors with county-based tax parcel data. Such quality reports can assist counties in improving the linkage between their parcel data and assessment data that emanates from multiple municipalities to help ensure that all tax parcels are being assessed appropriately. It is understood that parcel data are imperfect and both county data and the multi-county data set should include appropriate disclaimers such as “Not appropriate for survey purposes”. Over time, data errors will be reduced and data will improve and participants should not be embarrassed by routine data problems.

### 3.2 TO COUNTIES IN PARTICULAR

Identifying county-based benefits is challenging due to the fact that different counties have different levels of GIS maturity and thus different perspectives on benefits. Some counties such as Westchester and Rockland have very mature systems with high-quality data and are largely self sufficient and able to actively publish and share their parcel data. Thus, they have a lower perception of the benefits of statewide parcel data availability. Other, smaller and more rural counties, such as Schuyler and Wyoming have less developed programs with poorer quality data that lacks associated metadata, and limited access to server-based software that allows them to publish and share their parcel data. These counties may perceive a **richer set of benefits if the state is able to provide data quality checks, metadata guidance and standardization, and data publication tools** as part of statewide parcel data program. With recent budget stresses additional counties may perceive these benefits as some counties have reportedly had to discontinue contracted provision of web services.

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3 Based on email sent to the project team on 1/28/2011.
Potential benefits to counties: While counties primarily require data only about their own jurisdictions, there are several opportunities where statewide approaches might provide benefits to the counties. These include:

- Currently, a single county may be asked to provide parcel data to as many as 11 separate state agencies via 11 separate data requests. With a statewide approach, a county would only need to provide the data to the state once, and the state could be responsible for sharing it amongst its own agencies.

- Consistent cadastral data will aid federal agencies in damage assessment during emergencies which could speed disaster funding allocation.

- Significant county staff time is spent fulfilling data orders, collecting fees, and accounting for fees obtained. In the end, the fees collected may not adequately cover the time expended to distribute the data. Centralized data access would reduce the high cost of selling and distributing cadastral data at the local level. This served as an incentive in New York City where they share their data because “the cost of selling data is too high and a money loser”.4

- Public safety situations such as a missing person’s search, or, conducting a large scale evacuation can benefit from access to detailed data from neighboring jurisdictions. Furthermore, state emergency response to, and planning for county and local governments can be made more efficient with centralized access to parcel data (e.g., for locating potential staging areas).

- County border disputes may be alleviated with access to parcel data for the adjoining communities. During the 2007-2008 statewide GIS strategic planning project, a wide variety of stakeholder reported a need to address these issues and confirmed that parcel data would support resolution of disputes.

- Statewide parcel data linked to property owner information would support “STAR exemption” checking to ensure that an owner is claiming only one primary residence.

- Broader regional sales comparisons become possible with statewide parcel data. Often, in rural areas there can be a need for cross-county sales comparison checks due to an inadequate number of “in county” comparable sales.

- The New York City Department of Environmental Protection is responsible for managing the water supply for all of NYC plus several upstate counties up-to-date digital parcel data is a critical component of this system. According to Matthew Schwab of NYCDEP, “Hundreds of DEP staff use this data every day to manage City lands, review private landowner applications for regulatory

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4 As verbalized during the January 26 Coordinating Body meeting.
approvals, support landowner solicitation for land acquisition and a myriad of other uses related to watershed protection and management. It is literally hard to imagine DEP operations without this critical data layer.\textsuperscript{5} A similar sentiment was expressed by Elisabeth DeGironimo of the Mohawk Valley Watershed.\textsuperscript{5} In short, significant local government resources are invested in maintaining this system to support management of regional water supply operations and watershed protection and statewide parcel data could help alleviate this local burden.

- While an admittedly a minor benefit, some rural counties develop snow mobile routes that cross county boundaries as a means of attracting winter tourists. Access to neighboring county parcel data would facilitate this planning activity\textsuperscript{7}. It is expected that there will be numerous additional minor benefits of this nature that will accrue due to improved parcel data availability across the state.

\textbf{New opportunities for benefits arise with consistent statewide parcel data:} An example of a new class of benefit that might arise if there was broad access to standardized parcel data would be the state potentially developing and hosting “shared applications” that would run against the multi-county parcel data set and could be made available to participating counties.\textsuperscript{8} These applications would be particularly valuable to counties that have less well developed GIS programs and limited technology and budget availability for application development. The following applications support common county workflows and could be feasibly developed and hosted back to participating counties:

- Automated tool for preparing “soil group worksheets” for agricultural parcels
- Automated tool for identifying DEC spills and hazards on parcels. Identifying these kinds of hazards can be a requirement for foreclosure proceedings
- Automated tool for identifying DEC wells and reservoirs on parcels
- Parcel abutter identification and owner notification within specified distances of a subject parcel or parcels.
- Wetland and Floodplain data overlay analysis with statewide parcels
- Administrative areas such as zoning, emergency services, school districts, and others are best maintained as an aggregation of parcels. Some of these cross county lines.

\textsuperscript{5} Email correspondence to project team January 25, 2011.
\textsuperscript{6} As verbalized during the January 26 Coordinating Body meeting.
\textsuperscript{7} Jeff Quackenbush, Oneida County, via conversation with Frank Winters of OCS.
\textsuperscript{8} A standardized municipal boundary map would serve as a valuable basemap to a multi-county parcel data set however existing accuracy issues would be costly to resolve (see the 2008 Strategic Plan for a full description).
4 IMPLEMENTATION PLAN

4.1 IMPLEMENTATION PROGRAM FOR NEAR TERM RESULTS

The following presents a structured implementation program for pursuing key elements of the overall vision. These key activities are presented below and are described in more detail above in Details of Recommended Approach (Section 2.3):

1. As described in Standards (Section 2.3.2), a key initial activity will be to assemble a group of stakeholders to work with OCS on the development of a “statewide parcel data schema”. This schema will act as a container for receiving county data that is obtained in a wide variety of formats and will, at least initially, only require a closed parcel polygon attributed with a unique parcel identification number.

2. The section Existing Data Characteristics (Section 2.3.3) enumerates the current characteristics of the New York state parcel data. The implementation program will require additional data assessment, building on the information collected via the ORPTS survey, to build a complete inventory of parcel data holdings and county practices for the entire state. This effort will involve identifying and documenting the following characteristics for each county:
   a. Parcel data availability (technology format, schema format, quality, currency, spatial accuracy, etc.)
   b. County “willingness to share” existing parcel data identifying the initial set of willing participants that would contribute data to this program (e.g., Ontario, New York City, etc.) and potentially rating other counties according to their likeliness for participation.
   c. Complete a full inventory of all available county on-line parcel data resources (i.e., viewers, consumable web services, data download). The online GIS Parcel Data Resources Inventory created by OCS would serve as an appropriate and useful starting point for this type of inventory.

3. To support the implementation program, appropriate Technology (Section 2.3.5) will need to be deployed by OCS. Key activities related to this deployment are described below:
a. Create a **repeatable process for extracting, transforming and loading (ETL)** (Section 2.3.5.1) the data received from initial counties in an “as-is” format into the “statewide parcel data schema” and validating that the transformation has been completed accurately. Ideally, at least 3 counties would be involved in the initial pilot project. OCS already has in place robust ETL tools that have supported recent broadband mapping efforts. As part of this activity, OCS will need to evaluate these existing ETL tools and determine whether any additional investments in ETL technology will need to be made to support the parcel program.

b. The implementation program will require that OCS publish contributed data using various technologies (Section 2.3.5.2). This will involve establishing an initial set of “data access services” for collected parcel data. Initial services should include data for download, with various options for user-defined extents, as well as a variety of consumable web service types. It is also recommended that OCS begin planning for the deployment and hosting of a shared, multi-county web-viewer application that would provide cost savings opportunities for participating counties.

c. Create an **on-line index of existing, available and consumable parcel resources** (i.e., viewers, consumable web services, data download) based on the results of the inventory completed as part of the “data assessment” phase of implementation.

4. The approach described here will require a substantial level of **Human Resources** (Section 2.3.6) devoted to obtaining the raw data, assembling and managing contributed parcel data. As described earlier, the amount of staff time required will depend on the number of counties that will voluntarily participate. Staff resource requirements presented here assume that approximately 15-20 of the 62 counties (including NYC) would participate in the first year of the implementation program. Staff activities to support the program will include:

   a. **Assessment of current OCS human resource availability** and assignment of pilot program tasks to appropriate staff. The pilot program is estimated to require a total of 0.5 FTE divided across several personnel categories:

       - Coordinator/GIS Analyst: 0.2 FTE to manage outreach and stakeholder discussions to create at an initial “statewide parcel data schema”. This level
of effort assumes that multiple drafts will be distributed, reviewed and edited prior to arriving at an acceptable initial schema.

- **Coordinator**: 0.1 FTE for outreach to counties to complete the “data assessment” inventories.

- **Programmer/Developer**: 0.1 FTE to perform ETL routine writing for at least 3 contributed parcel data sets

- **Web Developer**: 0.1 FTE to stand up consumable web services for OGC services and data download and to stand up a web-site for publishing county parcel data resources for counties that are not yet participating in the statewide parcel program.

b. Following the pilot project, OCS will need to **identify longer term staffing requirements** for operational management of statewide parcels. These requirements would likely be phased in over time as increasing numbers of counties choose to participate. The results of the pilot project specified above will be critical for properly estimating the long term staffing requirements.

5. The success of the implementation program presented here will require that certain Risk Mitigation activities are pursued. The following provides direct recommendations for addressing the risks that were identified in **Section 2.3.7** above:

a. Pursue **explicit direct communication and engagement to counties encouraging their participation** in the program. It will be important to demonstrate forward momentum for increased county parcel data contributions. Communications should be aimed at:

   - **Documenting participation trends** to better understand where promotional activities should be targeted

   - **Identifying positive “use cases” and testimonials** from participants.

   Examples of use cases that may emerge include:

   - Staff time saved by removing the need to respond to and fulfill data requests
- Hosting fees and application maintenance costs saved through participation in a multi-county, shared parcel viewer
- Documented support for regional emergency response following a severe weather event

- Equally, it will be important to document *use cases that address county concerns* including:
  - Comparison of historic data sale revenues to staff time saved by removal of data distribution burden
  - Documentation of improved spatial data accuracy and link to tax records through quality control reports and recommendations from OCS

- The benefits of the program should be documented, consolidated and quantified to the degree possible. Evidence of benefits presented in clear, quantifiable terms will garner further support for the program and participation by counties.

- Pursue explicit, direct communication and engagement with other key state agencies such as NYSDT&F, ORPTS and NYSDOB. These agencies should be aware of the program and cognizant of the progress that is being made.

6. As discussed above, outreach is an essential component to the recommended program for the purposes of encouraging county participation and risk mitigation. Outreach efforts to those who would benefit from the program should be sustained throughout implementation in order to maintain awareness, publicize milestone achievements, and build long-term support for the statewide parcel program. As described in Program Benefits & Justification (Section 3), these stakeholders would include municipal and county governments, Real Property Directors, State agencies (such as Criminal Justice, DEC, DEC Water, DEC Fish & Wildlife, NY Canal Corporation, NY Thruway Authority, DOT, Public Health Research, Division of Coastal Resources, State Museum, State Parks), and Federal agencies (such as USDA). Long-term outreach activities should include the development of a marketing plan and promotional materials that share the program details, present program progress, and
highlight use cases and testimonials from participants. Key venues for outreach include the annual meetings of the County RPTS Directors, County Assessors, Association of Counties, Association of Towns, Conference of Mayors and Municipal Officials, NYS Association of E911 Coordinators, Regional GIS Groups, and the NYS GIS Conference.

4.2 PHASING & MILESTONES

The following presents a general timeline for pursuing the activities identified above in **Section 2.1:**

<table>
<thead>
<tr>
<th>Activity</th>
<th>M1</th>
<th>M2</th>
<th>M3</th>
<th>M4</th>
<th>M5</th>
<th>M6</th>
<th>M7</th>
<th>M8</th>
<th>M9</th>
<th>M10</th>
<th>M11</th>
<th>M12</th>
<th>Future years</th>
</tr>
</thead>
</table>

4.3 BUDGET PLAN

At present, the budget requirements for this program include investments in OCS staff time (approximately 0.5 FTE) and technology to support the pilot activities described above in **Section 4.1** under “Human Resources” (item 4) and “Technology” (item 3). These staff and funding requirements are presented in the two tables on the following page:
Staff Requirements

<table>
<thead>
<tr>
<th>Program Activity</th>
<th>Human Resource Category</th>
<th>Human Resource Requirements (FTE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manage outreach to create initial statewide parcel schema</td>
<td>Coordinator/ Analyst</td>
<td>0.2</td>
</tr>
<tr>
<td>Complete data assessment inventory</td>
<td>Coordinator</td>
<td>0.1</td>
</tr>
<tr>
<td>Create ETL scripts for initial data sets</td>
<td>Programmer/ Developer</td>
<td>0.1</td>
</tr>
<tr>
<td>Stand up consumable web services, data download, and website for online parcel resources</td>
<td>Web Developer</td>
<td>0.1</td>
</tr>
<tr>
<td>TOTAL FTE REQUIREMENTS</td>
<td></td>
<td>0.5</td>
</tr>
</tbody>
</table>

Funding Requirements

<table>
<thead>
<tr>
<th>Program Activity</th>
<th>Technology Resource</th>
<th>Technology Resource Estimated Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stand up consumable web services, data download, and website for online parcel resources</td>
<td>Purchase new server</td>
<td>$10,000</td>
</tr>
<tr>
<td>TOTAL FUNDING REQUIREMENTS</td>
<td></td>
<td>$10,000</td>
</tr>
</tbody>
</table>

At present, it is anticipated that one FTE would be required to administer the program for the longer term. While staff time demands will increase as more counties begin to provide parcel data, the staff time required to maintain ETL scripts and deploy data access technologies will decrease. As described above, this FTE may need to be a combination of different staff categories that will likely include the following functions:
- Management: Program oversight and guidance
- Coordination: Continued outreach efforts and engagement with counties and state agencies
- GIS Analyst: Collect and inventory data assets
- Programmer/Developer: Maintain ETL routines
- Web developer: Maintain consumable web services, data download, and online resource web page as well as support planning for shared web viewer
5 MEASURING SUCCESS & RECALIBRATION

5.1 MEASURING SUCCESS

The twelve month timeline presented in Section 4.2 identifies several key milestones. The most obvious measure of success is to see whether those milestones have been met and whether the initiative is progressing according to schedule. The following provides a summary of key implementation milestones that will help to measure the success of this effort:

1. Complete full inventory of parcel data availability based on county “willingness to share” and all available county on-line parcel data resources by month 3.

2. Assemble a group of stakeholders to develop a “statewide parcel data schema” by month 4.

3. Identification of pilot study scope and implement an on-line index of existing, available and consumable parcel resources by month 6.

4. Pilot Program to collect and develop ETL routines into the statewide parcel data schema for counties that volunteer to contribute their data by month 9.

5. Stand up an initial set of “data access services” for contributed data by month 11.

As presented in this plan, the near-term objective is to develop a working model for receiving and harmonizing voluntary county parcel contributions into a standard, multi-county data set. Although statewide parcel data is the ultimate goal, it is unrealistic to expect that 100% of the state’s parcels can be assembled in a short amount of time. As such, success should be measured incrementally after the initial multi-county data sets become available. The following measure of success is based on county contribution targets for the next 5 years. Hopefully, this program will result in a parcel data collection with 95% county participation within the 5 year timeframe:

- Year 1: 25% of counties voluntarily contribute their data to OCS to create the initial “multi-county collection”
- Year 2: 35% of counties voluntarily contribute their data to OCS to the “multi-county collection”
- Year 3: 50% of counties voluntarily contribute their data to OCS to the “multi-county collection”
- Year 4: 70% of counties voluntarily contribute their data to OCS to the “multi-county collection”
- Year 5: 95% of counties voluntarily contribute their data to OCS to the “multi-county collection”
5.2 FEEDBACK & RECALIBRATION

New York has a good history of active engagement between the state GIS coordination program and GIS stakeholders both inside and outside of state government. The success of this plan will depend on maintaining this dialog and obtaining timely and relevant feedback from these stakeholders. To this end, it is recommended that:

- Active and ongoing education and briefing should be provided to both state and non-state GIS stakeholders
- Active input and comment on the approach being taken by OCS should be sought from both sets of stakeholders
- Ongoing input via the NYS Coordinating Body

The program should be prepared to recalibrate and reprioritize efforts based on early success and/or failures and be based on the input that is provided from GIS stakeholders.
APPENDICES

APPENDIX 1: Project Methodology
APPENDIX 2: Findings from Input from Local Government
APPENDIX 3: Summary Report of ORPTS Survey
APPENDIX 1: PROJECT METHODOLOGY

PROJECT TEAM. The development of this business plan was performed under the direction of the New York Office of Cyber Security with guidance and input from the New York State GIS Coordinating Body. The consulting team consisted of:

- Applied Geographics, Inc. (AppGeo)
- MRB Group
- Oswald Associates

PROJECT ACTIVITIES.

- **Kick-Off Meeting:** The team participated in a kick-off meeting with OCS to review management, communications, roles, schedule and task distribution. The meeting also identified terms and goals as well as policy issues that needed to be researched, evaluated and addressed in the Business Plan.

- **Coordinating Body Presentations:** Throughout the business planning process, several presentations were given by the consulting team, either in person or via conference call. Feedback received at the following Coordinating Body meetings was key to the development of the plan.
  - December 9, 2010
  - January 26, 2011 (special meeting)
  - March, 2011

- **Review and Analysis of Parcel Inventory Survey:** The team reviewed results of the ORPTS survey and evaluated the content and completeness and ability to address technical and policy issues based on the results.

- **Stakeholder Outreach - Meetings and Correspondence with Local Government Stakeholders:** The team conducted interviews with county and local governments in order to ensure that a diversity of opinions was collected to inform the development of the Business Plan.
  - Meeting with Essex and Warren Counties (September 2010)
  - Cattaraugus County (email correspondence)
  - Schenectady County (email correspondence)
  - Warren County (email correspondence)
- Ontario County (email correspondence)
- Westchester County (email correspondence)
- Rockland County (email correspondence)
- Nassau County (email correspondence)
- Suffolk County (email correspondence)
- County Real Property Tax Directors’ Meeting (October 2010)
- NYS Association of Counties Meeting (February 2011)
- Town of Bethlehem (email correspondence)
- New York City
  - Meeting with New York City Departments of Finance (DOF) and Information Technology and Telecommunications (DOITT) Representatives (January 2011)
  - New York City Department of Environmental Protection (email correspondence)

**First Draft of Business Plan:** Based on OCS guidance and stakeholder input via email and at the Coordinating Body meeting of January 26, 2011, the AppGeo team created an outline and initial draft of the business plan. The content reflected the required elements for the FGDC CAP grant as well as the priorities set by OCS and the CB.

**Second Draft of Business Plan:** Feedback from the initial draft was incorporated and details of the plan were fleshed out to create a full draft of the Business Plan. This availability of this draft will be announced at the Coordinating Body meeting took place on June 15, 2011 prior to the NY GeoSpatial Summit. Feedback will be requested in a timely manner for incorporation into the final version.

**Final Business Plan:** The business plan will be finalized following feedback on the second draft.
APPENDIX 2: FINDINGS FROM INPUT FROM LOCAL GOVERNMENT

As part of process of developing the Business Plan for Centralized Access to Consistent Cadastral Data for New York, input was solicited directly from specific County and local governments to determine both ideas on how such a program might be best framed and what major hurdles that needed to be overcome to insure its success. This included a geographically diverse group of counties representing both sophisticated GIS users as well as those not as knowledgeable on the technology. The counties contacted directly included: Essex, Warren, Cattaraugus, Ontario, Schenectady, Westchester, Rockland, Nassau, and Suffolk. Input was also obtained from New York City as well as from the Town of Bethlehem. In addition, presentations were made and discussions held at the New York State Association of County Directors of Real Property Tax Services Conference in Syracuse as well as the NYS Association of Counties Meeting in Albany to obtain additional input. Below are the summaries of the information obtained.

<table>
<thead>
<tr>
<th>MAJOR ISSUES NOTED</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Concern over loss of control of data.</td>
</tr>
<tr>
<td>2. Concern of loss of revenue from data sales.</td>
</tr>
<tr>
<td>3. Concern over unfunded State mandates.</td>
</tr>
<tr>
<td>4. Data sales show the “value” of parcel data to county upper management.</td>
</tr>
<tr>
<td>Lack of sales may diminish that perception of value.</td>
</tr>
<tr>
<td>5. Concern over quality (and age) of data currently available for use and distribution on national websites.</td>
</tr>
<tr>
<td>6. Concern over the amount of county resources required to respond to data requests by State &amp; Federal Agencies.</td>
</tr>
<tr>
<td>7. Need for demonstrations and training on any new system for counties.</td>
</tr>
<tr>
<td>8. A statewide cadastral program won’t succeed if Tax Directors don’t “buy in.”</td>
</tr>
<tr>
<td>9. There will be a significant influx of new Tax Directors shortly who may be more receptive to technology than current ones.</td>
</tr>
</tbody>
</table>
POTENTIAL INCENTIVES FOR PARTICIPATION IN A STATEWIDE PROGRAM

1. Obtain a group discount on software and maintenance.
2. Develop a tool that allows county staff to automatically update the statewide data.
3. Offer quality control for data.
4. Develop applications that could be used by County and local governments to enhance or leverage a statewide layer.
5. Provide centralized state web services and applications that would allow county governments to forgo hardware and software maintenance and application development costs.
6. Provide funding to assist Counties with putting data on-line as well as for certification training of County Real Property Tax Directors.
7. Reduce or eliminate County data distribution efforts for State and Federal government agencies.

• Input from meetings, phone calls and e-mail with County representatives

  o Meeting with Essex and Warren Counties – September 2010
    A meeting was held with Essex and Warren Counties in September 2010 to obtain input on important issues with both counties regarding cadastral data. Important details from the meeting were:
    – Both counties support public access to tax maps and assessment data.
    – Both counties sell this data. Their annual revenue has shrunk since the introduction of internet access and is:
      o Essex ~ $18,000
      o Warren ~ $25,000
    – Both counties share data for free if they can get something of value back in return (i.e. they provide local surveyors with digital parcel data and the surveyors return their surveys to the county.
    – Both counties use SDG Image Mate Online software with annual fees.
    – Both counties use Esri products (Warren – ArcGIS; Essex – ArcIMS)
    – Staff reductions – Warren saw a 40% reduction in staffing (5-3) with the advent of Internet access to their data. Essex did not see any reduction.
    – Warren has a GIS Coordinator. Essex does not have GIS staff.
    – Updating of assessment data – Warren County – Updates done regularly; Essex County – Updates done annually.

    – Counties will need demonstrations and training so that they understand the technology of any statewide cadastral program.
- The provision of software tools and/or services, such as quality control of the tax maps and attributes, or reconciliation of the digital tax maps with the corresponding RPS data, would be helpful to the counties.
- Presentations on the statewide parcel initiative could be given at regional meetings of the tax directors. If continuing education credits were given for the presentations, attendance would be likely to improve.
- The program won’t work if the tax directors don’t buy in.
- Develop automatic replication tools or services that would replicate data on a consistent time frame and send automatically to a central site.
- Is there a coordination role for the state to play that helps counties minimize their data distribution efforts?
- How would FOIL requests for data be handled?
- Keep assessment data separate from the tax map data that would be in a statewide database.
- With 1/3 of the county RPTS Directors expected to retire in the next 18 months, many new RPTS Directors will need training. Historically online training has not been embraced by the RPTS Directors and assessors. Is this attitude changing and is there a role for the state to assist with this?
- ORPTS has dropped funding in two areas: 1. Funding assistance needed to help them put their data online. 2. County RPTS Directors are no longer reimbursed for taking courses toward maintaining certification, once the director has accumulated the 24 credits required for one year. If funding opportunities occur, perhaps they could be leveraged to help fill the gaps in these two areas.

  o **Discussion with Cattaraugus County (Cattaraugus)** – A series of e-mails with Cattaraugus provided the following input:
    - The county has a cadastral data parcel viewer as a service (ArcIMS).
    - It had “open” parcel viewer, but county shut it down once they found out.
    - Surrounding counties were added at one point, but the county had to get rid of them because it one of their services went down, it also brought Cattaraugus’ down.
    - The county would have no trouble replicating its parcel data to a statewide program.
    - Data updates – County parcel lines get updated on the fly; assessment data gets created in March and updated 3 times a year.
    - The county would love to be able to refer state and federal government agencies to one “statewide” parcel service.

  o **Discussion with Schenectady County (Schenectady)** – In addition, to a proposal made by Mark Storti at a NYS GIS Coordinating Body Meeting, a series of e-mails with Schenectady provided the following input:
    - RPTS Directors are not versed in the technical GIS options. Directors’ hands have been tied by budget cuts and lack of support for State (money & technology knowledge).
    - ORPTS does not provide tax map QA/QC after initial digital conversion or other financial support when converting to Geodatabase. Grants are too ridged in requirements upon counties.
- Counties are sensitive to unfunded mandates and losses of revenue. They sometimes sell data to pay for GIS and equipment upgrades.
- The willingness to share parcel data varies greatly across counties.
- Private companies that request real property data expect to acquire that data at no cost or very minimal cost to them. These companies use data in their own products and charge their customers for product for fee. They are very reluctant to share data because of this.
- Local town and city governments are resistant to provide data to county when requested.
- State Agency or other agencies request data or want data but don’t give anything in return except on State GIS Clearinghouse.
- Lots of work on standards is needed. Standards should be developed by asking for input from the people that have the data.
- The State can help by:
  - Keeping the process simple
  - Providing tech support when needed
  - Being cooperative
- Participating counties will “lose control” (and feeling of ownership) of contributed data. As a result the State better be prepared to answer any questions and not send them back to counties.
- County IT departments need to be on board with any technological solution and be willing to host web map services.
- Counties should have access to RPS data without any State license fee.
- Counties are aware that the State is making life easier for themselves.
- There needs to be a process to resolve “border issues” between municipalities effectively.

- Warren County – Mike Swan – E-mail correspondence.
  - Mike Swan noted that, to be successful, any business plan develop must clearly identify how the counties would benefit from participating in a statewide (or even a regional pilot) cadastral program and must be able to answer the questions for the county of “What’s in it for me?”
  - He suggested that attractive incentives for counties to participate in the program would include:
    - The ability to obtain a group discount on software and maintenance; and
    - The development of a tool that allows county staff to just click on an icon once a day to automatically update the statewide data without any other work being required.

- Kevin Schultz – Ontario County – E-mail correspondence. Kevin Schultz noted that Esri already has NYS tax parcel boundaries on line.
- The County noted that privacy is still a major concern even recognizing the fact that parcels are public information.
- Incentives for the county to participate would include:
  - Expend less staff resources to fill data requests.
  - Currently Ontario County pays approximately $20k annually for RPSv4 (including municipalities). If this could be provided for free in exchange for the parcel layer, there would be broad support for the program.
  - Another suggestion from the County was to put the reassessment aide back in the budget as an incentive for participation.
Also, suggested that development of applications (desktop, web based, GPS, widgets, etc.) that could be used by county and local governments could enhance or leverage a statewide layer. He suggested that these applications could be distributed via the clearinghouse and help to create a more level playing field across the state. Suggestions for these applications included one for MS4 Storm water, where instead of giving each coalition grant funds to do the same thing as the guys next door, create a uniform MS4 storm water tool. He also suggested one for onsite Wastewater Treatment.

- **Sam Wear – Westchester County – E-mail correspondence.** Sam Wear stated that Westchester County does not maintain countywide digital tax parcel data. It has 26 tax mapping jurisdictions. The county obtains copies of these municipal tax maps.
  - The county hopes to be publishing a countywide digital tax parcel map service (WMS) that would contain minimal variables. There are no current plans to publish owner names and assessment values.
  - Sam sees no advantage in contributing to the “statewide cadastral database/clearinghouse” concept. He would instead encourage these same local governments to build the capacity and/or systems to direct external traffic to their map services that contain tax parcel content.

- **Doug Schuetz – Rockland County – E-mail correspondence.** Doug Schuetz noted that the majority of Rockland County’s data is now released through the county’s GIS Portal.
  - Data, such as the cadastral data, is only made available via its Portal for those with a License Agreement. Presently, they have agreements with various local governments as well as Federal and many State agencies. There is no fee for access to data for government agencies. However, there are restrictions as to its use. Fees do exist for other users.
  - Any possibilities for Rockland County to participate with the State would require the State’s strategy to be consistent with its digital data release policy, or would require an internal policy change.
  - Since its data exists in a central repository already, via its GIS Portal, it would want customers to continue to go through the county site for access. Without this, Rockland County feels that it would be a significant negative impact on its program.
  - Rockland County does not anticipate any savings or efficiencies to joining a statewide program as they already upload/update their data on the GIS Portal in the form of GIS data, maps and applications.
  - The County does not receive data requests for another county’s cadastral data.
  - They do not have any applications that would benefit from acquiring another county’s data.

- **Nassau County – Joe Jones – E-mail correspondence.**
  - Joe Jones believes that a statewide cadastral system should be designed providing access through web services with the data coming from the original source not the State.
  - One of the State’s first priorities should be to clean up their own ownership of parcels with appropriate government jurisdictions prior to commencing on Statewide parcels project. Nassau County has found the State (ORPTS) to have inaccurate parcels and poor knowledge of its inventory of parcels.
- Experience has shown that, when access to data has been given to the private sector, they do not refresh the data on a timely basis and the data is used in their own profit making goals, not providing an accurate representation to the public. Giving access to the data on a sneaker net basis or through State System to stale versions of the data would provide a disservice to taxpayers.
- Joe does not envision savings or efficiencies for Nassau County if it participates in a statewide program. It sees such a system causing the State transferring cost of supporting the system to the Counties while causing revenue (from data sales) being taken from the County.
- Nassau Counties is planning to expand upon their Cadastral access in the future through WEB Services.
- It is suggested that data correction incentives should be provided through the State. (ORPTS recently drastically reduced these services.)
- Joe notes that access to data from surrounding counties, if required, could come through arrangements with the other Counties such as MOU’s.

○ Suffolk County – Penny LaValle – E-mail correspondence. (Penny LaValle noted that her opinion does not necessarily reflect the County’s) – Penny expressed concern over the definition of the statewide cadastral program as well as who would be participating in it and how it would be related with the national program being discussed.
  - Penny noted Suffolk County data would need to be licensed (which would restrict its publication) to government entities. A fee based license would be required for any other organization or private entity.
  - Data access would only be allowed through the County’s web services.
  - As the County maintains its tax maps and obtains income from them, she does not envision any appreciable advantage to joining a statewide system at this time.
  - The County would be interested in considering incentives to participate in the program if they were attractive.

- Input from meetings, phone calls and e-mail with New York City representatives

  ○ Meeting with New York City Departments of Finance (DOF) and Information Technology and Telecommunications (DOITT) Representatives – January 2011
  A presentation was made to DOITT and DOF to obtain input from them and determine if NYC would contribute data to a statewide parcel data program. DOF provided a briefing on the NYC tax parcel mapping and data delivery process. Important details from the meeting were:
  - Quarterly data updates are provided to City agencies.
  - DOITT didn’t see any initial issues with providing quarterly updates (with no distribution restrictions) from NYC to a statewide plan after formal approval was obtained from DOF.
  - It was not likely that DOF would agree to change NYC’s ~ 860,000 parcels to meeting a new state cadastral standard if that was requested.
  - DOITT couldn’t provide web services (which would have daily updates) to a statewide cadastral data set at this time using their current resources because of concerns over internet traffic issues.
- NYC doesn’t have cadastral data from the counties surrounding NYC. Having this data might be of assistance at times for transportation, public safety and health issues.

○ Discussion with New York City Department of Environmental Protection (DEP) – A series of e-mails with DEP provided the following input:
  - DEP has invested significant resources in a state-of-the-art GIS system to support NYC water supply operations and watershed protection.
  - Up-to-date digital tax parcel data, including parcel shapes and associated assessment roll data are a critical component of the GIS.
  - Hundreds of DEP staff use this data every day to manage City lands, review private landowner applications for regulatory approvals, support landowner solicitation for land acquisition and a myriad of other uses related to watershed protection and management.
  - DEP has various data-sharing agreements with many of those counties to this day. However maintaining those relationships, and merging the myriad data models employed by different counties into a seamless, watershed-scale parcel dataset is a continuing challenge, and requires an ongoing and significant input of City resources.
  - DEP has an ongoing need for up-to-date tax parcel and assessment GIS data.
  - DEP would be extremely interested in any efforts to coordinate and simplify aggregation and dissemination of those datasets, including web download capability.

• Input from meetings, phone calls and e-mail with the Town of Bethlehem
  ○ Town of Bethlehem – Jason Baum – E-mail correspondence. Jason indicated that the State do the hard work to develop a statewide system with input by local government. He suggested that an incentive offered by the state for participation in such a program might be that the State would pay for ½ of a staff salary for 3 years to allow the Counties to work on the program while being properly compensated for the costs that they might incur.

• County Real Property Tax Directors’ Meeting – October 2010
  A presentation was made at the County Real Property Tax Directors’ meeting to obtain input on important issues with both counties regarding cadastral data. Important details from the meeting were:
  ○ Concern about loss of control of “their” data.
  ○ Concern about loss of revenue from sales.
  ○ Cost of sales greatly exceeded revenue in some cases, but sales was continued to show “value” of data.
  ○ Embracing of a statewide parcel data program would require incentives for large-scale adoption to occur.
    - Suggested “incentives” included:
      ○ State licensing of Esri software.
      ○ Funding.
      ○ Centralized state web services and applications that would allow county governments to forgo hardware and software maintenance and application development costs.
NYS Association of Counties Meeting – February 2011 – Mike Swan of Warren County made a presentation outlining the project and providing an update on its progress and early findings. No unfunded mandates, loss of control of their data, concern over inaccurate data currently being presented by private firms via the Internet, and concern over loss of revenue as well as State takeover of the real property tax data.
### ORPS & OCS Tax Map Questionnaire

#### 1. Select your County:

<table>
<thead>
<tr>
<th>County</th>
<th>Response Percent</th>
<th>Response Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Albany</td>
<td>1.6%</td>
<td>1</td>
</tr>
<tr>
<td>Allegany</td>
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</tr>
<tr>
<td>Broome</td>
<td>0.0%</td>
<td>0</td>
</tr>
<tr>
<td>Cattaraugus</td>
<td>1.6%</td>
<td>1</td>
</tr>
<tr>
<td>Cayuga</td>
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</tr>
<tr>
<td>Chautauqua</td>
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<td>0</td>
</tr>
<tr>
<td>Chemung</td>
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<td>0</td>
</tr>
<tr>
<td>Chenango</td>
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<td>Columbia</td>
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<td>Cortland</td>
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<td>Delaware</td>
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<td>Dutchess</td>
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<tr>
<td>Erie</td>
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<tr>
<td>Essex</td>
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<tr>
<td>Franklin</td>
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<tr>
<td>Fulton</td>
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<tr>
<td>Genesee</td>
<td>1.6%</td>
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</tr>
<tr>
<td>Greene</td>
<td>1.6%</td>
<td>1</td>
</tr>
<tr>
<td>Hamilton</td>
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</tr>
<tr>
<td>Herkimer</td>
<td>1.6%</td>
<td>1</td>
</tr>
<tr>
<td>County</td>
<td>Percent</td>
<td>Votes</td>
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<tr>
<td>-------------</td>
<td>---------</td>
<td>-------</td>
</tr>
<tr>
<td>Jefferson</td>
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</tr>
<tr>
<td>Lewis</td>
<td>1.6%</td>
<td>1</td>
</tr>
<tr>
<td>Livingston</td>
<td>1.6%</td>
<td>1</td>
</tr>
<tr>
<td>Madison</td>
<td>1.6%</td>
<td>1</td>
</tr>
<tr>
<td>Monroe</td>
<td>0.0%</td>
<td>0</td>
</tr>
<tr>
<td>Montgomery</td>
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</tr>
<tr>
<td>Nassau</td>
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<td>Niagara</td>
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<tr>
<td>Oneida</td>
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<td>0</td>
</tr>
<tr>
<td>Onondaga</td>
<td>1.6%</td>
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</tr>
<tr>
<td>Ontario</td>
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</tr>
<tr>
<td>Orange</td>
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<tr>
<td>Orleans</td>
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<tr>
<td>Oswego</td>
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</tr>
<tr>
<td>Otsego</td>
<td>1.6%</td>
<td>1</td>
</tr>
<tr>
<td>Putnam</td>
<td>1.6%</td>
<td>1</td>
</tr>
<tr>
<td>Rensselaer</td>
<td>1.6%</td>
<td>1</td>
</tr>
<tr>
<td>Rockland</td>
<td>0.0%</td>
<td>0</td>
</tr>
<tr>
<td>Saratoga</td>
<td>1.6%</td>
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<td>Schenectady</td>
<td>1.6%</td>
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</tr>
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<td>Schoharie</td>
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<tr>
<td>Schuyler</td>
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<td>St Lawrence</td>
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<tr>
<td>Steuben</td>
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<tr>
<td>County</td>
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<td>Count</td>
</tr>
<tr>
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<td>----------</td>
<td>-------</td>
</tr>
<tr>
<td>Suffolk</td>
<td>1.6%</td>
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</tr>
<tr>
<td>Sullivan</td>
<td>1.6%</td>
<td>1</td>
</tr>
<tr>
<td>Tioga</td>
<td>1.6%</td>
<td>1</td>
</tr>
<tr>
<td>Tompkins</td>
<td>1.6%</td>
<td>1</td>
</tr>
<tr>
<td>Ulster</td>
<td>1.6%</td>
<td>1</td>
</tr>
<tr>
<td>Warren</td>
<td>1.6%</td>
<td>1</td>
</tr>
<tr>
<td>Washington</td>
<td>1.6%</td>
<td>1</td>
</tr>
<tr>
<td>Wayne</td>
<td>1.6%</td>
<td>1</td>
</tr>
<tr>
<td>Westchester</td>
<td>25.4%</td>
<td>16</td>
</tr>
<tr>
<td>Wyoming</td>
<td>1.6%</td>
<td>1</td>
</tr>
<tr>
<td>Yates</td>
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</tr>
</tbody>
</table>

answered question 63
skipped question 0

2. First and Last Name:

<table>
<thead>
<tr>
<th>Response</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>63</td>
</tr>
</tbody>
</table>

answered question 63
skipped question 0

3. E-Mail Address:

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<thead>
<tr>
<th>Response</th>
<th>Count</th>
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<tbody>
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<td>63</td>
</tr>
</tbody>
</table>

answered question 63
skipped question 0
### 4. Phone Number:

<table>
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<tr>
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<th>Count</th>
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<tr>
<td>Answered question</td>
<td>63</td>
</tr>
<tr>
<td>Skipped question</td>
<td>0</td>
</tr>
</tbody>
</table>

### 5. Best method to contact you in case of follow-up questions:

<table>
<thead>
<tr>
<th>Method</th>
<th>Response Percent</th>
<th>Response Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>E-Mail</td>
<td>90.5%</td>
<td>57</td>
</tr>
<tr>
<td>Phone</td>
<td>9.5%</td>
<td>6</td>
</tr>
</tbody>
</table>

| Answered question | 63 |
| Skipped question | 0  |
6. Please select your Municipality below:

<table>
<thead>
<tr>
<th>Municipality</th>
<th>Response Percent</th>
<th>Response Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bedford (T)</td>
<td>6.3%</td>
<td>1</td>
</tr>
<tr>
<td>Cortlandt (T)</td>
<td>6.3%</td>
<td>1</td>
</tr>
<tr>
<td>Eastchester (T)</td>
<td>6.3%</td>
<td>1</td>
</tr>
<tr>
<td>Greenburgh (T)</td>
<td>0.0%</td>
<td>0</td>
</tr>
<tr>
<td>Harrison (T)</td>
<td>0.0%</td>
<td>0</td>
</tr>
<tr>
<td>Lewisboro (T)</td>
<td>0.0%</td>
<td>0</td>
</tr>
<tr>
<td>Mamaroneck (T)</td>
<td>6.3%</td>
<td>1</td>
</tr>
<tr>
<td>Mount Kisco (T)</td>
<td>0.0%</td>
<td>0</td>
</tr>
<tr>
<td>Mount Pleasant (T)</td>
<td>0.0%</td>
<td>0</td>
</tr>
<tr>
<td>Mount Vernon (C)</td>
<td>6.3%</td>
<td>1</td>
</tr>
<tr>
<td>New Castle (T)</td>
<td>6.3%</td>
<td>1</td>
</tr>
<tr>
<td>New Rochelle (C)</td>
<td>6.3%</td>
<td>1</td>
</tr>
<tr>
<td>North Castle (T)</td>
<td>6.3%</td>
<td>1</td>
</tr>
<tr>
<td>North Salem (T)</td>
<td>6.3%</td>
<td>1</td>
</tr>
<tr>
<td>Ossining (T)</td>
<td>0.0%</td>
<td>0</td>
</tr>
<tr>
<td>Peekskill (C)</td>
<td>0.0%</td>
<td>0</td>
</tr>
<tr>
<td>Pelham (T)</td>
<td>6.3%</td>
<td>1</td>
</tr>
<tr>
<td>Pound Ridge (T)</td>
<td>0.0%</td>
<td>0</td>
</tr>
<tr>
<td>Rye (T)</td>
<td>6.3%</td>
<td>1</td>
</tr>
<tr>
<td>Rye (C)</td>
<td>0.0%</td>
<td>0</td>
</tr>
<tr>
<td>Scarsdale (T)</td>
<td>6.3%</td>
<td>1</td>
</tr>
<tr>
<td>Somers (T)</td>
<td>6.3%</td>
<td>1</td>
</tr>
<tr>
<td>White Plains (C)</td>
<td>6.3%</td>
<td>1</td>
</tr>
</tbody>
</table>
### 7. How many parcels are in the entire county or municipality?

<table>
<thead>
<tr>
<th>Number of parcels:</th>
<th>Response Average</th>
<th>Response Total</th>
<th>Response Count</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>61,108.00</td>
<td>3,544,264</td>
<td>58</td>
</tr>
</tbody>
</table>

- **answered question**: 58
- **skipped question**: 5

### 8. How many map sheets do you have?

<table>
<thead>
<tr>
<th>Number of Map Sheets:</th>
<th>Response Average</th>
<th>Response Total</th>
<th>Response Count</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1,041.76</td>
<td>60,422</td>
<td>58</td>
</tr>
</tbody>
</table>

- **answered question**: 58
- **skipped question**: 5

### 9. Are you maintaining tax maps digitally or manually?

<table>
<thead>
<tr>
<th></th>
<th>Response Percent</th>
<th>Response Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>digitally</td>
<td>96.6%</td>
<td>56</td>
</tr>
<tr>
<td>manually</td>
<td>3.4%</td>
<td>2</td>
</tr>
</tbody>
</table>

- **answered question**: 58
- **skipped question**: 5
10. Where applicable, what is the time frame from recording the deed to submitting the information to the Assessor?

<table>
<thead>
<tr>
<th>Response</th>
<th>Percent</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not Applicable</td>
<td>10.3%</td>
<td>6</td>
</tr>
<tr>
<td>Weeks:</td>
<td>89.7%</td>
<td>52</td>
</tr>
</tbody>
</table>

answered question 58
skipped question 5

11. Are approved tax map SBL numbers used to describe the parcel on the assessment roll?

<table>
<thead>
<tr>
<th>Response</th>
<th>Percent</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>93.1%</td>
<td>54</td>
</tr>
<tr>
<td>No</td>
<td>6.9%</td>
<td>4</td>
</tr>
</tbody>
</table>

answered question 58
skipped question 5

12. How often are tax map sheets updated or revised?

<table>
<thead>
<tr>
<th>Response</th>
<th>Percent</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daily</td>
<td>65.5%</td>
<td>38</td>
</tr>
<tr>
<td>Weekly</td>
<td>10.3%</td>
<td>6</td>
</tr>
<tr>
<td>Monthly</td>
<td>24.1%</td>
<td>14</td>
</tr>
</tbody>
</table>

answered question 58
skipped question 5
### 13. What backlog, if any, exists for tax map corrections/updates as of taxable status date?

<table>
<thead>
<tr>
<th>Response</th>
<th>Percent</th>
<th>Response Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>No backlog exists</td>
<td>44.8%</td>
<td>26</td>
</tr>
<tr>
<td>Less than 90 days</td>
<td>55.2%</td>
<td>32</td>
</tr>
<tr>
<td>More than 90 days -- please explain:</td>
<td>0.0%</td>
<td>0</td>
</tr>
</tbody>
</table>

Answered question: 58  
Skipped question: 5

### 14. Where applicable, when you have a split in a parcel, what do you give to the assessor?

<table>
<thead>
<tr>
<th>Response</th>
<th>Percent</th>
<th>Response Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not Applicable</td>
<td>19.0%</td>
<td>11</td>
</tr>
<tr>
<td>Material and/or data provided (e.g. parcel split sheet, map and deed, digital copy, etc.):</td>
<td>81.0%</td>
<td>47</td>
</tr>
</tbody>
</table>

Answered question: 58  
Skipped question: 5

### 15. When you have a split in a parcel, are copies of deeds provided to the assessor?

<table>
<thead>
<tr>
<th>Response</th>
<th>Percent</th>
<th>Response Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not Applicable</td>
<td>13.8%</td>
<td>8</td>
</tr>
<tr>
<td>Yes</td>
<td>79.3%</td>
<td>46</td>
</tr>
<tr>
<td>No</td>
<td>6.9%</td>
<td>4</td>
</tr>
</tbody>
</table>

Answered question: 58  
Skipped question: 5
16. Where applicable, are a set of updated tax maps provided to the assessors annually?

<table>
<thead>
<tr>
<th>Response</th>
<th>Percent</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not Applicable</td>
<td>17.2%</td>
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</tr>
<tr>
<td>Yes</td>
<td>82.8%</td>
<td>48</td>
</tr>
<tr>
<td>No</td>
<td>0.0%</td>
<td>0</td>
</tr>
</tbody>
</table>

Answered question: 58  
Skipped question: 5

17. Where applicable, when there is a change in the acreage of a parcel, do you send a revised map to the assessor?

<table>
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<tr>
<th>Response</th>
<th>Percent</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not Applicable</td>
<td>17.2%</td>
<td>10</td>
</tr>
<tr>
<td>Yes</td>
<td>74.1%</td>
<td>43</td>
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<tr>
<td>No</td>
<td>8.6%</td>
<td>5</td>
</tr>
</tbody>
</table>

Answered question: 58  
Skipped question: 5

18. Are the parcel coordinate locator numbers maintained on a computerized assessment roll?

<table>
<thead>
<tr>
<th>Response</th>
<th>Percent</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>91.4%</td>
<td>53</td>
</tr>
<tr>
<td>No</td>
<td>8.6%</td>
<td>5</td>
</tr>
</tbody>
</table>

Answered question: 58  
Skipped question: 5
19. In what projection are tax maps maintained?

<table>
<thead>
<tr>
<th>Projection</th>
<th>Response Percent</th>
<th>Response Count</th>
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</thead>
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<tr>
<td>NAD27</td>
<td>17.2%</td>
<td>10</td>
</tr>
<tr>
<td>NAD83</td>
<td>77.6%</td>
<td>45</td>
</tr>
<tr>
<td>Both</td>
<td>5.2%</td>
<td>3</td>
</tr>
</tbody>
</table>

answered question 58
skipped question 5

20. How many staff are assigned to tax-map maintenance?

<table>
<thead>
<tr>
<th>Staff Type</th>
<th>Response Average</th>
<th>Response Total</th>
<th>Response Count</th>
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</thead>
<tbody>
<tr>
<td>In-House Staff</td>
<td>2.10</td>
<td>122</td>
<td>58</td>
</tr>
<tr>
<td>Contract Staff</td>
<td>0.34</td>
<td>20</td>
<td>58</td>
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</table>

answered question 58
skipped question 5

21. Tax Map Conversion Status

<table>
<thead>
<tr>
<th>Status</th>
<th>Response Percent</th>
<th>Response Count</th>
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</thead>
<tbody>
<tr>
<td>In Progress</td>
<td>10.3%</td>
<td>6</td>
</tr>
<tr>
<td>Completed</td>
<td>89.7%</td>
<td>52</td>
</tr>
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</table>

answered question 58
skipped question 5
22. Please provide the date that your conversion is scheduled to be completed or was completed.

<table>
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<tr>
<th>Response</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>58</td>
</tr>
</tbody>
</table>

- answered question: 58
- skipped question: 5

23. Vendor used to complete the conversion

<table>
<thead>
<tr>
<th>Vendor Used:</th>
<th>Response Percent</th>
<th>Response Count</th>
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</thead>
<tbody>
<tr>
<td>Not Applicable</td>
<td>20.7%</td>
<td>12</td>
</tr>
<tr>
<td>Vendor Used:</td>
<td>79.3%</td>
<td>46</td>
</tr>
</tbody>
</table>

- answered question: 58
- skipped question: 5
### 24. What Digital Maintenance Software is being used for editing?

<table>
<thead>
<tr>
<th>Software</th>
<th>Response Percent</th>
<th>Response Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arc/Info</td>
<td>22.4%</td>
<td>13</td>
</tr>
<tr>
<td>ArcGIS - Coverage</td>
<td>12.1%</td>
<td>7</td>
</tr>
<tr>
<td>ArcGIS - GeoDatabase</td>
<td>53.4%</td>
<td>31</td>
</tr>
<tr>
<td>AutoCad</td>
<td>31.0%</td>
<td>18</td>
</tr>
<tr>
<td>Novalis</td>
<td>0.0%</td>
<td>0</td>
</tr>
<tr>
<td>Other</td>
<td>10.3%</td>
<td>6</td>
</tr>
</tbody>
</table>

answered question 58

skipped question 5

### 25. Do you maintain Digital Tax Maps?

<table>
<thead>
<tr>
<th>Response</th>
<th>Response Percent</th>
<th>Response Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>96.6%</td>
<td>56</td>
</tr>
<tr>
<td>No</td>
<td>3.4%</td>
<td>2</td>
</tr>
</tbody>
</table>

answered question 58

skipped question 5
**26. What extent(s) are your digital Tax Maps maintained? (Check all that apply)**

<table>
<thead>
<tr>
<th>Extent</th>
<th>Response Percent</th>
<th>Response Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual Sheets</td>
<td>58.9%</td>
<td>33</td>
</tr>
<tr>
<td>By Municipality</td>
<td>73.2%</td>
<td>41</td>
</tr>
<tr>
<td>Countywide</td>
<td>44.6%</td>
<td>25</td>
</tr>
</tbody>
</table>

answered question 56
skipped question 7

**27. What Data Formats are these maps and specifically your parcels maintained in? (Check all that apply)**

<table>
<thead>
<tr>
<th>Data Format</th>
<th>Response Percent</th>
<th>Response Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>DWG – Closed Polylines</td>
<td>25.0%</td>
<td>14</td>
</tr>
<tr>
<td>DWG – Lines</td>
<td>16.1%</td>
<td>9</td>
</tr>
<tr>
<td>Shapefile – Polygons</td>
<td>48.2%</td>
<td>27</td>
</tr>
<tr>
<td>Shapefile – Lines</td>
<td>16.1%</td>
<td>9</td>
</tr>
<tr>
<td>Geodatabase – Polygons</td>
<td>57.1%</td>
<td>32</td>
</tr>
<tr>
<td>Geodatabase – Lines</td>
<td>25.0%</td>
<td>14</td>
</tr>
<tr>
<td>Coverage – Polygons</td>
<td>16.1%</td>
<td>9</td>
</tr>
<tr>
<td>Coverage – Lines</td>
<td>8.9%</td>
<td>5</td>
</tr>
<tr>
<td>Other – Polygons or Lines. Specify Software program and data format:</td>
<td>7.1%</td>
<td>4</td>
</tr>
</tbody>
</table>

answered question 56
skipped question 7
### 28. Do you have the ability to attach Assessment Roll information to your Tax Maps?

<table>
<thead>
<tr>
<th>Response</th>
<th>Response Percent</th>
<th>Response Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>78.6%</td>
<td>44</td>
</tr>
<tr>
<td>No</td>
<td>21.4%</td>
<td>12</td>
</tr>
</tbody>
</table>

- answered question 56
- skipped question 7

### 29. What is your approximate percent mismatch rate from Assessment Roll to Tax Map?

<table>
<thead>
<tr>
<th>Response</th>
<th>Response Percent</th>
<th>Response Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unknown</td>
<td>59.1%</td>
<td>26</td>
</tr>
<tr>
<td>Percentage:</td>
<td>40.9%</td>
<td>18</td>
</tr>
</tbody>
</table>

- answered question 44
- skipped question 19
### 30. How often are these attributes updated?

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Response Percent</th>
<th>Response Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daily</td>
<td>38.6%</td>
<td>17</td>
</tr>
<tr>
<td>Weekly</td>
<td>2.3%</td>
<td>1</td>
</tr>
<tr>
<td>Monthly</td>
<td>18.2%</td>
<td>8</td>
</tr>
<tr>
<td>March 1 Roll Cycle</td>
<td>18.2%</td>
<td>8</td>
</tr>
<tr>
<td>July 1 Roll Cycle</td>
<td>25.0%</td>
<td>11</td>
</tr>
<tr>
<td>Annually on:</td>
<td>6.8%</td>
<td>3</td>
</tr>
</tbody>
</table>

- answered question 44
- skipped question 19

### 31. What parcel identifier could be used to attach Assessment Roll information to your Tax Maps?

<table>
<thead>
<tr>
<th>Identifier</th>
<th>Response Percent</th>
<th>Response Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>16 Digit SBL</td>
<td>13.6%</td>
<td>6</td>
</tr>
<tr>
<td>20 Digit SBL</td>
<td>22.7%</td>
<td>10</td>
</tr>
<tr>
<td>26 Digit SBL</td>
<td>13.6%</td>
<td>6</td>
</tr>
<tr>
<td>Print Key</td>
<td>45.5%</td>
<td>20</td>
</tr>
<tr>
<td>Other – Please explain:</td>
<td>4.5%</td>
<td>2</td>
</tr>
</tbody>
</table>

- answered question 44
- skipped question 19
### 32. Do you maintain metadata in conjunction with your tax maps?

<table>
<thead>
<tr>
<th>Response</th>
<th>Percent</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>40.0%</td>
<td>22</td>
</tr>
<tr>
<td>No</td>
<td>60.0%</td>
<td>33</td>
</tr>
</tbody>
</table>

answered question 55  
skipped question 8

### 33. What format is your Metadata maintained in?

<table>
<thead>
<tr>
<th>Response</th>
<th>Percent</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complete FGDC Metadata</td>
<td>50.0%</td>
<td>12</td>
</tr>
<tr>
<td>Limited FGDC Metadata</td>
<td>29.2%</td>
<td>7</td>
</tr>
<tr>
<td>Other Metadata Format</td>
<td>20.8%</td>
<td>5</td>
</tr>
</tbody>
</table>

answered question 24  
skipped question 39

### 34. Is your Assessment Information available to the public via the internet or other electronic method?

<table>
<thead>
<tr>
<th>Response</th>
<th>Percent</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>87.3%</td>
<td>48</td>
</tr>
<tr>
<td>No</td>
<td>10.9%</td>
<td>6</td>
</tr>
<tr>
<td>No, but planned within next year</td>
<td>1.8%</td>
<td>1</td>
</tr>
</tbody>
</table>

answered question 55  
skipped question 8
35. What methods are used to make your Assessment Information available to the public?

<table>
<thead>
<tr>
<th>Method</th>
<th>Response Percent</th>
<th>Response Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Online mapping application</td>
<td>54.2%</td>
<td>26</td>
</tr>
<tr>
<td>Published map service - ArcIMS</td>
<td>16.7%</td>
<td>8</td>
</tr>
<tr>
<td>Published map service - ArcGIS Server SOAP/REST</td>
<td>8.3%</td>
<td>4</td>
</tr>
<tr>
<td>Published map service - Web Map Service (WMS)</td>
<td>4.2%</td>
<td>2</td>
</tr>
<tr>
<td>Published map service - Web Feature Service (WFS)</td>
<td>4.2%</td>
<td>2</td>
</tr>
<tr>
<td>Published map service - KML</td>
<td>0.0%</td>
<td>0</td>
</tr>
<tr>
<td>Published map service - Other</td>
<td>2.1%</td>
<td>1</td>
</tr>
<tr>
<td>Direct Download – Maps Only</td>
<td>12.5%</td>
<td>6</td>
</tr>
<tr>
<td>Direct Download – Attributes Only</td>
<td>4.2%</td>
<td>2</td>
</tr>
<tr>
<td>Direct Download – Both Maps &amp; Attributes</td>
<td>8.3%</td>
<td>4</td>
</tr>
<tr>
<td>Distribution by CD/DVD</td>
<td>35.4%</td>
<td>17</td>
</tr>
<tr>
<td>Distribution by Email</td>
<td>25.0%</td>
<td>12</td>
</tr>
<tr>
<td>Other -- Please Explain:</td>
<td>39.6%</td>
<td>19</td>
</tr>
</tbody>
</table>

answered question 48

skipped question 15
### 36. URL:

<table>
<thead>
<tr>
<th>Response</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>48</td>
</tr>
</tbody>
</table>

- answered question 48
- skipped question 15

### 37. Do you charge for this access?

<table>
<thead>
<tr>
<th>Response</th>
<th>Percent</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>16.7%</td>
<td>8</td>
</tr>
<tr>
<td>No</td>
<td>83.3%</td>
<td>40</td>
</tr>
</tbody>
</table>

- answered question 48
- skipped question 15

### 38. General Comments

<table>
<thead>
<tr>
<th>Response</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>11</td>
</tr>
</tbody>
</table>

- answered question 11
- skipped question 52
Business Plan for
Statewide Parcel Data
Development & Maintenance
For the
Commonwealth of Massachusetts
June 2011
produced by
AppGeo
For
MASS GIS
Part of the Information Technology Division
This Plan was funded by the US Geological Survey
Through a National Spatial Data Infrastructure Cooperation Agreements Program Grant
Award # G10AC00174
This document was produced by Applied Geographics, Inc. (AppGeo) under contract to the Commonwealth of Massachusetts.
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1 EXECUTIVE SUMMARY

1.1 BACKGROUND

Over the past two decades, Massachusetts has made enormous strides towards creating a statewide GIS data layer from local assessors’ maps. Key accomplishments include:

- Digital parcel data available for approximately 92% of the state
- A strong data standard that covers minimal requirements for both digital parcel content and accuracy
- An ongoing $2 million program, funded by the Executive Office of Public Safety and Security and the Information Technology Division that will result in approximately 1.7 million of the state’s 2.3 million parcels (i.e., 73%) being brought into compliance with the statewide standard by the end of FY2012.

This plan is focused on documenting the progress that has been made, summarizing the business case for completing parcels on a statewide basis and identifying the funding and implementation path necessary to complete the job.

1.2 THE BUSINESS CASE FOR STATEWIDE PARCELS

Parcels are a critical and versatile data set that is used by the vast majority of state, local, and private sector GIS practitioners in the Commonwealth. This study documents the positive experiences of other states that have pursued similar efforts and while an exhaustive cost-benefit analysis was out of scope, the plan documents the wide benefits of statewide parcel data as well as several specific examples of cost savings and cost avoidance that would accrue if statewide parcels were developed. The following highlights the expected benefits and savings:

<table>
<thead>
<tr>
<th>General Benefits</th>
<th>Cost Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Creation of statewide addresses and improvements in geocoding</td>
<td>State owned property boundary verification is streamlined</td>
</tr>
<tr>
<td>Improved accuracy and efficiency in property tax assessment</td>
<td>On-line data leads to improved public data access with less staff time</td>
</tr>
<tr>
<td>Improved E911 dispatching and emergency response</td>
<td>Decreased GIS application development time</td>
</tr>
</tbody>
</table>
• Support for statewide economic development
• Support for natural resource protection
• Improved management of state owned property

Cost Avoidance
• Commercial data licensing fees are eliminated
• Redundant state agency parcel data collection efforts are removed

1.3 THE COST AND IMPLEMENTATION PLAN

1.3.1 Finishing the State

Based on the cost of current parcel automation and standardization efforts, the plan documents that the expected cost to finish the statewide parcel data layer beyond state fiscal year 2012 will be approximately $601,000. To complete parcels, the Commonwealth would contract for and conduct a third phase of the parcel automation and standardization work to take place in FY2013.

1.4 KEEPING THE DATA CURRENT

Earlier MassGIS grant programs have shown that converting parcels into digital format is not enough. Parcel data that is converted into electronic format with statewide funding does not get readily updated on a voluntary basis. To protect the Commonwealth’s investment in statewide parcels, this plan recommends that MassGIS partner with the Department of Revenue (DOR) to phase in a requirement that a community submit standards compliant, digital parcel data as part of the three-year revaluation and certification cycle. The current DOR revaluation and certification process includes a hard copy parcel mapping requirement and making this a digital requirement is a logical and timely evolution for the 21st century. Such a requirement leverages a technology that is already employed by the vast majority of communities and would serve to protect the investment the Commonwealth has made in electronic parcels by helping to maintain this extremely valuable data asset.
2 PROGRAM GOAL

This Business Plan provides details for the implementation of complete and accurate mapping of 
**statewide parcels that are regularly and systematically updated.** The 2007 Strategic Plan for 
Massachusetts’ Spatial Data Infrastructure (hereafter “the Strategic Plan” see 
http://www.mass.gov/mgis/stratplan.html) identified parcel data as a key data set to support 
government operations and economic development in the Commonwealth. Amongst other 
observations, the “Vision for a Massachusetts Spatial Data Infrastructure (MSDI)” in the Strategic Plan, 
identified requirements for:

- Rich and accurate spatial databases including new capital initiatives to develop *standardized 
mapping of statewide parcels and addresses*

- Sustainable *funding to support data maintenance*, including regular updating of core, base 
datasets such as parcels

This plan includes the identification of funding to complete development of standardized statewide 
digital parcel data and a plan for maintenance and standards compliance to protect the value of the 
investment in statewide parcel data.

2.1 BACKGROUND

Digital parcels are important for a broad range of government activities at state, regional and local levels 
of government for property assessment, planning, environmental, transportation, public health and 
public safety programs. **In particular, parcel data can support the development of high quality address 
point data for emergency response** and other field operations.

Currently, each community in Massachusetts is required by the Department of Revenue to maintain a 
complete map of property parcels as part of the property tax assessment process. Historically, these 
hard-copy maps have been maintained on Mylar or linen at varying scales. These maps show the 
approximate boundaries of each property parcel along with related information - such as parcel 
identification numbers, street names, dimension text, acreage, easements, building footprints, and 
natural features - to assist with property valuation. Over the past 15 years there has been an increasing 
trend for communities to manage their property parcel maps using geospatial technology and the 
resultant digital parcel data are among the most important and versatile of any GIS data set. Some
communities, however, have not had the resources to create a digital assessor map or have an inferior electronic dataset that is poorly done or out-of-date.

To encourage the creation of digital parcel maps, MassGIS funded grant programs in 2002 ($434,000) and 2006 ($198,000). Under these programs MassGIS provided communities cash grants to support new parcel data development and to bring existing digital parcel data into compliance with the data standard. In 2002, 117 communities applied for a grant and there was funding for 34 awards. In 2006, when grants were targeted to Bristol and Plymouth counties, 43 of a possible 47 communities applied for grants. The funding supported 15 awards which were scaled to the number of parcels and ranged from $2,000 to $30,000.

While these programs were successful in incentivizing a substantial number of communities to meet the digital parcel standard, there remained a large gap in the Commonwealth’s digital parcel database. MassGIS estimated that only 43% of the Commonwealth’s 2 million parcels were considered “good quality” as of December 2010. Furthermore, the communities who did upgrade their parcel data in 2002 and 2006 have had little incentive to maintain the data in compliance with the standard and return copies to the Commonwealth in the subsequent years. Nevertheless, the vast majority of these communities have received significant value as they continue to use the data for a wide variety of other internal purposes.

To further the goal of statewide, standardized parcels, the State Executive Office of Public Safety and Security has committed funding to cover some portion of the cost as part of building a statewide point address dataset. As an example of public safety’s need for more precise mapping, the new, next generation 911 systems (NG911) being installed over the next 3-5 years will require an exact geographic location, down to the level of a parcel of land or even a specific building in order to correctly route calls to the call centers and to assign responding services. More accurate mapping will also enable emergency personnel to respond more quickly and accurately to calls, as the display of parcel polygons and the availability of more detailed address information will allow dispatchers to help responders find locations. Ultimately, more accurate mapping, including parcels, may be deployed in the field using mobile technology. Additional funding is coming from bond funds through the Executive Office of Administration and Finance (ANF), the agency that houses the Information Technology Division of which MassGIS is a part.
3 BENEFITS & JUSTIFICATION

3.1 OVERVIEW & BENEFITS

Parcel data are essential to state, local, and private sector GIS practitioners in the Commonwealth. Parcel data are extremely useful in municipal operations, whether in planning and zoning, public health, building inspections, assessing, education, conservation, public safety or other departments. Parcel data are also used by state programs with regional goals or with involvement in specific sites, such as economic development, transportation infrastructure, broadband infrastructure planning, natural resource protection, land use and environmental permitting, large-scale emergency response and disaster recovery, energy facility siting, property management and other state agency missions. The private sector depends on parcel data to comply with permitting processes and identify optimal sites for new businesses. In short, investments in parcels will benefit a very broad cross section of government and private sector stakeholders.

3.2 RETURN ON INVESTMENT

Studies completed in several other states, as well as the “National Land Parcel Data: A Vision for the Future” (2007), and the Commonwealth’s 2007 strategic plan all indicate that statewide parcels have and will generate a substantial return on investment in terms of benefits and cost savings. As presented by the National Research Council, “It can be argued that in addition to the efficiencies that digital parcel data brings to the assessment community, the parcel layer used as a base map is the most information rich database with the broadest utility to local, state and federal agencies.”¹

3.2.1 Strategic Plan for Spatial Data Infrastructure (2007)

The 2007 Strategic Plan for Spatial Data Infrastructure focused on identifying key data sets that serve as core resources for government operations and economic development in the Commonwealth. Parcel data was deemed “critical” for a variety of state and local activities and was identified as the largest existing data gap in the Commonwealth. At the time the report was published, it was estimated that $20 million had been spent on GIS data development over the preceding seven years. This investment as well as the demands on the state’s spatial data infrastructure, have continued to grow rapidly. With this growth comes the needs for improved coordination and effective resource allocation to develop

and maintain critical data sets such as parcels. The report recommends that the Commonwealth protect these investments in data assets by upgrading accuracy and currency and filling in the identified data gaps, such as statewide parcel data.

3.2.2 Evidence from Other States

NORTH CAROLINA EMERGENCY RESPONSE TO FLOODING. The State of North Carolina is prone to flooding because of frequent hurricane activity, with average annual flood damages of $56 million\(^2\). On September 18, 2003, Hurricane Isabel arrived on the outer banks of North Carolina leaving devastation in its path. While the hardest hit communities were identified and evacuated in plenty of time, the lack of digital parcel data inhibited damage assessment and distribution of emergency relief funds. Many of the more rural communities were unable to provide responders with digital data. In response, a Federal Geographic Data Committee (FGDC) workgroup was created to evaluate the importance of parcel data in emergency response situations and to identify issues that limited access to these data. The workgroup efforts revealed that in many cases, local governments had digital parcel data, but had problems getting it to emergency response crews in an efficient and standardized manner. Parcels are essential for formulating disaster management plans and for helping to preserve the assets of the state and its citizens. “Knowledge about who owns a given piece of land, the value of improvements made to the land, and current use of the land can be crucial in formulating disaster management plans.”\(^3\) In North Carolina, where available, digital parcel data helped expedite insurance claims and federal emergency loans thus greatly reducing the processing time and labor required for the recovery effort.

MONTANA CADASTRAL DATABASE. The Montana Cadastral Database was completed in 2002 and is publicly available for all counties in the state. The Montana Department of Revenue maintains the parcel maps for forty-nine of fifty-six counties with the remaining seven being maintained by county GIS staff. Montana works closely with the Bureau of Land Management to improve the accuracy of the parcel data through its Montana Cadastral Framework Program. The public as well as local governments and state agencies benefit from the parcel database through its use in countless applications ranging from agricultural appraisal to determination of surface ownership for lease agreements by private oil and gas firms. The parcel data is made accessible for query and download via the states Cadastral Website and a 2002 cost/benefit analysis estimated that the website alone was providing an annual


benefit of approximately five million dollars as thousands of individuals, from realtors to state employees, use the parcel data accessible on the website on a daily basis.

**ARKANSAS GEOSPATIAL STRATEGIC BUSINESS PLAN: STATEWIDE PARCELS.** Parcels are a critical data set to the State of Arkansas as evidenced by the disproportionate demand for parcel data from the state’s geospatial web services. Parcels alone count for 13% of data requests despite the fact that less than 50% of the state’s parcels are digitally available, and an even smaller percent are available via the web service. The state’s 2010 Strategic Business Plan revealed a long list of the expected benefits and returns that investment in statewide parcels would bring. These include:

- Improved efficiency and equity in property tax assessment, revaluation and revenue collection including:
  - Finding new, untaxed development on existing parcels.
  - Performing automated agricultural land assessment based on soils.
  - Increased ability to perform analysis such as viewing assessment sales ratios (ASRs) across an entire county to look for clusters of high or low values.
- Increased revenue collection from property taxes that will lead to increased school funding.
- Routine state government planning and decision making.
- Providing a key tool for economic development and meeting site selection consultant requirements.
- Resolving jurisdictional boundary questions.
- Providing an invaluable tool in assembling the statewide address databases.

### 3.3 ANTICIPATED BENEFITS

#### 3.3.1 Benefits

Benefits to local and state agencies as well as citizens and the private sector will be broad and varied. Property ownership, location and feature proximity impacts short and long-term planning from the rapid decisions of the emergency responder to the long term protection of environmental resources. Statewide parcels are an essential component to each of the following important activities.
• **BASIS FOR CREATION OF STATEWIDE ADDRESSES.** The Commonwealth has a vital interest in maintaining a comprehensive, statewide address database for a variety of reasons, particularly in the public safety and emergency response arenas. Indeed, a working and effective E911 system requires current and accurate addressing – in the existing system, a dataset called the Emergency Service List (ESL) is used for this purpose. However, the ESL does not have a geographic component, nor does it include addresses where there is no land-line, which is a significant and increasing percentage of all addresses. Statewide parcels would provide an invaluable resource for standardizing and enhancing the statewide address database. While a single parcel can have multiple addresses (e.g. for apartments or various commercial properties), the statewide parcel data would provide an accurate inventory of all places that should be addressed and in combination with assessor’s data from their computer assisted mass appraisal (CAMA) systems, parcels provide an important cross check for address list accuracy and completeness.

• **IMPROVED GEOCODING.** Almost every piece of information that state agencies collect and manage about businesses and citizens is attached to an address. This project will allow state agencies to derive the benefit of having a geographic location associated with each address (this is called “geocoding”) without having to resort to commercial geocoding services which provide much less accurate information. Parcel data can mitigate linear geocoding inaccuracies by making possible geocoding to specific address locations represented by parcel polygons.

**Figure 1: Cohasset Geocoding.** Geocoding using commercial street data can result in significant misplacement of address points. In the example below from Cohasset in 2007, the geocoded point for 39 Atlantic Avenue is approximately 600 meters north of the actual location.
• **MORE ACCURATE AND EFFICIENT TAX ASSESSMENT.** Completion of parcels will lead to improved efficiency and equity in property tax assessment, revaluation and revenue collection. Specific examples include, but are not limited to:

  o **Support for in-office revaluation certification by DOR staff.** Field certification currently requires 10 full-time DOR staff who must visit Town offices throughout the state and review maps in person. Digital submission of parcels would allow DOR staff to complete the map review portion of their certification process in office. Statewide standardized parcels would alleviate the need for some, and perhaps a lot, of the field work, thus offsetting budget cuts for traveling.

  o **Finding new, untaxed development on existing parcels.** Once parcels are automated, then Tax Assessors can compare those properties to orthophotography and the existing CAMA database. From those comparisons, Tax Assessors can see whether the CAMA record properly accounts for all the real property (e.g. structures, mobile homes, etc.) that are visible in the imagery. The City of Newton’s aerial-photo GIS base map (“orthophotos”) provided conclusive evidence in city’s favor for a personal property assessment dispute. **This resulted in a one-time additional $61,800 in tax revenue.** Many such examples can be found in communities across the Commonwealth.

*Figure 2: Untaxed development detectable. An example of the quality of data used in Newton to identify untaxed Property Features, such as pools, decks, or outbuildings.*
- **Improved revenue collection.** As CAMA systems are reconciled with mapped parcels and gaps indicating untaxed or improperly assessed parcels are identified, revenue collection tools will be refined. By comparing the area of a parcel calculated by the GIS with the area listed in the Assessors database, finding errors and making the necessary corrections in lot area, **the City of Fitchburg gained $225,000 in assessed value for the first ten properties corrected.**

- **Improved neighborhood classification methods.** The neighborhood classification is a key element in establishing assessed value. The classification process, however, has traditionally required extensive field work to identify homogenous areas based on factors such as proximity to water. **The assessor in the Town of Marshfield had estimated that it would have required one person full-time for a year to drive around and classify approximately 12,000 parcels.** Using parcel data, orthophotography, contours, surface waters, and wetlands however, the Assessor was instead able to complete this task by devoting approximately 75% of her time over 45 days. The parcel data saved the Town money and provided further refinement of the assessment neighborhoods, thus improving the quality of the evaluation used in determining assessed values.

**Figure 3: Neighborhood mapping in Marshfield.** Digital parcel data can save Towns hundreds of hours of field labor traditionally required for neighborhood classification. The map below shows parcels color coded according to neighborhood classification.
• **Support for fair and accurate tax assessment.** Accurate and up to date parcel data are required for fair and accurate real property tax assessment *across the state*. MassGIS has collaborated with the DOR to produce an on-line mapping tool for researching statewide comparable sales. Having parcel data on-line will further enhance this capability by enabling assessors to view potential comparable sales and other map information on a regional basis.

> “In our attempts to collect data from municipal offices, we found that many communities had no established process for delivering parcel geography data to the public. Most municipal officials had little or no knowledge of the data at all. Even its existence was unknown to many municipal officials in assessing and engineering offices.

...we strongly support the intention and goal, of MassGIS and others, to create a statewide data repository for parcel level geography. Ultimately we believe this outcome will prove itself the best practice for public access to this valuable data. Also a consolidated and consistent statewide data set allows for the use of parcel geography in regional and statewide GIS applications.”

*Mark Fahey, President, Real Estate Mapping Inc.*

Commenting on his company’s experience providing site-finding services in the Metro Boston area for a commercial client.

• **SUPPORT FOR ECONOMIC DEVELOPMENT.** Statewide parcels will provide a key tool for economic development and business site selection consultants. When businesses or their site selection consultants are looking for properties, it is critical that they be easily able to view property boundaries and key characteristics of the parcels such as the current assessed value or current land uses. Of equal importance can be information on abutting properties such as the number of neighbors a given parcel may have. Cities and states that have their parcels completed and on-line are at a distinct advantage in this arena.

• **CADASTRAL BASE MAP.** In addition to the data content benefits described above, parcels – like orthophotography – fulfill an important base map function. Specifically, a variety of political and administrative boundaries such as school districts or zoning are coincident with property boundaries. For example, a given parcel should not be split by a school district boundary. Accurate parcel data will help ensure that there is no ambiguity about the taxation and services provided to that parcel. Without statewide parcels, it will be impossible to properly map such
boundaries across the Commonwealth and there will continue to be inequities and time spent resolving jurisdictional boundary questions.

**FIGURE 4: PARCELS SERVE AS THE BASEMAP FOR OTHER THEMATIC MAPS. A VARIETY OF POLITICAL BOUNDARIES, DISTRICTS, AND ZONES ARE DERIVED FROM PARCEL DATA, SUCH AS IN THE ZONING MAP EXAMPLE BELOW FROM NEWTON.**

- **SIMPLIFIED DATA MANAGEMENT.** Standardizing and aggregating parcels statewide provides many benefits to the managers and users of parcel data, including:
  
  o Eliminating the workload associated with redundant requests from multiple state agencies and the private sector by enabling parcel data distribution from a single state-level source. Currently, a single municipality may be asked to provide parcel data to many separate state agencies via separate data requests. Similarly, a state agency would need to make 351 separate requests for parcels to achieve statewide coverage (even if all towns had parcels). **With a statewide approach, a city/town would only need to provide the data to the state once, and the state could be responsible for sharing it amongst its own agencies.**

  o Independent state-level data quality checks for municipal data. Compliance with the parcel standard and submission to MassGIS will provide Towns with outside feedback on the quality of their parcels highlighting issues that may be interfering with proper assessment, such as mismatched parcels or unidentified property owners.
• Ability to work with parcel maps from adjacent communities as part of evaluating regional projects such as developments that cross or are near community boundaries.

- **SUPPORT FOR NATURAL RESOURCE PROTECTION.** Planners will be able to look at land ownership and development potential in relation to habitat areas, wetlands and other resources such as sand and gravel deposits. For example parcel data have been used to help with protected area land acquisition strategies.

**FIGURE 5: NATURAL RESOURCE PROTECTION MAPPING IN GROTON.** In Groton, the parcel data served as the basis for the development of a comprehensive Protected Open Space data layer. The Conservation Commission uses the data regularly to identify property owners of key lands that may contain unique habitats, preserve wetlands, or have adjacency to other protected lands.

- **IMPROVED MANAGEMENT OF STATE LANDS.** Statewide parcels would allow land managers to visually assess their lands in relation to the overall context of land ownership and quickly identify abutters that are likely responsible for encroachment and/or buffer violations. Routine, comprehensive field assessment is often not feasible as the exterior boundaries of lands controlled by the state’s environmental agencies add up to over 2000 miles. In the Department of Environmental Protection (DEP), parcel boundaries would provide agency staff or their agents with immediately accessible information regarding the owners of land subject to notification,
investigation or enforcement actions. For instance, owners of properties subject to Chapter 91⁴ might need to be contacted regarding construction activities not shown as permitted. In other cases, notification would be a matter of public safety and welfare such as owners of land abutting a parcel where a spill was reported might need to be informed about a threat to their water supplies. The parcel mapping, which eliminates the interpolation error of commercial geocoding, would directly support such requirements and allow DEP staff to implement operational and regulatory mandates more efficiently and effectively.

- **SUPPORT FOR MORTGAGE CRISIS “DISTRESS” INDICATORS.** Standardized, statewide parcels would provide a common, statewide platform for integrating, comparing, and analyzing key factors such as utility shut-offs, mortgage payment status, foreclosures, unemployment, crime statistics, undelivered mail, etc. Parcel data makes it possible to correlate these disparate factors and observe patterns before the situation reaches a critical point.

- **SUPPORT DCAM IN MANAGING STATE PROPERTIES AND WITH SURPLUS PROPERTY SALES.** At present, there is no comprehensive GIS dataset representing boundaries of any state agency lands outside of EOEA. This makes it difficult for DCAM’s planners and site programmers to take advantage of the wealth of GIS data on physical conditions, such as soils and slopes, and resources, such as water supplies. In many cases, outside consultants are hired to provide the GIS expertise and parcel map data conversion services at significant expense to DCAM.

- **MORE EFFICIENT PERMITTING PROCESSES.** Parcel data are essential to the permitting process for identifying proximity to protected areas, relevant

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⁴ Massachusetts General Law Chapter 91 protects the public’s interest in waterways of the Commonwealth. It ensures that public rights to fish, fowl and navigate are not unreasonably restricted and that unsafe or hazardous structures are repaired or removed. Chapter 91 also protects the waterfront property owner’s ability to approach his land from the water.
features or buffer zones as well as notifying abutters to the project. Contractors spend time and budget hunting down parcel data from various sources, converting data to a usable format, or even digitizing parcel data on a case by case basis. These activities and costs would be significantly reduced with statewide standardized parcels.

### 3.4 COST SAVINGS

Many burdens on local and state agency staff can be reduced through access to reliable statewide, standardized parcel data.

- **IMPROVED PUBLIC DATA ACCESS.** Public access to parcel data viewer online parcel viewers would free up, on average, the equivalent of one-half to one assessing staff per Town currently devoted to answering questions and providing parcel information. Communities that do not have digital parcels must manually identify parcels on paper tax maps and look up associated property information such as owner, acreage, zoning, and purchase or permit history. When abutters lists are requested by the public, assessing staff have reported spending 4-6 hours manually measuring distances and retrieving owner and address information for abutters. With digital parcel data, property information can be made public 24 hours/day via web access.

- **REDUCED COST FOR GIS APPLICATION DEVELOPMENT.** Historically, local and state agencies have contracted with GIS vendors to develop custom GIS viewer applications that provide simplified queries and spatial analysis for their particular data sets. Communities often require similar functionality, but non-standardized parcel and CAMA data has typically driven costs up. Development costs can be reduced significantly with the use of standardized data as the same code base can be delivered to multiple, even hundreds, of communities providing easy access to property information and spatial overlay tools.

### 3.5 COST AVOIDANCE

Statewide parcel data will allow agencies to use internal resources rather than purchasing commercial data or outsourcing data maintenance.

- **FINISHING PARCELS AND ADDRESSES OBVIATES THE NEED FOR AGENCIES TO PURCHASE COMMERCIAL DATA FOR GEOCODING PURPOSES.** Ownership of an accurate and up to date parcel data set would provide a robust reference layer for geocoding purposes. Currently, a
number of Commonwealth agencies license costly commercial street centerline data for
geocoding purposes at a cost ranging from $15,000 to $80,000 per year.

- COMPLETE PARCELS WOULD REMOVE THE FINANCIAL BURDEN ON STATE AGENCIES FOR
OUTSOURCING ANNUAL MAINTENANCE OF AGENCY PARCEL DATA. Data changes made at the
local level would be reliably carried through to the statewide database and made available to all
agencies. The current duplication of this effort would be unnecessary.
4 REQUIREMENTS & COSTS

4.1 STRATEGIC & ORGANIZATIONAL APPROACH

The Strategic Plan from 2007 identified the development of statewide parcels as a major goal for MassGIS. As described earlier in this document, MassGIS has had a long-term interest in and engagement with parcel data and has put in place many of the precursors necessary for an efficient statewide parcel effort. In building this foundation, MassGIS has also learned important lessons that will help smooth the construction of statewide parcels. Foundational elements that are currently in place include:

- Publication of a mature data standard for parcels, currently in its second edition
- Development of a GIS data layer containing the legislatively approved mapping of municipal boundaries (see http://www.mass.gov/mgis/townssurvey.htm). Without this data layer, it would not be possible to quilt together a seamless statewide parcel map from mapping maintained by the Commonwealth’s 351 cities and towns
- Construction of critical working relationships and collaborations with other Commonwealth agencies that require parcel data, including the State 911 Department and the Massachusetts Department of Revenue (DOR)
- Completion of two rounds of parcel grant programs that have catalyzed new parcel data development across the Commonwealth
- Initiation of a third, larger scale round of parcel automation and standardization that will greatly increase the volume of standards compliant parcel data within the Commonwealth

In short, through a combination of persistence and opportunism over an eight year period, MassGIS has substantively begun the development of a statewide parcel data set. Critically, this work has not been done in isolation and all MassGIS program efforts – from standards development to grant making – have been done in consultation with other state agency stakeholders and with the strong recognition that parcel mapping originates through the efforts of local government assessors. Indeed, both intra-governmental and inter-governmental collaboration and coordination are integral to the overall strategic approach of building statewide parcels.
Right now, the key strategic challenge is transitioning current statewide parcel development efforts from opportunistic projects into a cohesive ongoing program that will not only complete the state but also will build in both incentives and business processes for the ongoing maintenance of the parcel data. One of the core challenges of parcel data is that parcel data changes regularly and on a transactional basis with every sub-division and every home sale. It is critical that parcel data development not be viewed as a one-time exercise but rather as an ongoing, multi-participant program.

The following provides an overview of how such an ongoing, multi-participant program might be organized for the long-term.

4.1.1 Program Management

MassGIS would maintain technical leadership and serve as the overall coordinator of the program. Activities in this area include:

- Standards setting and revision
- Coordination amongst state agencies that are involved in funding or incentivizing the program
- Provision of education and technical support to local governments
- Coordinating with private mapping companies to promote the benefits of the state parcel standard
- Coordinating with the vendors of computer assisted mass appraisal (CAMA) software used by assessors to include a standard report in their software that produces the extract needed for the state standard and to incorporate a standard map identifier from parcel maps into each property listing in each municipal CAMA database

4.1.2 Program Funding

The Executive Office of Public Safety and Security would continue to support this initiative with the operational requirement of “next generation” E911 systems (NG911) as a key driver. Parcels provide a direct linkage to the high quality addressing required by NG911 and parcel depictions provide critical context to first responders working in the field, particularly in rural places.

Once developed, MassGIS staff, through its parent agency, the Executive Office of Administration and Finance, Information Technology Department, would support the ongoing update and distribution of parcel data on behalf of the Commonwealth. Various agencies that are significant users of parcel
information, such as State 911, may be tapped to provide a cost share for the staff and technical resources necessary to keep the statewide parcel data current on an ongoing basis.

4.1.3 Engaging the Municipalities And Ongoing Maintenance

The DOR Division of Local Services currently requires that all communities maintain complete and current tax parcel maps. Such maps are critical for helping to ensure a fair and equitable assessment by ensuring that Assessors have a complete view of all property within their jurisdiction. While rarely used, DOR has the ability to withhold certification of the local tax rates due to inadequate mapping. Instead, DOR prefers to proactively work with communities to encourage good mapping practices. Nevertheless, the “certification transaction” provides an opportunity for DOR to support the statewide parcel program by inspecting the condition of parcel mapping during the tri-annual revaluation process. Ultimately, such a business transaction is essential for ensuring 100% participation by municipalities so that a true statewide resource is created.

Currently, DOR does not have a requirement that parcel mapping be conducted in electronic, GIS format nor does it have detailed technical standards for how communities should perform their parcel mapping. There is a significant opportunity to combine DOR’s oversight of local parcel mapping with MassGIS’s strong technical standards setting work to help provide an ongoing parcel data maintenance process. Under this scenario, the following could happen:

- MassGIS would work to provide state funding support to automate any parcels that were not yet in electronic form and to bring up to standard quality and format already automated parcels across the Commonwealth.

- With the completion of this work, which is already underway, all parcels in the Commonwealth will be automated in a standard form. Thus, there would be no “unfunded mandate” to automate the parcels.

- Once this was done, DOR would work to alter parcel mapping requirements so that it is clear that parcel mapping should be done in an electronic format and parcels should be submitted in compliance with the MassGIS standard (for both quality and format) as part of the tri-annual revaluation process. This should not impose a burden on municipalities since parcel maintenance is no harder/more expensive than manual drafting and is likely easier/less expensive when done utilizing electronic technologies. Equally, providing the mapping in
electronic format reduces the physical size of the submission which can be hundreds of pages of maps thereby saving resources such as paper. Electronic maps may be submitted via email or by on-line file transfer (“FTP”).

- Just as they always have, municipalities would continue to perform ongoing work to keep their parcel data current by updating them for new sub-divisions and other lot changes and also for changes in ownership and valuation. As with hard copy mapping, municipalities could perform the updates in the manner that best meets their needs. Currently, common practices include: performing the work in-house with their own GIS staff, sub-contracting to the private sector, or partnering with organizations such as Regional Planning Agencies.

- MassGIS would assist DOR by performing quality control and would validate that submitted parcels have maintained their standards compliance. Ideally, parcels would be submitted annually, but at worst they would be submitted once every three years through the DOR revaluation process.

- MassGIS would warehouse all submitted parcels on behalf of the Commonwealth and would serve the parcel data back to both municipalities and all state agencies that would benefit from access to parcel data, including State 911 and DOR.

### 4.1.4 Related Activities & Opportunities

Once automated, there are many further opportunities to integrate parcel data with other data sets and applications. For example, municipalities and regional Registries of Deeds could align their records so that scanned images of deeds can be related to municipal parcel mapping. Many Registries are in the process or have completed scanning their documents. The parcel standard would enable this link as it includes last sale date, book, and page from the local assessor’s database. In this manner, the Commonwealth can build a complete, integrated land records management system. This system could be employed directly by the Commonwealth as the largest land owner in the state, but it would also be available to municipalities, the real estate industry and citizens. Integrating registry records with assessor parcel mapping will remove some economic inefficiencies that currently burden the Massachusetts economy.
4.2 SUITABILITY ASSESSMENT OF EXISTING INFRASTRUCTURE

MassGIS is well suited to provide the technical infrastructure necessary to aggregate and host statewide parcel data. MassGIS:

- Has a long history of coordination and GIS support for Massachusetts cities and towns as well as active relationships with both the private sector GIS suppliers and regional planning agencies (RPAs)
- Has long established data and web serving capabilities and capacity
- Move of MassGIS infrastructure to the Massachusetts Information Technology Center (MITC) in Chelsea in 2011 will increase server capacity, providing the robust infrastructure needed for supporting the state’s web mapping services
4.3 DATA COMPONENTS

Statewide digital parcels involves several, interrelated data components required to compile the data, assess spatial accuracy, retrieve descriptive information about the land, identify the locations of structures and associated addresses, and understand the data limitations and compilation methods.

- **BASEMAP** (Aerial Imagery): Orthophotography serves as the spatial anchor for digital parcel boundaries and is required for accurate compilation of parcel data.

- **DIGITAL PARCEL POLYGONS**: The vector representation of property boundaries compiled as polygons with a unique identification number that can be linked to owner and address information from the assessor’s CAMA database.

- **CAMA ATTRIBUTES**: Are non-graphic information stored in the assessor’s Computer Aided Mass Appraisal database (e.g., name of owner, property address, property area, property value, etc.) and associated with a unique parcel identification number. CAMA attributes are necessary to retrieve descriptive information about the parcel including a property address that can be spatially associated with an address point within the property boundary.

- **BUILDING ROOF PRINTS**: Vector representation of structures as visible in an orthophoto basemap or as detected in elevation data. Structure locations are necessary for proper placement of the address points that inform emergency response efforts.

- **ADDRESS POINTS**: Point locations coded with property address and indicating the location and/or entrance to structures on a given property.

- **METADATA**: Description of the compilation methods, level of completeness, spatial accuracy, and limitations of any particular data component. With parcel compilation, MassGIS requests that communities provide ample description of the source materials, the data development methodology, data development dates, and contact information.

4.4 TECHNOLOGY REQUIREMENTS

Key technology components for the success of this program include:
• Automated reminders to communities to provide data, at least annually and a system for logging contributed data

• Automated standards compliance checking

• Data aggregation methods for piecing individual town data into a statewide data set

• Address extraction from polygons and conversion to point data as a key component to statewide standardization and validation of addresses from multiple address sources

• Data updating capabilities that may include, but are not limited to:
  o Wholesale replacement of community data on a regular basis
  o Pilot projects for parcel database replication approaches for communities that are interested, willing and maintain the appropriate technology

• Web map and feature services for data publication

• Data extraction/download for public data distribution

4.5 STANDARDS

The implementation of a robust standard is a vital prerequisite to the creation of a statewide digital parcel layer. The MassGIS digital parcel data standard, initially released in 2001, is widely viewed as a substantial improvement over having a wide variety of data management schemes in use. The essential elements of the original standard have remained throughout the revisions that have taken place over the past 10 years. These standard elements aim to:

• Provide communities a flexible specification for developing a high quality digital parcel file for use with their local GIS

• Make it possible to merge parcel data from multiple communities for multi-town mapping and analysis

• Establish a parcel identification that uniquely identifies each parcel statewide

• Assure a minimum level of spatial accuracy

• Assure a minimum and consistent set of descriptive attributes from the assessor’s database are associated with each parcel on the map
• Assure that all entries in the assessor database, including **condominiums and combined lots**, are associated with a parcel on the map

The standard is strong and mature after a decade of minor revisions and clarifications. MassGIS has engaged stakeholders throughout the Commonwealth’s GIS community including local communities, regional planning agencies, state agencies, and private contractors to gather input and suggestions for improvements to the standard since its inception. Recent changes have included a new approach to boundaries of other legal interests in land (such as easements and other features), revised guidance on boundary compilation, and a restructuring of the data model for the highest level of compliance (Level III). The success of the Massachusetts standard and an indicator of its usefulness can also be measured by the fact that other New England states, such as Rhode Island have borrowed heavily from its content and used it to inform their own standard development process\(^5\).

As described in the most recent version of the Parcel Standard (v2.0, October 2010), the standard aims to provide the following benefit to stakeholders using and/or maintaining the community’s parcel data:

- **A consistent framework** for the management of parcel data in GIS which should satisfy the needs of assessors to view and query mapping linked to their tax list and to produce hard-copy map products
- **Guidance for** municipal staff and their contractors on **compilation of parcel boundaries** where the existing mapping is of poor quality and/or not in digital form
- **A format for the exchange and aggregation** of assessors’ tax parcel mapping and associated attributes
- **Minimum specifications for mapping accuracy** and for consistent and **complete attribution**

While most of the **requirements described in the standard are quite feasible to achieve**, the requirement for spatial accuracy goes beyond the minimal requirements for parcel mapping currently issued by the Department of Revenue. However, this level of accuracy is required to compare parcels to orthoimagery without introducing inconsistencies. Once the parcels meet the spatial accuracy requirements, maintenance at this level is no more burdensome than maintenance at a level of poor spatial accuracy. Furthermore, cities and towns generally find the usefulness of parcel data increases with enhanced spatial accuracy and want to protect the quality of their investment. In addition,

implementing the standard often reveals errors in assessing databases, leading to data quality improvements.

As described earlier in the document, MassGIS funded grant programs in both 2002 and 2006 to encourage the creation of new digital parcel maps and upgrade of existing digital parcel data to meet the parcel standard. Nearly 50 communities participated in the program and successfully submitted standardized, digital parcels to MassGIS. Clearly, with a suitable incentive, communities are willing to standardize their digital data. However, while these programs were successful in incentivizing communities to meet the digital parcel standard, many have failed to maintain their parcel data at the same level in the subsequent years due to lack of enforcement. If, as described in more detail in the Strategic Approach section, the Department of Revenue were to require electronic mapping according to the MassGIS digital parcel standard, this would provide suitable incentive for communities to maintain their parcel data in a standard format to the benefit of the Commonwealth.

4.6 COSTS & RESOURCE REQUIREMENTS

Substantial funding will be required to meet the goal of statewide, standardized parcels. As described in the Implementation Details (see section 5.1), MassGIS has already contracted $880,000 for FY2011 to bring over 700,000 parcels in compliance with the standard. These tasks include:

- Digitizing parcels from various non-GIS sources
- Standardizing good quality parcels (e.g., move into MassGIS standard format)
- Standardizing poor quality parcels (e.g., move into MassGIS standard format and remedy quality and accuracy deficiencies)

An additional $1.53 million has been requested for FY2012 to bring an additional 1 million parcels in compliance with the standard.

MassGIS staff time will be required to:

- Assemble, review, and manage data automation and improvement projects
- Act as liaison to local governments and municipal data providers
- Technology management (data hosting and web services)
4.7 RISKS

Implementing this project is not easy nor without risk. Currently, only a small minority of states – notably Montana, Tennessee and Delaware - have completed statewide parcel automation. The following provides an overview of the major risks that need to be avoided:

1. **LACK OF FULL PARTICIPATION ACROSS 351 CITIES AND TOWNS:** Given that parcel data is maintained locally, absent full participation from all communities there is a significant risk that the Commonwealth will not be able to construct a statewide resource. While the suggested implementation path aims to avoid known obstacles, there remain several reasons why full participation may prove elusive:

   - **There is no motivation to participate.** While many communities have voluntarily automated their parcels with their own resources and for their own needs and willingly share their parcel data with the Commonwealth, many other communities have not been able to fund automation. Without a compelling reason and with local government facing budget challenges new data automation is not likely to take place. Thus, it is critically important that DOR parcel mapping requirements be updated to acknowledge the 21st century reality that most parcel mapping is taking place electronically. Updating the parcel mapping requirement provides a reason for participation.

   - **There is no money to participate.** Parcel mapping and map updating responsibility is properly at the municipal level and some communities face real technological and staffing constraints. The program presented above provides a funding stream to provide original automation and standards compliance and backs this recommendation with ongoing education and technical support to communities through MassGIS.

   - **There is a reluctance to share digital parcel data with the state.** Even communities that have successfully created and maintain parcel data may not be willing to share these data with the Commonwealth. This reluctance can emanate from several sources and will require active effort to overcome. Reasons for a reluctance to share include:

     - Misunderstanding of the Massachusetts **Freedom of Information (FOI) law** which requires that public documents, including electronic records such as GIS data, be provided to any entity that asks for them for the cost of duplication.
Some communities “sell” their data and generate modest revenues that exceed the cost of duplication called for under by FOI. These communities may fear that freely sharing data will lead to lost revenues and understand that it is up to data requesters to initiate FOI challenges.

Misconceptions and concerns about the spatial accuracy of parcel boundaries and associated liability. In other words, some parcel data maintainers understand that their data are imperfect and are concerned about exposing information that is known to have problems. Experiences elsewhere have shown that proper disclaimers can alert users to the limitations of data, and more importantly that active use of data by others helps expose errors so that they can be corrected.

There can be legitimate concerns over privacy issues related to property ownership information and related data in municipal tax parcel data. While these concerns may be made in good faith, it is established that the parcel and registry data are public records, including owner names (except in a few cases specified by legislation)\(^6\). Ultimately, property ownership involves asserting rights to property and the public is entitled to validate ownership claims via public access to the records. The technology to preserve privacy for the small number of legislated exceptions to this open data norm (in the case of names of judges and other public safety officials) already exists and should be employed.

2. **Statewide parcels will be constructed, but they will not be maintained.** One of the biggest challenges with GIS data in general is performing ongoing work to keep the data current in light of constant administrative and environmental changes. Water courses such as streams change over time. Land use changes with new development. New zoning districts are legislated. And, parcel ownership changes and parcels get subdivided — all the time. The proposed implementation path involves spending a good deal of Commonwealth resources to automate and standardize parcels on a statewide basis. The fullest return on investment will not be realized unless the funding and processes are in place to help ensure that the parcels are kept current. Hence, it is critical that some kind of “business transaction” with the Commonwealth be employed that creates a reason for parcel data to be exchanged and an opportunity for those data to be inspected to ensure that

\(^6\) The Secretary of the Commonwealth’s Guide to Public Records (available on the Secretary’s public records web page) specifically notes that GIS and other computer records are public records.
changes are recorded. The existing oversight of parcel mapping by the DOR provides the perfect opportunity to *modernize* an existing transaction as opposed to installing a new one.

3. **PUBLIC SAFETY RISKS FROM INACTION.** One of the key opportunities that has allowed progress is the availability of public safety funding to support parcel and address data development. These funds have become available due to an understanding within the public safety community that high quality parcel and addressing data leads to improved emergency response. Better mapping and more accurate addresses can cut response times and eliminate response errors in an environment where minutes and seconds matter. Inaction or an inability to execute can lead to extended response times and an overall decrease in public safety.
5 IMPLEMENTATION PLAN

As described above, MassGIS has been engaged in parcel data development through standards setting and grant programs for the past 10 years. During that time some important lessons have been learned which have informed the overall strategy and the specific implementation path that it outlined below:

- Key lessons learned from the 2002 and 2006 parcel grant programs:
  - Municipalities will support data development, standardization and data sharing when they have financial incentives
  - It has been a recurring challenge to get municipalities to voluntarily maintain parcels in standardized format and regularly re-submit updated parcels to MassGIS following the grant program

Another factor that has influenced the proposed implementation path is the recognition that New England poses unique challenges with parcel data management since this function occurs exclusively at the city/town level of government. In most other parts of the country, parcel data management largely occurs at the county level which has a built-in aggregation of city/town information. For example, in spite of the fact that Utah is almost 10 times the size of Massachusetts, it may be easier to create a statewide parcel layer there due to the fact that state needs to coordinate with, and collect data from only 29 counties. In Massachusetts, this coordination and collection needs to take place with 351 independent municipalities. As such, the process for receiving data submission and tracking data status across communities must be automated and watched closely.

The last factor that has strongly influenced this implementation plan is an explicit recognition of the versatility of parcel data. Parcel work should not be viewed only through the lens of “assessing” but also through critical and fundamental linkages to public safety and other environmental and economic development programs. Indeed, this versatility is what drives a larger return on investments in this important data set.
5.1 IMPLEMENTATION DETAILS

Implementation of statewide parcels can be covered in three steps:

1. Completion of development
2. Transition to maintenance
3. Enforcement of currency

The following sections provide further details for these three steps.

5.1.1 Completion of Development

As of December 2010, 92% of the 2 million parcels in the Commonwealth had been automated and exist in electronic form (MassGIS, FY10). The quality of these parcels varies greatly, however. MassGIS records indicate that 45% are “good quality” and 48% are non-standard and sometimes very poor quality. The image below shows the best reckoning of parcel development status across the state:

**FIGURE 7: STATUS OF DIGITAL PARCEL MAPPING DEVELOPMENT IN MASSACHUSETTS**

Status of Digital Parcel Development in Massachusetts

Level I & II = Level I classifications have not been checked by MassGIS. Most with Level II classifications have not been maintained that way. Various Levels = Municipalities where digital parcel data in some form exists In Development = Conversion to digital form in progress Not Digital also includes status unknown.

Thus, the completion of development can be reduced to two elements:
1. The remaining 8% of parcels needs to be automated into electronic format

2. Existing parcel data needs to be updated and upgraded to comply with the MassGIS parcel standard

During the last quarter of 2010, with funding support from the Executive Office of Public Safety and Security (EOPSS), MassGIS initiated a project targeting these two elements. In January of 2011, MassGIS issued $880,000 of contracts to multiple vendors\(^7\) to both automate new parcels and to retrofit existing parcels to match the standard. MassGIS has requested funding to continue the program in FY2012 with another $1.53M.

These projects will enable MassGIS to not only create substantial volumes of standards-compliant parcel data, but also they will help to perfect the approach for completing the state. This work should also enable a firmer cost estimation for the additional funding necessary to finish the state. The table on the following page provides a summary of the total volume of parcel work necessary, the current status of planned and active automation work in FY2011 and FY2012, and the remaining work that will be necessary after FY2012.

---

\(^7\) Full disclosure: Applied Geographics received one of those contracts.
<table>
<thead>
<tr>
<th>ITEM</th>
<th>NUMBER OF PARCEL RECORDS</th>
<th>NUMBER OF TOWNS*</th>
<th>% OF PARCELS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total parcels (including condo records)*</td>
<td>2,091,175</td>
<td>348</td>
<td>100%</td>
</tr>
<tr>
<td>Total parcels in electronic format (estimated)</td>
<td>1,923,881</td>
<td>317</td>
<td>92%</td>
</tr>
<tr>
<td>FY2011 New parcels digitized</td>
<td>82,495</td>
<td>19</td>
<td>4%</td>
</tr>
<tr>
<td>FY2011 Existing digital parcels made standards compliant</td>
<td>630,461</td>
<td>102</td>
<td>30%</td>
</tr>
<tr>
<td><strong>FY2011 Subtotal</strong></td>
<td><strong>712,956</strong></td>
<td><strong>121</strong></td>
<td><strong>34%</strong></td>
</tr>
<tr>
<td>FY2012 New parcels digitized</td>
<td>43,016</td>
<td>11</td>
<td>2%</td>
</tr>
<tr>
<td>FY2012 Existing digital parcels made standards compliant</td>
<td>956,456</td>
<td>139</td>
<td>46%</td>
</tr>
<tr>
<td><strong>FY2012 Subtotal</strong></td>
<td><strong>999,472</strong></td>
<td><strong>150</strong></td>
<td><strong>48%</strong></td>
</tr>
<tr>
<td>FY2013 New parcels digitized</td>
<td>1,219</td>
<td>1</td>
<td>0%</td>
</tr>
<tr>
<td>FY2013 Existing digital parcels made standards compliant</td>
<td>377,528</td>
<td>76</td>
<td>18%</td>
</tr>
<tr>
<td><strong>FY2013 Subtotal</strong></td>
<td><strong>378,747</strong></td>
<td><strong>77</strong></td>
<td><strong>18%</strong></td>
</tr>
</tbody>
</table>

*Figures for “Total Parcels” and “Number of Towns” do not include Boston, Worcester or Springfield because current plans and funding requests do not include contracting for standardization in these communities. “Total Parcels” does include condominium records.

As the finished product of the FY2011 projects should demonstrate and the table illustrates, the path forward is well understood. Thus, the remaining element is securing funding that will finish the state according to the methods established with the FY2011 and FY2012 work. Options for obtaining this funding include continued funding from EOPSS and continuing capital funding through MassGIS’s parent agency, the Information Technology Department within the Executive Office of Administration and Finance.

5.1.2 Transition to Maintenance

As indicated above, if the Commonwealth can fund the completion of standardized, statewide parcels, an extensive investment will have been made. It should be noted that this investment goes far beyond the current direct expenditure by the Commonwealth and includes significant funding from local governments over the past 20 years that has resulted in the approximately 92% electronic parcel coverage across the state. Given that parcel data changes regularly, and in light of the lessons learned...
from the 2002 and 2006 parcel grant programs, it will be essential that MassGIS and its partners formulate a strategy for protecting that investment and ensuring regular update and re-submittal of parcel data so that the state-wide resource is kept current.

As described above in the Strategic and Organizational Approach (see Section 4.1) it is recommended that the existing Department of Revenue parcel mapping requirement be modernized to include the submission of electronic parcel data that complies with the MassGIS standard. Given DOR’s regular, tri-annual revaluation approval cycle this should result in regular updates and re-submittals of parcel data to the Commonwealth. Since the Commonwealth is providing funding support to bring parcels into standards compliance this modernization of DOR’s requirements should not require any new investments by local governments.

This is a significant change and the process would need to be carefully planned and closely managed by DOR. As described above, completion of parcel automation will take at least three additional years and this provides time for DOR and MassGIS to plan the details of this change and to communicate with the assessing community. Any types of new requirements or changes of practice need to be handled carefully and sensitively. At the same time, given the improvements in mapping technologies over the past 20 years it is entirely appropriate that the Commonwealth evaluate existing programs to see whether there are opportunities to capitalize on these technologies. Does it make sense to have a hard copy standard when most people are using electronic technologies to fulfill this function, including the Commonwealth itself and most of the companies that produce subdivision plans and provide map maintenance services? Indeed, receipt of up-to-date digital parcels from communities will open new possibilities for spatial analysis at DOR that can help improve the equity and efficiency of the state-wide revaluation process.

If desired, MassGIS could substantively support DOR in three separate ways:

1. Providing technical assistance in developing a plan for issuing the new requirements and in communicating to the assessing community

2. Performing “standards compliance” testing on parcel data submittals received from communities

3. Aggregating and assembling submitted data into a state-wide data set and efficiently serving those data for DOR’s internal uses
While the parcel revaluation certification process happens once every three years, there may be opportunities to encourage and incentivize communities to contribute their parcel maps more frequently and on an ongoing basis. Indeed, most communities update their GIS data and parcel maps annually. Beyond a DOR requirement, MassGIS could explore other outreach activity and incentives to generate annual submissions of updated parcel data.

Regardless of the update cycle, new tools will be necessary for streamlining the process of tracking submittal of parcels from municipalities to the state. At its simplest, these tools might involve a database that lists contact information and the date of the last, accepted submittal. Using this database, MassGIS could proactively generate requests/reminders to re-submit on an annual basis. Private sector companies such as the Warren Group have been successful in obtaining updated CAMA data from assessors by being diligent in their communications and requests to communities.

Developing tools for assessors that facilitate their maintenance of standards compliant digital parcels would potentially incentivize more frequent submittals. The easier it is to update standardized parcels the more likely it is that communities will update and resubmit their data. By working with communities to provide technical guidance and productivity tools, MassGIS may be able to encourage both parcel updating and a willingness to share with the Commonwealth.

Finally, state government outreach to the private sector geospatial services and CAMA software vendor communities can be an important element in fostering regular updating and sharing with the Commonwealth. Many geospatial companies perform parcel map updating on behalf of communities and these companies can help explain the benefits of the MassGIS standard and perform their work so as to maintain parcel compliance. Indeed, most of the leading geospatial service providers in the Commonwealth are working, under contract to MassGIS, to perform parcel automation and standards compliance work as part of the State 911 funded initiative of FY2011. MassGIS has also already contacted the major CAMA vendors concerning the parcel standard and the need for those vendors to add a standard report (data extract) to their software that supports the state standard; these companies have willingly created this new report. Such reporting tools should simplify the process of producing standards compliant parcel attributes directly from CAMA databases. The companies can help to further carry this work forward through their collective parcel updating contracts with municipalities. Again, by providing and/or encouraging the development of tools that make it easier for municipalities to comply with the standard, the more likely it is that the cities and towns will regularly provide updated data to DOR.
5.1.3 Enforcement Of Currency

While it is far more desirable to encourage compliance with the parcel standards and regular submittals to MassGIS, it is likely that some form of “enforcement” will also, in rare cases, be necessary to ensure that the statewide parcels are kept current. As described earlier, the DOR “certification” of local revaluations has the potential to provide this kind of enforcement mechanism. Local communities cannot levy the property tax without having a certified revaluation and tax rate and thus they are highly incentivized to meet DOR requirements. If providing parcels in a standards compliant format was a requirement for certification, then communities would have a very strong motivation for updating parcels.

Indeed, DOR has this capability with their current hard copy mapping requirement. While used very infrequently, there have been several cases where a community’s maps were so bad that DOR communicated that improvements would be necessary in order to receive their next certification. In these cases, such a warning was enough to compel the community to improve its parcel maps. The City of Revere provides an example of this as following a DOR “warning” they made significant investments in both automating their hard copy maps and updating them. Again, the three-year revaluation cycle provides a good amount of time for DOR to communicate concerns and for a community to react on a voluntary basis to avoid a future certification complication.

Absent DOR involvement, there wouldn’t be opportunities for a regular business transaction between the Commonwealth and assessors that has a direct nexus to parcel data. Other opportunities would be more limited, but could be experimented with. For example, other grant or funding opportunities between EOAF-ITD and communities could be made contingent on the community having parcel data submitted to MassGIS. While less expansive than a DOR requirement, this approach has the ability to make access to funding an incentive for regular, standards compliant parcel submittals.

5.2 Phasing & Milestones

The phased, timeline on the following page shows the general sequence of activities for executing the program over the next 5 years. As per the implementation path presented above, the timeline reflects two major sets of activities pertaining to 1) completion of standardized, digital parcels on a statewide basis, and 2) working with DOR to formulate and implement a strategy for making digital parcel submissions a component of the revaluation process.
Task Name

- Completion of statewide parcels
  - MassGIS/EO PSS Parcel Automation/Standardization - Phase 1
  - MassGIS/EO PSS Parcel Automation/Standardization - Phase 2
  - Seek and finalize funding to complete the state for standardized, digital parcel
  - Finalize project contract to complete parcel automation & standardization

- Planning for parcel updating & maintenance
  - Work with DOR to plan for updating tax mapping requirement to be digital
  - Obtain decision from DOR on whether requirements can be updated to require digital
  - Communicate with committees on new digital parcel map requirement
  - Institute new requirement for committees with digital parcel & performing re-evaluations for 2013
  - Re-evaluations stated for 2013 proceed

- Updated parcel data is submitted to DOR for committees as part of Phase 1 or 2 projects
  - MassGIS performs QA/QC and standards compliance testing on submitted data
  - Digital requirement, parcel submissions and QA/QC checks are perfected through 2014 & 2015amu
  - Final guidelines for digital parcel submissions as part of renewal process are issued by DOR
  - Submit initial portions of the automation and standardization of all parcels in state
5.3 BUDGET PLAN

The following provides a summary of the expenditures that are committed for FY2011 (Phase 1) and anticipated for FY2012 (Phase 2) and FY2013 (Phase 3) to implement the goal of statewide, standardized parcels.

5.3.1 Assumptions

The following assumptions should be kept in mind when considering the budget requirements described below:

- As described in the table in Completion of Development (see section 5.1.1), the statewide parcel total refers to total number of project parcels which does not include parcels in the three largest communities in the Commonwealth: Boston, Springfield and Worcester. Because of their size and the quality of their existing parcel mapping, which complies with important elements of the MassGIS standard, current plans do not include funding requests for standardization of parcels in these communities.

- The numbers in the budget table below include condominium records. It is estimated that there are 300,000 condominium records in the Commonwealth. While condominiums are not represented as polygons in the parcel standard, it does require significant effort to properly associate condominium records with the appropriate parcel polygon and should be budgeted for accordingly.

5.3.2 Budget Requirements

As the table below documents, following the full execution of the FY2011 and FY2012 projects, approximately $601K of additional funding is required to complete statewide parcel automation and standard compliance work (i.e. see the Phase 3 columns below).

<table>
<thead>
<tr>
<th>Statewide</th>
<th>Phase 1 (FY2011)</th>
<th>Phase 2 (FY2012)</th>
<th>Phase 3 (FY2013)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parcels</td>
<td>As %</td>
<td>Parcels</td>
<td>As %</td>
</tr>
<tr>
<td>2.1M</td>
<td>100%</td>
<td>712K</td>
<td>34%</td>
</tr>
</tbody>
</table>
5.3.3 Maintenance Costs

Maintenance of standardized digital parcels is no more costly than maintenance of non-standardized digital parcels. Communities who are currently maintaining parcel maps digitally, and who typically outsource these activities to consultants, are typically paying in the range of $1,500 - $3,500 per year for parcel maintenance depending on the number of updates and number of maps. Approximately 20% of a community’s annual maintenance fees go toward printing hard-copy maps for display at the Assessor’s public counter and distribution to municipal departments. If the perceived need to view and distribute parcel maps on paper went away, average costs for digital parcel maintenance would be significantly reduced and fall in range of $1,200 to $2,800 annually. The reliance on paper maps has already begun to decline as digital maps are often made available to municipal staff and the public in widely accessible formats such as Adobe PDF.

5.4 OUTREACH & EDUCATION

The program presented above institutes some significant changes. While these changes are consistent with existing trends and the vast majority of parcels are already managed in an electronic format, requiring these changes, including a submittal of digital parcel data to the Commonwealth, will be very new. Thus, if and when it is determined that new revaluation requirements will be pursued, this concept will need to be communicated proactively and sensitively and with input from impacted stakeholders, i.e., the assessing community.

MassGIS has already begun to pursue this path. During 2010, MassGIS conducted 7 regional stakeholder workshops that introduced MassGIS’s strong interest in obtaining statewide parcels and the nexus between parcels, addressing data and public safety. As summarized below, these stakeholder sessions were very well attended:

<table>
<thead>
<tr>
<th>LOCATION</th>
<th>DATE</th>
<th>PARTICIPANTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pittsfield</td>
<td>May 4, 2010</td>
<td>16</td>
</tr>
<tr>
<td>Springfield</td>
<td>May 20, 2010</td>
<td>31</td>
</tr>
<tr>
<td>Auburn</td>
<td>May 24, 2010</td>
<td>42</td>
</tr>
<tr>
<td>Boston</td>
<td>June 3, 2010</td>
<td>22</td>
</tr>
<tr>
<td>Lawrence</td>
<td>June 7, 2010</td>
<td>17</td>
</tr>
<tr>
<td>Greenfield</td>
<td>June 10, 2010</td>
<td>27</td>
</tr>
<tr>
<td>Wareham</td>
<td>June 15, 2010</td>
<td>56</td>
</tr>
</tbody>
</table>
If this program moves forward, these initial workshops should be repeated to demonstrate the progress that has been made. Such workshops might be planned and conducted in collaboration with the Massachusetts Association of Assessing Officer’s (MAAO) and the county assessing associations. Examples of general progress that might be highlighted include:

- MassGIS parcel automation and standardization projects
- Introducing the concept of a DOR parcel data submittal requirement in the context of keeping the statewide parcel data current.

Other key messages to convey during a second round of workshops might include:

- Encouraging broad, ongoing participation to help shape the parcel submittal requirement
- Describing how Commonwealth funding for initial automation and standardization in combination with existing requirements for parcel map maintenance means that this is not an unfunded mandate
- Introducing a multi-year implementation schedule that will allow all parties to participate in program planning, and for communities to make appropriate preparations
- Explaining the linkage of parcel data submittal requirements to existing revaluation cycles

In addition to outreach to the GIS community, there should also be energetic outreach to the GIS and public safety communities. These communities understand the importance of standardized statewide parcel data and will be eager consumers of this resource. These communities need to know the shape and status of these initiatives so that they can continue to help advocate for it. While there may be understandable concerns from some communities, it is important to also show that there is deep and broad based support as well.
6 MEASURING SUCCESS & FEEDBACK FOR RECALIBRATION

The timeline presented in Section 5.2 identifies several key milestones. The most obvious measure of success is to see whether those milestones have been met and whether the initiative is unfolding “on time.” The following provides a summary of key implementation milestones that will help to measure the success of this effort:

1. The funding necessary to complete the next round of statewide parcel standardization and automation is obtained by August or September 2012 when capital funding requests are reviewed.

2. The DOR determines that there will be parcel data submittal requirement as part of the revaluation process by March 31, 2012.

3. 100% of the Commonwealth’s parcels are automated and standardized by June 30, 2014.

4. The first digital parcel submittals from communities are received by DOR as part of the 2013 revaluation process.

5. By the 2016 revaluation cycle, the submittal of digital parcels is fully implemented and 100% of communities have re-submitted updated parcel data at least once.

While the DOR revaluation cycle is currently 3 years, most communities update their parcel data annually and for this initiative to be most effective, most communities will submit their parcel data to the statewide collection annually. An alternative approach might be to separate communities into three groups with the one group for communities where the target would be annual updates, one for bi-annual updates, and the third for tri-annual updates. These groups could reflect the level of development activity and property sales. The following targets aim to track the progress of obtaining annual updates from communities:

- By 2013, 33% of municipalities have parcels no more than 1 year old
- By 2014, 67% of municipalities have parcels no more than 1 year old

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8 Except, as noted earlier, for Boston, Springfield, and Worcester.
• By 2015, 90% of municipalities have parcels no more than 1 year old
APPENDICES

6.1 INTERVIEW WITH THE MASSACHUSETTS BOARD OF REAL ESTATE APPRAISERS (MBREA)

**Date:** November 16, 2010

**Attendees:**

- Neil MacGaffey, MassGIS
- Shaun Fitzgerald, Past President of the Board of Massachusetts Real Estate Appraisers
- Michael Terner, Applied Geographics, Inc. (AppGeo)
- Kate Hickey, Applied Geographics, Inc. (AppGeo)

**Discussion:**

- Neil introduced project as a 3-4 year timeline
  - a. Conversations need to happen with described the major stakeholders: DOR, MAAO, State 911, Board of Real Estate Appraisers
- Big question: How does MassGIS hold onto funding?
  - Shaun described appraisers as falling in to 2 groups:
    - Group 1: Residential
      - Using lots of scrubbed, easy-access online data
      - Focused on questions on the standard appraisal form
      - Need to see utilities, flood, endangered species, zoning, orthos, hazardous waste, underground storage tanks
    - Group 2: Non-Residential
    - Focused on eminent domain, divorce proceedings, etc.
- Appraisal Software Vendors
  - Help fill in forms
  - Package the “free” data
  - Examples include ACI, Appraisers Choice, AppraiseIT
  - These are the vendors buying data and standardizing it
  - Creating software design to fill in the forms
• Errors occur: Paper data is more accurate but often out of date. Digital data can reveal spatial inaccuracies.

**KEY POINT:** There are multiple agencies collecting parcels perpetuating an inefficient process.

• Desired Functionality
  
a. Wants to be able to map any property list using standardized parcel data for geocoding to generate thematic maps (e.g. foreclosures, comparable properties).
b. Wishes there was a “Map from List” web service that would do this for him
c. Thematic Map Checklist: Flood, Storage Tanks, Zoning, Flood
d. Direct links to Property Record Cards, Deeds, Plans
  
  - Some registries charge to print these documents (e.g. Plymouth, Barnstable, Norfolk, Bristol) as these are still independent registries
e. Support for identifying developable land (Owner, street address, lat/long, parcel identification number)

• The Privacy Issue
  
a. Some communities don’t want to give CAMA data and get their legal departments involved
b. Property records are public and transparency is critical
c. Data already available from Banker & Tradesman
  
  - Everything in same format because of B&T (he designed this database as a consultant)
d. The Towns *know* they have to give it to you but the Open Records Law is contentious and litigious
e. The Warren Group
  
  - Data Supplier of Statewide Data
  - Scrub and merge with registry information (weekly) via electronic feed
  - Are they a monopoly? They have competition, but it’s weak
  - The coup that Warren Group has achieved is collaboration with CAMA vendors
  - Soon Patriot and Vision will implement a MassGIS standard extract

**KEY POINT:** Good lessons to be learned from the private sector about data collection and standardization
6.2 INTERVIEW WITH THE MASSACHUSETTS ASSOCIATION OF ASSESSING OFFICERS (MAAO)

Date: December 15, 2010

Attendees:

- Neil MacGaffey, MassGIS
- Kate Hickey, Applied Geographics, Inc. (AppGeo)

Discussion:

- Neil introduced the project and the business plan
  a. Parcel status in Massachusetts
  b. Recap of prior grants
  c. The “maintenance issue”
  d. Described the role of Assessors in supporting the statewide parcel initiative
  e. Said we are here for their suggestions

- MAAO Suggestions:
  a. Take the 911 funding and distribute to every city and town promising that funding would continue as long as they keep submitting standardized parcel data. They would lose money if they didn’t comply with submission request. (This suggestion did not take into account that the state does not have long-term funding for parcel maintenance).
  b. Need DOR requirement for standard digital data in order to get Town funding and support. Otherwise, this gets “hacked” from the Town budget. They ALL want it done, but they need a “club” to force the Town to support standardization and maintenance. They were all in agreement that they didn’t think the DOR would change their requirement because this would be viewed as an “unfunded mandate”.
  c. Educate decision makers that Parcel data is the basis for the entire Town’s GIS capabilities and these will be lost without good parcels.
d. The state should pay for maintenance. (This recommendation had no suggestion for where the long-term funding would come from.)

e. Public Safety departments should budget for parcel maintenance as it serves local emergency response.

### 6.3 INTERVIEW WITH THE MASSACHUSETTS DEPARTMENT OF REVENUE

**Date:** March 14, 2011

**Attendees:**

- Marilyn Browne, DOR
- Dave Davies, DOR
- Brenda Cameron, DOR
- Christian Jacqz, MassGIS
- Michael Terner, Applied Geographics, Inc. (AppGeo)
- Kate Hickey, Applied Geographics, Inc. (AppGeo)

**Discussion:**

- **MassGIS Summary of Current Parcel Project**
  
a. $800K this year with additional $1.18M next year requested
  
b. Vendors currently working with 120 Towns to produce standardized, digital mapping
  
c. Funding sources
  
d. Brief history of the standard - a lot of input from Assessors, Consultants and is generally well-received
  
e. Clarification made that MassGIS is working with all major GIS vendors on current effort; AppGeo is a parcel vendor and also happens to be working on the Business Plan simultaneously

- **So, what’s the role for DOR in sustaining this investment?**
  
a. MassGIS is convinced that digital mapping is important to local assessing and a major benefit to DOR because it makes standard, high-quality information easily available
b. With the right PR and support, people will see the benefit
c. Owner information easily accessible because of required link to CAMA
d. Benefit to DOR includes ability to perform multi-county comp analysis
e. The Assessors in Arkansas are supportive of statewide parcel standardization and are discovering new land and increasing assessments

• Since DOR has business transactions with communities already, could there be a “strong encouragement” and even potentially a requirement for digital standard parcels?
  a. DOR has occasionally recommended digital parcels “as funding permits”
  b. There have been issues with a map-centric revaluation in an unidentified Mass Town
  c. DOR acknowledges that GIS is a great tool, but maintenance is a big problem
  d. DOR concerned about the small communities – would they need to pay for an annual contract with vendors? How would they view parcels?

  ▪ MassGIS will provide online viewer to towns and soon, Broadband will be available to all western Massachusetts. This will provide public service and help small towns that are only open for limited hours each week.

• What’s the current procedure for checking maps and certification?
  a. Currently DOR checks paper maps – only the changed map sheets.
  b. Mapping is really a minor component for certification
  c. DOR acknowledged that mapping would help alleviate field work and help get around travel restrictions (currently 10 people in the field)

• DOR: What do we need to do?
  a. DOR to endorse the MassGIS Parcel Standard

  ▪ Encourage communities to use it and endorse it as “best practice”

  b. Potentially change procedures so that DOR validates map updating practice through digital submission (regular but not necessarily annually)

  ▪ MassGIS does not see that as an “unfunded mandate” because Towns are already required to maintain maps
• **DOR:** What are the Town’s hesitations to comply with program once you’ve “sold” them on benefits to assessors, public safety, schools, etc?
  
a. Everyone is interested in a “free” parcel product; the RISK we are trying to address is long term maintenance

• **DOR:** Could MassGIS tell DOR who is not in compliance? Would they accept this QA role?
  
a. Yes, MassGIS has highly automated QA process

**NEXT STEPS**

a. DOR will consider endorsing the standard after review

b. The Business Plan will identify DOR as potentially part of the long term maintenance plan
   - DOR would like to see draft of plan when complete

- DOR will consider the requirement of digital submission
  
a. IF they did proceed they would issue a “Guideline” to be included in certification materials.

  If Towns don’t comply, then no certification and no tax rates.