

# **MetroGIS Fair Share Financial Model Consultant Team's Report**

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## 1.0 EXECUTIVE SUMMARY

MetroGIS is a volunteer organization, established in 1995, committed to the development and sharing of geospatial data among local government organizations in the Minneapolis-St. Paul metropolitan region. The intent of the organization is to become self-sustaining. The goal of the project reported here was to provide the foundation for sustainability.

The MetroGIS Fair Share Financial Modeling project was conducted between October, 1998, and September, 1999, with funding provided by a National Spatial Data Infrastructure (NSDI) Framework Demonstration Grant from the US Geological Survey (USGS). Its objectives were to identify the roles and responsibilities of key MetroGIS participants, to estimate basic costs of achieving the data collaboration goals of MetroGIS, and to develop alternative financing and organizational models for MetroGIS. An additional objective was to determine how MetroGIS data and functions might fit into the National Spatial Data Infrastructure.

In May 1997, thirteen high priority information needs were identified (Section 4.2.1 and Appendix 3). In September 1998, the Policy Board approved a number of functions appropriate to a mature MetroGIS (Section 3.8.1 and Appendix 4). These, and a set of Policy Board endorsed assumptions (Section 3.8.2), became the foundation for this study.

An assumption of NSDI is that the data needs and functions of regional GIS collaboratives, such as MetroGIS, fit within the concept of the NSDI. This statement was proven true for MetroGIS, MetroGIS' data needs and functions were found to overlap those of NSDI (Section 4). The framework data categories and functions identified in the Framework Handbook and Guide also were shown to overlap with MetroGIS data needs and functions. However, both MetroGIS and NSDI were found to have needs outside the interests of the other (Section 4.3.1). Data content requirements also vary considerably. MetroGIS also adheres to less stringent metadata standards than NSDI, in hopes of encouraging the rapid development of metadata. Supplemental funding will likely be needed if MetroGIS is expected to meet suggested NSDI content and standards when not consistent with the needs of MetroGIS stakeholder community.

Task tables developed from the definitions of data needs, roles, and responsibilities became interview tools in the second phase of the project (Section 5.2 and Appendix 9). The interview results provided the basis of the subsequent estimates of the costs to maintain MetroGIS and achieve its stated goals. Cost estimates concentrated on the three highest priority business needs: jurisdictional boundaries, parcels, and street centerlines and addresses. Costs for other data needs were extrapolated from these on the basis of four recommended operational scenarios (Section 5.6). We estimate the average annual cost for maintaining the normal operations of a mature MetroGIS organization and creating and maintaining datasets to address the top 13 identified information needs to be \$1,482,449 per year over a four year period. Normal operations and the satisfaction of the 11 least expensive information needs would cost \$1,039,255 per year over four years. Normal operations and the satisfaction of the 3 highest priority information needs would cost \$909,482 per year over four years. The annual cost to support normal operations only for a mature MetroGIS is estimated at \$634,312.

These cost estimates provided the basis for the fair-share financial models presented in Section 6. Development of the financial model was constrained by the following assumptions:

1. Equivalent Effort - No organization will be expected to contribute more to support a MetroGIS data need than it would have to pay to meet its internal needs outside of membership in MetroGIS.
2. Cost of Data Development - Organizations will not be expected to incur costs to develop or maintain data for MetroGIS that exceed what it would cost to meet their own needs without being appropriately compensated.
3. Cost of Data Distribution - Organizations will not be expected to contribute more to a MetroGIS data sharing solution than they would incur to obtain, import, and manipulate data for their own needs unless they are appropriately compensated.
4. Existing Business Functions - Organizations will not be expected to maintain data for MetroGIS unless that organization has an internal business purpose to maintain the data.
5. Forms of Contributions - Contributions may be in several forms, including funding, data, people and equipment.

The primary tasks of model development include:

1. Develop fair user charges
2. Create a pricing mechanism that will compensate producers of regional data when beyond their organization's business needs and create a financially stable MetroGIS.
3. Develop a financial and pricing model that can be updated and expanded to incorporate future changes in the number of subscribers and cost of operations.

A marginal cost methodology was determined to be most appropriate for developing the financial model (Section 6.3.2). The estimated costs to develop regional "socioeconomic" and "where people" data sets were excluded from the financial model at this time because of the high cost of data development (Section 6.4.1). Annual costs were assumed to be \$1,040,000, with data development spread over a four-year period. Costs were allocated to seven classes of users (Section 6.4.2), based on allocators discussed in Section 6.4.3. The recommended fee structure includes a base subscriber fee, a variable subscriber fee, and a GIS User Group Participation Credit.

\$900,000 of the \$1,040,000 proposed annual expenses would be recovered through subscription fees from the seven classes of public subscribers. The other \$140,000 in annual revenue would come from grants and other subscribers. Market penetration rates are a critical component of the study (Section 6.5.5). A total of 62 subscribers, distributed among the seven public user classes, including participation of state and federal government in addition to metropolitan and local government classes, are assumed. If a higher penetration rate is achieved, costs per subscriber would be lower or more can be done. Conversely, without this penetration rate, costs per subscriber would be higher. County participation would be satisfied through contribution of their data resources.

Alternative organization models to support the long-term viability of MetroGIS were also considered. Criteria for evaluating these alternatives were provided by the MetroGIS Policy Advisory Team and the Consultant (Section 7.1.2). The field of alternatives was narrowed to

three: an intergovernmental or other contractual agreement, a joint powers agreement, and a non-profit corporation. Upon clarification of the pros and cons of each, the Policy Advisory Team recommends that a joint powers agreement best fits its current vision of MetroGIS, pending completion of a Business Plan to confirm this decision.

## 2.0 INTRODUCTION

*Randall Johnson, MetroGIS*

*Dr. Elizabeth Hobbs, Sufficient Systems, Inc.*

Organizations within the Minneapolis-St. Paul metropolitan region have been working together since 1995 to build a sustainable structure for effectively meeting their common geospatial data needs. This effort, called MetroGIS, reflects Minnesota's historical tradition of practical collaborative development and implementation of geospatial information technology. Involving a comprehensive cross-section of public and private organizations doing business within the seven-county metropolitan planning region, MetroGIS evokes an unprecedented level of commitment from its stakeholders to a shared vision.

In its first four years of operation, MetroGIS has been a volunteer organization. The Metropolitan Council agreed to finance the majority of the definition phase of MetroGIS, which could be effectively complete on October 27, 1999, in accordance with two overarching goals: 1) Be a leader in the region and 2) Facilitate regional approaches and collaboration with and among government organizations that serve the seven county region. However, continued development of MetroGIS will require funding from stakeholders in addition to the Metropolitan Council. In some cases, organizations in addition to the Metropolitan Council may be called upon to provide funding in excess of their direct benefit to main the momentum during the development phase.

The MetroGIS Fair Share Financial Modeling project was conducted between October, 1998, and September, 1999, with funding provided by a National Spatial Data Infrastructure (NSDI) Framework Demonstration Grant from the US Geological Survey (USGS). Its objectives were to identify the basic costs of achieving the data and operation collaboration goals of MetroGIS, to develop alternative financing models for MetroGIS, and to document their long-term feasibility. The project consisted of four major tasks:

- *Clarifying stakeholders' roles and responsibilities with respect to NSDI Framework Functions.* The primary objective of this task was to identify shareholder activities pertinent to the creation, maintenance, integration, and management of high priority spatial data sets. The identification of such activities was necessary to support the cost estimates in the following task. In addition, comparisons between NSDI Framework themes and MetroGIS Business Needs and between NSDI and MetroGIS standards were made.
- *Estimating the costs of collaboration.* The primary activities of this task were work analysis, managerial accounting, and auditing to best estimate the marginal cost of operating MetroGIS on a long-term, sustainable basis.
- *Design a fair-share financing model.* On the basis of the cost estimates from the previous task, accounting and financial modeling were used to develop models by which the costs of sustaining MetroGIS can be shared fairly by stakeholders.
- *Design an appropriate organization structure to support collaboration.* This task consisted of evaluating and recommending appropriate organizational structures that will allow MetroGIS to meet its goals of collaboration and cost sharing.

This document reports the findings of the MetroGIS Fair Share Financial Model project. It includes sections on each of the tasks described above, as well as an introductory section on the history of MetroGIS. The Appendices (separate document) to this report provide the detailed supporting material developed over the course of the project.

## 3.0 BACKGROUND

*Randall Johnson, MetroGIS*

*Dr. David Arbeit, Mn Land Management Information Center (LMIC)*

MetroGIS<sup>1</sup> may be the most ambitious multi-participant GIS venture in the country, with over 250 units of local government represented by its stakeholder organizations. Conceived in late 1995, MetroGIS reflects significant commitments of a broad cross-section of organizations. These include:

- the Metropolitan Council of the Greater Minneapolis-St. Paul Metropolitan Area (Metropolitan Council)<sup>2</sup> and other metropolitan agencies, such as the Metropolitan Airports Commission and the Metropolitan Mosquito Control District
- city councils; county boards; school districts; watershed organizations; state and federal agencies
- state and federal agencies
- the academic and non-profit communities
- the private sector

### 3.1 Organizational Structure

The organizational structure for MetroGIS reflects the strong commitment that has been made by the stakeholder organizations. Legislative bodies and policy boards of key organizations have adopted resolutions supporting MetroGIS principles, and members from organizations critical to the success of MetroGIS serve on the MetroGIS Policy Board. A Coordinating Committee, comprised of more than twenty GIS professionals and managers representing participating organizations, advises the Policy Board. Dozens of other GIS professionals serve on MetroGIS teams and special purpose workgroups devoted to identifying workable solutions to data access, data content, data standards, and policy needs critical to achieving the vision of MetroGIS.

Detailed by-laws and operating procedures, adopted by the Policy Board, provide a basic structure for governance. The Metropolitan Council provides administrative support and most of the funding at the present time. The Policy Board and Coordinating Committee meet quarterly. Advisory Teams and their various work groups meet as needed to complete their work, which is

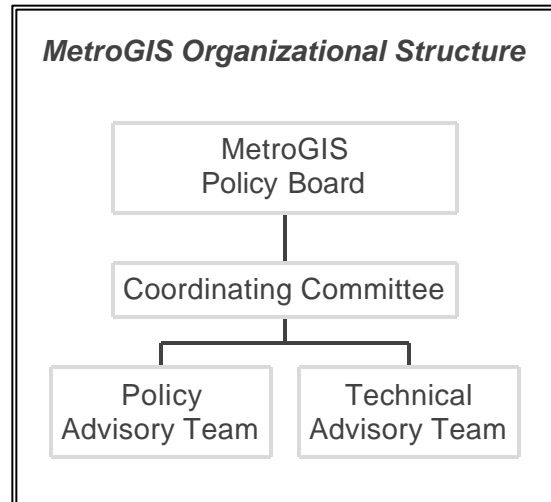
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<sup>1</sup> See the MetroGIS Internet site at [www.metrogis.org](http://www.metrogis.org) for additional information about the participants, projects, and operating guidelines.

<sup>2</sup> The Metropolitan Council is the regional planning organization for the seven-county Minneapolis-St. Paul Metropolitan Area. Its responsibilities include running the regional bus system, collecting and treating wastewater and managing water resources preservation, overseeing growth management policy, planning regional parks and administering funds that provide housing opportunities for low and moderate income families. See [www.metrocouncil.org](http://www.metrocouncil.org) for more information.

generally assigned by the Coordinating Committee. The teams report back to the Coordinating Committee, which recommends actions to the Policy Board.

Although the current geographic scope of MetroGIS is the seven-county region served by the Metropolitan Council, the by-laws and procedures adopted by the Policy Board provide for extending the effort beyond those boundaries. Since the Metropolitan Council serves only the core counties of a much larger Minneapolis-St. Paul Metropolitan region recognized by the U.S. Census Bureau, including three counties in Wisconsin, the organizational framework and the technical protocols for integrating data adopted by MetroGIS must be capable of expansion.



### 3.2 Vision and Accomplishments

A seemingly simple vision guides MetroGIS. This vision has been forged through an intensive consensus-building process and endorsed by all local government organizations critical to its success. The vision:

*Provide an ongoing, stakeholder-governed, metro-wide mechanism through which participants easily and equitably share geographically referenced graphic and associated attribute data that are accurate, current, secure, of common benefit, and readily useable.*

MetroGIS has made significant progress towards fulfilling its vision, thanks to substantial financial and resource commitments made by the Metropolitan Council, several hundred volunteers representing dozens of cooperating organizations, and grant funding received from the National Spatial Data Infrastructure (NSDI) program. Significant MetroGIS accomplishments are described in Section 3.5.

Nonetheless, MetroGIS is a work-in-progress, an ad hoc organization not yet able to operate independently. The current schedule calls for the MetroGIS Policy Board to decide on October 27, 1999 whether to seek legal standing for MetroGIS as an independent entity. The Board will also be asked to consider the final components of the MetroGIS defining phase that relate to adopting an approach for equitably sharing MetroGIS operating costs.

### 3.3 MetroGIS: the State and National Context

MetroGIS shares a similar vision with those adopted by the Minnesota Governor's Council on Geographic Information and promoted for the NSDI. Each assumes that geographic data have significant value and that coordination among data producers can significantly enhance that value while reducing the costs of data development and use. Each also envisions making data available for use at minimal cost to users. Further, MetroGIS and the state of Minnesota have both actively contributed to refining and advancing the NSDI vision. Based on these circumstances, it is tempting to conclude that the NSDI vision is a practical goal, and that, at least within Minnesota, the pieces will easily and rapidly fall into place.

But similar visions do not guarantee easy synchronization between MetroGIS, the state of Minnesota, and the NSDI. As a regional organization, the geodata needs for MetroGIS cannot be assumed to be identical to state of Minnesota needs or to the needs of federal agencies. Even within single units of government, geodata needs are often complex. A municipal public works department may legitimately view its data needs differently from the same city's planning department. Diverging data needs also are common among county departments, state agencies, or federal units of government. Assuming that locally generated data can be meaningfully pieced together to form coherent regional, state or national data collections requires a huge leap of faith. Simply stated: one size does not fit all!

The NSDI vision assumes that any organization may contribute to the NSDI framework by integrating data for a geographic area contributed by local governments, state and federal agencies, the private sector and other organizations. Such organizations, called data integrators, would format the data to agreed-upon standard specifications. In local areas, organizations would work together to create large-scale (high-resolution) data. These data would be aggregated by data integrating organizations needing more generalized data for larger areas. This would be a plausible scenario if the geodata needs of all organizations within an area were identical and the costs of integration were trivial. But the reality is quite different — organizations have different data needs and the costs of integration are considerable. The vision requires willing data contributors and willing data integrators. Therein lies a key question: why would organizations choose to assume those roles?

MetroGIS makes a practical assumption that organizations cooperate out of self-interest. Very early, participants agreed that they would be asked to support the "data sharing" ideal only if it met their own business needs. In other words, MetroGIS must serve a diverse collection of functional ends, not data sharing for its own sake. For MetroGIS, the principal stakeholders are the Metropolitan Council and the over 250 local units of government that serve the seven county Minneapolis-St. Paul Metropolitan Area — counties, cities, school districts, and watershed districts — few of which need geodata for the same purpose or use it in the same form. The principal challenge for MetroGIS is to meet the geodata needs of these organizations without costing them more in resources or time than would otherwise be the case if they developed or integrated the data themselves.

To succeed, MetroGIS must clearly identify benefits to stakeholders to justify the resources they will be asked to commit to collaboration. Costs are a significant issue. In some cases, the data-sharing goal poses a real or imagined threat to stakeholder revenue streams. This issue, too, must be addressed fairly and practically. The answers will be important to MetroGIS and to the NSDI.

Based on this "self-interest" assumption, MetroGIS is guided by several fundamental principles, including the following.

1. *Actively Involve Policy Makers.* The MetroGIS Policy Board was created to include high level representation of key stakeholders and to keep MetroGIS focused on stakeholder needs. The Board has set the direction for strategic initiatives, provided a reality check for proposed courses of action, identified appropriate areas for collaboration, and, of course, set policy.
2. *Promote Understanding.* To help Policy Board members understand the value of geodata and GIS, Policy Board meetings include demonstrations by organizations represented on the

Board using GIS to support their business operations and to point out benefits associated with data sharing.

3. *Seek Consensus on Policy Decisions.* Consensus among Policy Board members is sought for courses of action on issues and opportunities fundamental to MetroGIS.
4. *Represent Diverse Perspectives.* MetroGIS decision making derives from work performed by broadly representative committees and workgroups, comprised of managers and technical staff with appropriate expertise. These committees and workgroups identify common needs, develop work programs, and formulate solutions to these needs.
5. *Maintain Focus on Business Information Needs.* MetroGIS took pains to identify common business information needs of key stakeholder organizations and embarked on a regional geodata strategy consistent with these common needs.
6. *Focus on Stakeholder Benefits.* Identifying stakeholder benefits is fundamental to strengthening commitments to MetroGIS, whether or not benefits can be precisely measured.
7. *Acknowledge Fair-Share Contributions.* Contributions to the sustained operation of the regional collaborative, from any one stakeholder, may be in the form of funding, data, and/or people and equipment.
8. *Compensate for “Costs of Collaboration”.* No stakeholder organization will be asked to perform a function exceeding their internal business needs for the collaborative without appropriate compensation.

### **3.4 The Metropolitan Council as Project Champion**

The Metropolitan Council is a metropolitan government organization charged by the Minnesota State Legislature to provide leadership that results in policies and mechanisms to wisely use land resources within the seven-county Minneapolis St. Paul Metropolitan Area and to cost-effectively operate regional systems for transit and wastewater treatment.

In 1994, the Metropolitan Council concluded it needed a parcel-based GIS to support its mission. It also concluded that a collaborative approach with its local government partners was the most prudent course of action for achieving this goal. The Council also concluded that championing a regional GIS collaborative was consistent with its over-arching corporate goals to foster collaborative solutions to needs in common with its local government partners and with its desire to be recognized as an effective leader in the region.

In October of 1995, the Metropolitan Council and the Minnesota Land Management Information Center co-sponsored two informational forums to assess support for pursuing a regional GIS and for the Council to facilitate the effort. Over 150 people attended these forums. Both concepts received strong support. In 1995, recognizing that a regional GIS could simultaneously address two of its high priority corporate goals, the Council approved a statement of its role in facilitating the creation of a regional GIS (Appendix 2) as recommended by the MetroGIS Coordinating Committee. Subsequently, the Council authorized:

- additional staff for the project
- funding for data and cost sharing agreements with each of the seven counties

- funding for outreach activities, general program administration, team support, pilot projects, and strategic initiatives to acquire institutional and technical knowledge needed to implement a regional data sharing mechanism

Through May 1999, the Metropolitan Council has contributed in excess of \$1.2 million in project funding, in addition to four FTE in staff support. Other sources of project financing have been:

- about \$380,000 from the Minnesota Department of Transportation for a master data license and maintenance agreement for addressable street network data
- a \$100,000 NSDI Framework Demonstration Grant awarded for the MetroGIS Fair-Share Financial Model Project

The Metropolitan Council concluded it would be difficult, not to mention extremely time consuming, to obtain significant financial contributions from other stakeholders until they acknowledged the benefits of a regional GIS. By removing the financial risk of participation, the Council cleared the way for essential stakeholders, regardless of their philosophy and financial resources, to actively participate in strategic decisions that have shaped MetroGIS.

### **3.5 Major Accomplishments of MetroGIS**

1. By Fall 1996, less than one year into the effort:
  - consensus had been reached on principles to govern MetroGIS
  - an interim organizational structure with operating guidelines was in place
  - unanimous endorsement had been received from the policy bodies of each of eleven key stakeholder organizations
  - a member from each of the eleven key stakeholder organizations policy bodies had agreed to participate as a member of the MetroGIS Policy Board to shape the policy for what has come to be known as MetroGIS
2. In May 1997, the Policy Board unanimously endorsed thirteen high priority information needs common to MetroGIS stakeholders (Section 4.2.1 Appendix 3). These priorities serve as the framework for defining and investing in regional data solutions. A component of the process to identify these priorities produced the MetroGIS Business Object Framing Model. The “fragments” pertaining to each priority information need are the starting points to define desired specifications for regional data solutions.
3. A regional data solution has been implemented for the top priority MetroGIS information need: city, township, and county jurisdictional boundaries. A partial solution has been implemented for addresses for people, places, and things. Substantial progress has been made to identify regional solutions specifications and custodian roles and responsibilities for parcels, future land use, and census geography. This work should be substantially complete by October 1999.
4. A partnership between the Metropolitan Council, Mn/DOT, and The Lawrence Group (TLG) was established in summer 1997 to provide free access to TLG’s addressable street centerline dataset by government and academic institutions that serve Minnesota. MetroGIS Policy Board has endorsed this dataset as a primary source of addressing information (address

matching) for MetroGIS stakeholders. In October 1998, this partnership was awarded a Commendation as an Exemplary GIS Project by the Governor of Minnesota.

5. The core functionality of MetroGIS Data Finder ([www.metrogis.org](http://www.metrogis.org)) became operational in April 1998.
6. The Policy Board reached agreement in September 1998 on the functions that MetroGIS should support as a mature organization (Section 3.81 and Appendix 4).
7. Data and cost sharing agreements were in place with all seven counties by fall 1998. All seven counties and Metropolitan Council are documenting data shared. The logs are being used by Dr. William Craig, with the University of Minnesota Center of Urban and Regional Affairs, for analysis of the benefits of collaboration and data sharing. Dr. Craig's study is funded by a 1998 NSDI Benefits Grant and is scheduled for completion fall 1999.
8. Several local GIS projects, with regional significance, are underway in conjunction with these agreements to enhance local GIS data holdings and system capabilities.
9. The Policy Board has endorsed standards pertaining to metadata, addresses, regional projection and coordinate system, MCD (minor civil division) and county jurisdictional boundaries, and a unique parcel identifier.
10. In 1998, an NSDI Framework Demonstration Grant was awarded for MetroGIS' Fair-Share Financial Model Project.

### **3.6 MetroGIS Strategic Initiatives**

Several MetroGIS strategic initiatives are currently in progress. One is complete. The following initiatives address needs critical to the success of MetroGIS and achieving its vision.

#### *1. Obtain Endorsement From Key Stakeholders*

This initiative is complete. In spring 1996, immediately following agreement on a mission statement and high level goals for a regional GIS, a stakeholder classification scheme was devised<sup>3</sup>. By December 1996, all eleven "essential stakeholder" organizations had approved a resolution endorsing the MetroGIS principles and had appointed one of its members to serve as a member of the MetroGIS Policy Board. The Policy Board met for the first time in January 1997.

#### *2. Execute Data and Cost Sharing Agreements*

Geospatial data assembled by local governments within Minnesota are often distributed for a fee and with restrictions. Minnesota law permits cost recovery for government developed datasets that have commercial value and whose development involved substantial public investment. For instance, most counties within the region currently maintain some cost-recovery policy for their parcel data. The Metropolitan Council charges for its existing land use and other datasets.

The first phase, securing the agreements, is complete. In accordance with its MetroGIS facilitation roles, the Metropolitan Council entered into interim data and cost sharing

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<sup>3</sup> The scheme is posted at the MetroGIS web site at [www.metrogis.org/organization/who\\_are\\_the\\_stakeholders](http://www.metrogis.org/organization/who_are_the_stakeholders).

agreements<sup>4</sup> with each of the seven counties in the Twin Cities Metropolitan Area. The focus is now on administering the provisions of these seven agreements. They foster a collaborative environment for testing solutions to technical and organizational obstacles to data sharing. As an incentive for the seven counties to share, without cost other than modest costs for reproduction, their data with all government units, the Council provided more than \$635,000 to the counties to assist with local GIS data and systems enhancement projects that have regional significance.

Each of the agreements has a three-year term and is intended to be superseded by agreements with the MetroGIS Policy Board. Two of them will expire on December 31, 1999. Extensions will be sought if the MetroGIS Policy Board decides to seek legal standing. Each of the seven Counties has or will receive funds ranging from \$49,500 to \$160,700 for GIS program and data enhancements that have significance for defining and implementing components of a regional data sharing mechanism. In exchange for these funds, each of the Counties has agreed to:

- share their geospatial data with all government organizations serving the region during the term of the agreement
- facilitate the creation and foster operation of a GIS Users Forum for local government within their respective boundaries
- actively participate in these forums and in the MetroGIS decision making process to address GIS issues and opportunities of common interest
- abide by common rules for data access/distribution
- maintain logs of the data they share
- provide the data sharing logs to MetroGIS to support research on the benefits of data sharing

### 3. *Define Priority Information Needs*

MetroGIS participants have worked hard to reach consensus about their collective priorities. The Business Information Needs Project has been especially important. This multi-purpose, consensus-based, broadly representative process was devised to:

- identify priority regional information needs common to stakeholder organizations, in particular those represented on the Policy Board
- identify data needed to answer each priority information need
- identify primary and regional data custodians and their responsibilities
- define critical standards, integration and aggregation specifications, and institutional policies necessary for MetroGIS participants to share commonly needed priority data

An Information Needs Forum and three Business Object Framing Modeling Sessions, held in fall 1996, were the initial events for the project. A survey followed in February 1997 to narrow the field of distinct information needs from 87 to the top 13<sup>5</sup>. The highest priority information needs

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<sup>4</sup> See <[www.metrogis.org/publications/index\\_of\\_MetroGIS\\_Publications\\_in\\_PDF\\_Format/Moving\\_MetroGIS\\_From\\_Concept\\_to\\_Reality:\\_An\\_Overview\\_of\\_the\\_Metropolitan\\_Council's\\_Data\\_and\\_Cost\\_Sharing\\_Agreement\\_Initiative](http://www.metrogis.org/publications/index_of_MetroGIS_Publications_in_PDF_Format/Moving_MetroGIS_From_Concept_to_Reality:_An_Overview_of_the_Metropolitan_Council's_Data_and_Cost_Sharing_Agreement_Initiative)> for more information about the objectives and expectations.

<sup>5</sup> More than 120 persons representing governments, private and non-profit sector interests and academia serving the metropolitan area were asked: *what information do you need to do your job?* More than 800 individual

are not only significant to the internal business operations of a variety of key MetroGIS stakeholder organizations, but are also highly dependent upon others for the data to address these information needs. In the near future, a summary of the ranking methodology used to identify MetroGIS' highest priority information needs will be available on the MetroGIS web site. Dr. David Arbeit, Director of the Minnesota Land Management Information Center (LMIC), and Dr. William Craig, Associate Director of the Center for Urban and Regional Affairs at the University of Minnesota, designed this methodology.

A consensus-based process also was created to identify desired specifications for data needed to answer each priority information need and identify candidate custodians for these data and their responsibilities. The seven NSDI Framework Functions, as outlined in the Framework Handbook published in January 1998, have been incorporated into the methodology.

Work on the top MetroGIS information need, "location of MCD (city and township)/county jurisdictional boundaries", is complete. The Metropolitan Council has accepted responsibility to serve as the regional custodian and has developed the regional dataset. Preliminary work has been initiated on data specifications for regional school and watershed district jurisdictional boundary solutions. A partial solution has been implemented for the "addresses for people, places, and things" information need through a public-private partnership (Section 3.5). Desired regional data specifications for parcels should be completed by November 1999. Development of regional data specifications for a regional future land use and existing land use designations should be complete by spring 2000. MetroGIS is collaborating with the Minnesota Governor's Council on Geographic Information to develop specifications for the MetroGIS hydrology information need. This work is expected to be substantially complete by the fall 2000.

#### *4. Implement Internet-Based Data Search and Retrieval Tool*

Core functionality for Data Finder ([www.datafinder.org](http://www.datafinder.org)), the MetroGIS Internet-based data search and retrieval tool, became operational in April 1998. Data Finder is designed to facilitate data sharing by providing a means to quickly search metadata for data holdings relevant to specific needs and facilitate data retrieval. The concept is similar to that of the NSDI Clearinghouse. Consequently, there has been close coordination between the Data Finder project and Minnesota's Geospatial Data Clearinghouse, a node of the NSDI Clearinghouse infrastructure.

For the past year, MetroGIS has focused on identifying incentives to institutionalize widespread development of metadata, in a standardized format endorsed by the Minnesota Governor's Council on Geographic Information, by MetroGIS stakeholders for their data holdings. Emphasis has been placed on documenting data associated with the high priority regional information needs. The standardized metadata are then posted with the Data Finder database to enable them to be searched over the Internet. The findings and recommendations of this metadata facilitation effort were presented at the 1999 National URISA Conference and summarized in a paper entitled "Making Metadata Part of Your Daily Diet." An expanded version of this paper will also be available on the MetroGIS web site.

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responses were received. These were consolidated to 87 mutually exclusive categories. A similar group was surveyed to rank the 87 needs on the basis of importance to the respondent's organization and the dependence on other organizations for data. On May 28, 1997, the MetroGIS Policy Board endorsed 13 of the 87 as priorities. These are listed in Appendix 3.

In addition to continuing to encourage MetroGIS stakeholders to develop and post metadata with Data Finder, the next phase of the Data Finder project will involve expanding its functionality.

#### *5. Identify A Sustainable Long Term Financing and Organizational Structure*

Addressing this strategic issue is currently the highest priority of MetroGIS and is the main topic of this report. A peer review forum is planned for September 16, 1999. MetroGIS Policy Board consideration of the findings and recommendations is scheduled for October 27, 1999. At that time, the Board will be asked to decide if sufficient public purpose exists to seek legal standing for MetroGIS. If so, the Board will be asked to act on recommendations to secure sustainable financing for the organization and an appropriate organizational structure to move MetroGIS to the next level. Several assumptions (Section 3.8.2) have been approved by the Policy Board to drive the development of the cost allocation model. They include recognition of previous investments, in particular by the Counties as producers of primary (source) data, recognition of existing formal partnerships between counties and local governments located within the counties, and acknowledgment that contributions cannot exceed perceived benefit.

#### *6. Finance Pilot Projects with Regional Significance*

Metropolitan Council, acting in its MetroGIS facilitation role, has financed three pilot projects outside of its GIS Data and Cost Sharing Agreements with the seven Metro Area Counties. They are: facilitating a GIS Data Fair, mapping land use designations in Dakota County, and assisting the North Metro I-35W Corridor Coalition implement its "backbone GIS" database. The latter is the most significant, resulting in a sub-regional database including integrated parcel, future land use, existing land use, and zoning data.

The I-35W Coalition is comprised of seven cities, located in two adjoining counties within the MetroGIS project area. The business needs the Coalition is attempting to address with GIS technology are similar to the business needs of MetroGIS stakeholders throughout the seven-county region. Specifically, the Coalition developed its sub-regional GIS to address the following objectives:

- Expand conventional land-use planning methods by applying livable community goals and objectives
- Approach physical, social, and economic development issues in an integrated and multifaceted manner
- Work at a sub-regional level to bridge the gap between regional policies and local circumstances
- Implement the policies and strategies outlined in the Twin Cities Metropolitan Council Regional Blueprint

In addition to addressing similar business needs to those of many other MetroGIS stakeholders, the technical GIS procedures developed by the Coalition to merge parcel data from two counties are directly relevant to technical hurdles that MetroGIS must resolve. MetroGIS is currently evaluating the policies and procedures developed by the Coalition for their applicability to MetroGIS needs.

### 3.7 MetroGIS Challenges and Issues

The MetroGIS vision that emerged out of public forums and strategic planning events held in 1995 continues to drive the active involvement of organizations within the Twin Cities metropolitan region. With the Metropolitan Council acting as a patron, offering significant start-up funds and staff support, tangible benefits have resulted, some of which are referenced in this paper. Still, the long-term future of MetroGIS is unclear: no permanent structure has been created, no stable source of funds has been committed, and data sharing agreements and license arrangements that currently facilitate extensive data sharing among MetroGIS participants will soon end.

In this report, we offer recommendations that may help resolve some of these uncertainties. But even with such recommendations, a sustainable MetroGIS will not be guaranteed. The following are some of the more evident challenges and issues that must be overcome, presented in no particular order.

1. *Clarifying Benefits for Data Producers.* MetroGIS has clearly benefited MetroGIS stakeholders who depend upon other organizations for data, especially organizations that depend on data from more than one data producer. School districts and watershed districts are good examples, especially when their jurisdictions cross county lines. Reliable and useful geodata that costs them little allow such organizations to fulfill their missions more effectively at reduced costs. However, counties are the primary data producers within Minnesota and depend only marginally on other organizations for most of the data they need. The case for county participation — essential for MetroGIS success — can be greatly strengthened if the benefits to them of data from other sources can be more convincingly documented.
2. *Developing Practical Common Data Specifications.* MetroGIS has identified its highest priority information needs, based upon public forums and formal surveys, and is working to develop clear data specifications to appropriately address those basic needs. Some of the data needs parallel the NSDI framework data elements, but others reflect local priorities (Section 4). General specifications have been developed for some of the highest priority data, such as municipal boundaries, and de facto specifications have evolved for some others, such as an addressable transportation network. In all cases, adopted specifications must be supported by strong consensus. Developing data specifications that both work and receive consensus support requires a significant investment in time, resources, and personnel. This is a challenge with no obvious solution.
3. *Respecting Costs of Collaboration.* MetroGIS participants, whether active on its Policy Board, its Coordinating Committee, or its working committees, have made a huge investment to help carry MetroGIS as far as it's come. These investments cannot be continued forever without obvious benefits or some form of compensation. As protocols for integrating local data within a regional data infrastructure are implemented, some organizations may potentially incur new costs to adapt their data to be compatible with that infrastructure. These collaboration costs (Section 5) must be fully understood so that organizations can be fairly compensated for work not needed to meet their own needs.
4. *Adopting a Workable Organizational Structure.* MetroGIS still functions without legislative authority as an informal organization supported by the Metropolitan Council. Alternative legal structures were investigated as part of the MetroGIS Fair Share Financial Model Project

reported here (Section 7). Our recommendation will be presented at a public forum September 16, 1999 and to the MetroGIS Policy Board on October 27, 1999. Identifying a workable structure that can be supported by the principal MetroGIS stakeholders and then implemented is a significant obstacle to overcome and is directly linked to funding options.

5. *Securing Adequate and Stable Funding.* Over the past three years, the costs to support the definitional phase of the MetroGIS initiative have averaged around \$500,000 annually including the staff support. Based upon this experience, the ongoing costs for maintaining basic support for MetroGIS would not be less than \$500,000, depending upon the level of staff support for committees and the pace of development for some technical needs related to web site maintenance and data distribution. These costs are above and beyond what organizations already spend to meet their own geodata and GIS needs. They do not include data integration efforts beyond those that meet the immediate needs of the stakeholder organizations, including the Metropolitan Council, or data development costs for other regional needs. Nor do they include the costs for "data sharing incentives" such as those that made active data sharing possible thus far.
6. *Adapting to State Data Practice Laws.* Minnesota laws governing data access, privacy, intellectual property, and cost recovery were reviewed by a state Information Policy Task Force that made some very significant recommendations in a recent legislative report. Controversial recommendations were considered but not approved during the 1999 legislative session and will be reintroduced next year. Several of these directly affect the current ability of government to charge fees for data. Most local governments oppose the change, especially those that classify their geodata as having commercial value. The challenge is double-edged: while eliminating most data fees potentially removes a major barrier to data access, it also may curtail funding for geodata development and constrain MetroGIS from using subscriptions and fees as revenue sources to support its work.
7. *Replacing "Data Sharing" Incentives.* MetroGIS participants have enjoyed an open data-sharing environment for the past several years, largely because of agreements between the Metropolitan Council and each of the seven MetroGIS counties. Each county has agreed to make its geodata available to any public organization doing business within the metropolitan region. In exchange, each receives a negotiated amount of funding, to be used for data maintenance and other technical work that both meets the needs of the contracting county and addresses a MetroGIS issue. Several metropolitan counties had previously charged fees for their data, but essentially have waived those fees for MetroGIS participants in return for a negotiated amount. Continued "data sharing" incentives may be needed to maintain an open data sharing environment for MetroGIS.
8. *Maintaining Focus.* Keeping focused on the basic MetroGIS vision remains a challenge, especially as the real and perceived successes of MetroGIS become increasingly apparent to organizations elsewhere promoting the NSDI vision. MetroGIS was created to meet regional and local needs. MetroGIS staff has participated actively in Minnesota organizations seeking improved coordination of geographic information technology and with NSDI events sponsored by the Federal Geographic Data Committee. For the most part all parties benefit, but maintaining focus on MetroGIS needs is, at times, a balancing act that requires constant attention.

### **3.8 MetroGIS Fair-Share Financial Model Project**

The MetroGIS Fair-Share Financial Model Project was conceived to guide the way to a mature MetroGIS. This project investigated the following necessary components:

- Roles and responsibilities of MetroGIS participants (Section 4)
- Data needs and standards (Section 4)
- Costs of maintaining MetroGIS and meeting its stated, near-term goals (Section 5)
- Models for fairly sharing these costs between participants (Section 6)
- Organizational structures for an independent MetroGIS that would allow it to perform its necessary functions and achieve its goals (Section 7)

The remainder of this report focuses on the methods and results of those investigations.

#### ***3.8.1 Definition of a mature MetroGIS***

The MetroGIS Policy Board acknowledged in the MetroGIS mission statement (Section 3.2) with the clause “stakeholder governed” that a mature MetroGIS must be independent from Metropolitan Council, or any other parent institution, to maintain credibility and flexibility as a stakeholder run organization. It must receive sufficient income from participants and granting agencies to support its necessary coordination, data development and distribution, service, research, and outreach functions. These core functions are (Appendix 4):

- Promoting coordination of GIS among the region's organizations
- Identifying unmet GIS needs of regional significance and acting on these needs
- Facilitating data sharing and licensing agreements among stakeholders
- Requiring standardized GIS data content, documentation, and management for regional datasets
- Endorsing standards for telecommunications protocols and networks
- Developing master contracts for regional GIS projects, when appropriate
- Promoting the exchange of GIS applications and procedures
- Create and maintain datasets based on identified priorities
- Filling gaps in metadata based on identified priorities
- Provide a directory of data within the region and a mechanism for search and retrieval of GIS data
- Undertake research to meet common GIS goals
- Promote collaborative funding of pilot projects that meet regional needs
- Advocate for MetroGIS needs and desires with state and federal policy makers
- Maintain liaison relationships with committees or organizations with similar objectives
- Promote forums for MetroGIS stakeholders to discuss common GIS needs and opportunities

- Publish MetroGIS newsletter
- Maintain MetroGIS web site
- Market MetroGIS data and products

Functions that the Policy Board (September 30, 1998) has determined **not appropriate** for MetroGIS include:

- Enforce polices which foster coordination of GIS among the region's organizations
- Actively coordinate GIS activities of the region's organizations
- Require standards for telecommunication protocol and networks
- Require standards for software and hardware
- Aggregate demand and purchase hardware, software, service contracts, etc.
- Manage MetroGIS data holdings at centralized MetroGIS site.
- Provide technical assistance to participants with hardware and software problems, application development, and projects.
- Provide a centralized service bureau. *(Note: Since the Policy Board endorsed this statement, officials from some metro area counties and larger cities, have stated they believe a major benefit to them would be for MetroGIS to help them service GIS data requests. The problem cited is responding to data requests is not a function they are geared up to effectively support and doing so takes away from the resources to carry out their primary responsibilities. Most believe a practical solution may lie in collaborative approach through MetroGIS.)*

In the course of this study, the core functions were broken down into a number of responsibilities, with roles assigned to different MetroGIS entities (Appendix 7). These formed the basis of the cost estimates (Section 5 and Appendices 9 and 10).

### 3.8.2 Assumptions

The MetroGIS Policy Board has endorsed the following assumptions from which to devise a fair-share financial model and appropriate organizational structure for MetroGIS.

*Financial/Cost Assumptions:*

- Broader funding support for MetroGIS is needed.
- Fair user rates will be established based on perceived benefit to the user.
- Benefits to the user will be defined (financial and non-financial).
- User rates will be set to assure a financially stable MetroGIS.
- A flexible model will be developed as a tool for MetroGIS, allowing modifications based on MetroGIS' changing needs.
- Producers of endorsed primary data (data to be integrated into an approved regional data solution) that are contributed to the MetroGIS data pool will receive nominal compensation

from MetroGIS for their participation in the form of a “supplemental data maintenance payment.” This payment is to compensate the producer for sharing data to all governments at no cost other than to cover modest data reproduction expenses and to defray costs attributable to sharing data with organizations outside of their jurisdictions.

- Producers of primary dataset will not be asked to support tasks or data related activities that exceed their internal business needs. They will be encouraged, but will not be required, to update/enhance primary datasets that are inconsistent with regional specifications. (E.g. the amount of supplemental data maintenance payment will be proportionately higher for fully compliant primary datasets.)
- Regional data custodians will be compensated for all tasks in excess of their internal business needs.
- Data consumers will have free access to data obtained from MetroGIS’ primary and regional data producers when by telecommunications transfer and shall not pay more than a modest fee to cover data reproduction costs for other means of data transfer.
- Not all primary data is of equal value in terms of counting toward defraying the costs of collaboration assigned to a particular organizational class (cities, counties, school districts, watershed districts, metropolitan, state, federal, and non government.) The model shall recognize the large investment counties have made to develop their GIS capabilities and the significant value of this investment to MetroGIS.
- Financial support for MetroGIS will come primarily from data consumers proportionate to the benefit perceived by organization class.
- Existing formal GIS cost sharing agreements among counties and units of government within their boundaries must be recognized in the fair-share financial formula.

#### *Data Sales Assumptions:*

- Intellectual property rights for producers of primary data contributed to MetroGIS shall remain intact.
- MetroGIS will not benefit from sales of data in the form contributed to MetroGIS by primary producers unless authorized by the primary producers.
- Data sales will be “zeroed-out” in the initial fair-share financial model.

### **3.8.3 Project Structure**

The project consists of the following four major tasks:

#### *Clarify Roles and Responsibilities*

The first task's objective was to identify the roles, responsibilities and tasks beyond the business needs of MetroGIS stakeholders that are necessary to the functions adopted by the Policy Board for MetroGIS (Appendix 4) in September 1998. These include executive guidance, monitoring, communication, advocacy, and support for MetroGIS Data Finder as well as regional data development and management responsibilities associated with each of the thirteen priority information needs. The roles and responsibilities for Framework Collaboratives, as presented in

the NSDI Framework Handbook, provided the starting point for this task. High level differences between roles and responsibilities identified for MetroGIS and those identified for NSDI were documented.

Another component of this task was to evaluate the thirteen MetroGIS priority information needs with respect to the NSDI Framework Themes and MetroGIS data standards with respect to NSDI standards. This information will be useful to NSDI, for understanding how local government needs may differ from those of federal agencies, and to MetroGIS, for determining what additional costs may be required if formal and full participation in NSDI becomes desirable.

The results of this task are documented in Section 4. The work done in this task became the foundation for the cost estimates. Consensus on the roles and responsibilities identified will be necessary to achieve widespread participation.

#### *Estimate the Costs of Collaboration*

The objective of this task was a realistic estimate of the “costs of collaboration.” This includes the costs of all tasks, beyond the internal business needs of the stakeholders, which are necessary to sustain operation of a mature MetroGIS organization. Costs are based on estimates of the level of expertise and amount of time needed to accomplish each of the tasks. The methods and results of this task are documented in Section 5. They became the basis of the Fair-Share Financial Model.

#### *Design Fair-Share Financial Model*

This task required the development of a politically-acceptable cost allocation model that equitably distributes the “costs of collaboration” among the stakeholders, consistent with their perceived benefits from MetroGIS. One of the greatest challenges for this task involved defining “perceived benefit”<sup>6</sup> and developing a scheme that balances amount of contribution with perceived benefit. Another challenge involved defining a means to balance the value of non-cash contributions. In particular, the relative value of data that addresses priority information needs must be balanced against the need for cash contributions to fund administrative and maintenance needs of MetroGIS. The methods and results of this task are documented in Section 6.

#### *Identify Appropriate Legal Organizational Structure*

The objective of the final project task was to develop a politically acceptable organizational structure, together with staffing requirements, to sustain the stated mission of MetroGIS. This is supported by a high-level implementation strategy. The methods and results of this task are documented in Section 7.

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<sup>6</sup> Three surveys/studies were relied upon to craft these financial equity policies and definitions (1997 MetroGIS Information Needs Study, 1998 NSDIC survey-Minnesota component, and Dr. William Craig’s 1999 MetroGIS Benefits Study funded with an NSDI Benefits Grant).

To be successful, an acceptable balance among decision-maker representation must be achieved between primary producers, regional custodians/area integrators, and data consumer interests. Policy Board consensus is a must if there is to be widespread participation.

## **4.0 ROLES AND RESPONSIBILITIES**

*Dr. Elizabeth Hobbs, Sufficient Systems, Inc.*

*Gina Buss, BRW, Inc.*

### **4.1 Introduction**

MetroGIS is a stakeholder-governed, cooperative venture that provides a mechanism for sharing geographic data, for the seven-county Twin Cities Metropolitan Area (Minnesota), that are accurate, current, of common benefit, and readily usable. It does this by undertaking tasks that identify regional information needs, then facilitating data development, data management, data access, and cost sharing to meet this needs.

MetroGIS is similar in its business purpose and practices to the National Spatial Data Infrastructure (NSDI). The Federal Geographic Data Committee (FGDC) initiated NSDI as “a means to assemble geographic data nationwide to serve a variety of users.” The rationales behind both efforts include making standardized, high quality data available for large areas, reducing costs by reducing redundancy in the development of geographic datasets, and improving service and decision making by the widespread use of these data.

The primary purpose of this component of the MetroGIS Fair Share Financial Model Project was to evaluate the 13 top Business Information Needs identified by MetroGIS and determine the appropriate roles and functions required to implement these needs and sustain MetroGIS as an ongoing organization. This information is the foundation for the estimation of costs required to sustain MetroGIS in the long term.

A secondary goal was to compare the information needs, roles and functions for MetroGIS at the regional scale with similar needs and functions identified at the federal level by NSDI (the NSDI Framework Themes and Framework Functions). This comparison highlights where local and federal needs for geographic information converge and diverge. It may help NSDI in the implementation of their Framework.

### **4.2 MetroGIS Business Information Needs**

The geographic information identified as having regional significance by MetroGIS are referred to as Business Information Needs. Thirteen priority business information needs are driving data content activity for MetroGIS. In 1997, MetroGIS stakeholders identified 87 distinct information needs important for supporting common business practices of the member organizations. Through a sophisticated ranking exercise, 13 of the 87 information needs emerged as high priorities for most, if not all, of the organization (stakeholder) classes represented on the MetroGIS Policy Board. These stakeholder classes include counties, cities, school districts, watershed districts and metropolitan agencies. The highest ranked information needs met two criteria: 1) the information is significant to the operations of the subject organization class and 2) the data to address this need must be obtained from another organization(s). The more critical the information to an organization’s business and the more an organization must rely upon another organization for the data, the higher the “data sharing need” rank. For instance, parcel data received a high data sharing need rank from four of the five

stakeholder organization types represented on the Policy Board. Not surprisingly, the rank from counties – producers of critical data – was lower than for the other four stakeholder groups.

There has been no attempt to evaluate how many of the remaining 75 Business Information Needs have regional significance. It is likely that several of the remaining 75 will be determined to be important to only one category of stakeholder and therefore would not likely be a candidate to be dealt with by MetroGIS as a regional need. Moreover, it is likely that MetroGIS will conduct another session with stakeholders to determine whether there has been any change in their information needs before setting priorities beyond the first 13.

MetroGIS Business Information Needs information is a higher level concept than data needs, but are the basis for the identification of data needs. Multiple datasets may be needed to address a single information need. For example, the Jurisdictional Boundaries information need (defined as jurisdictions with taxing authority) will require at least three datasets: county/MCD (minor civil divisions) boundaries, school district boundaries and watershed district boundaries. In other cases, one dataset may meet several information needs. The parcels dataset may include information meeting the information needs of Parcel Boundaries, Parcel Identifiers, Rights to Property, Locations of People, Places, and Things, and Socioeconomic Characteristics of Areas.

Framework has a similar set of data needs identified as having national significance. These are referred to as the NSDI Framework Themes (Section 4.2.2). The MetroGIS data sets identified from the Business Information Needs and NSDI Framework Themes are similar in that they provide a reliable, standardized source for commonly needed geographic data themes. Both organizations have also identified a variety of functions, or tasks, required to implement the development and sharing of their identified data needs.

There is not a one-to-one correspondence between the MetroGIS data sets and the NSDI Framework Themes. In some cases, information needs, identified at the local (MetroGIS) level, go beyond and enhance the NSDI Framework Themes. In other cases, components of the Framework Themes exceed local needs. This section attempts to define the correspondence between the top 13 Business Information Needs identified by MetroGIS and the suggested content of the seven NSDI Framework Themes. Section 4.3 examines the correspondence between NSDI and MetroGIS identified functions.

#### ***4.2.1 Top 13 MetroGIS Business Information Needs***

The top priority MetroGIS Business Information Needs are:

1. Jurisdictional boundaries
2. Street addresses
3. Land use plans
4. Rights to property
5. Parcel boundaries
6. Water features
7. Land use, existing
8. Census boundaries
9. Where people live
10. Land regulations
11. Highway / road networks

12. Socioeconomic characteristics of areas
13. Parcel identifiers

These needs have been further broken down in the course of this project to identify specific data needs and data sets required to meet each information need (Appendix 5).

#### **4.2.2 NSDI Framework Themes**

The National Spatial Data Infrastructure (NSDI) framework consists of four components: information content, technical context, operational context, and business context. The information content consists of the following seven geographic data themes:

1. Geodetic control
2. Orthoimagery
3. Elevation
4. Transportation
5. Hydrography
6. Governmental units
7. Cadastral information

Framework themes were defined as a basic set of common data to:

- Provide a foundation to which spatial information and attributes can be added
- Provide a base on which other themes of data can be compiled
- Orient and link the results of analysis to the landscape.

Framework Working Group considers these themes to be required by a majority of users, to form a critical foundation for many applications, and to have widespread usefulness. However, FGDC recognizes them to be a minimum and a starting point. Most organizations will have additional business needs for further GIS data. The specified information content of these themes is outlined in Table 1.

**Table 1: Information content of NSDI Framework Themes**

Framework Theme	Features	Attributes
<b>Geodetic Control</b>	Geodetic control stations	Name, feature identification code, latitude, longitude, orthometric height, ellipsoid height
<b>Cadastral Information</b>	The geographic extent of past, current, and future rights and interests in real property, as represented in the Framework by: <ol style="list-style-type: none"> <li>1. Cadastral reference systems (PLSS and similar systems for areas not covered by PLSS)</li> <li>2. Publicly administered parcels, such as military reservations, national forests, state parks               <ul style="list-style-type: none"> <li>• Features for these include survey corner, survey boundary, and parcel</li> <li>• For PLSS, minimum content is boundaries of sections, including deflection points and positions for quarter corners along section boundaries.</li> </ul> </li> </ol>	Name (or other common identifier), information about data quality, permanent feature identification code
<b>Governmental Units</b>	Geographic areas of units of government, including: <ul style="list-style-type: none"> <li>• The nation</li> <li>• States and statistically equivalent areas</li> <li>• Counties and statistically equivalent areas</li> <li>• Incorporated places and consolidated cities</li> <li>• Functioning and legal minor civil divisions</li> <li>• Federal- or state-recognized American Indian reservations and trustlands</li> <li>• Alaska Native regional corporations</li> </ul>	Name, applicable Federal Information Processing Standard (FIPS) code Feature boundaries: information about other features (such as roads, railroads, or streams) with which the boundaries are associated, description of the association (such as coincidence, offset, or corridor)
<b>Transportation</b>	<ul style="list-style-type: none"> <li>• Roads (centerlines)</li> <li>• Trails (centerlines)</li> <li>• Railroads (centerlines)</li> <li>• Waterways (centerlines)</li> <li>• Airports and ports</li> <li>• Bridges and tunnels</li> </ul>	<ul style="list-style-type: none"> <li>• Roads: feature identification codes, functional class, name (including route numbers), street address ranges</li> <li>• Trails: feature identification code, name, type.</li> <li>• Railroads: feature identification code, type</li> <li>• Waterways: feature identification code, name</li> <li>• Airports and ports: feature identification code, name</li> <li>• Bridges and tunnels: feature identification code, name</li> </ul>
<b>Elevation</b>	A spatially referenced vertical position above or below a datum surface. <ul style="list-style-type: none"> <li>• Elevations of land surfaces (elevation matrix) at post-spacing of 2 arc-seconds (approx. 47.4 meters at 40° latitude) or finer.</li> <li>• Depths below water surfaces (bathymetry) as soundings and a gridded bottom model.</li> </ul>	Height or depth
<b>Hydrography</b>	Surface water features: lakes, ponds, streams, rivers, canals, oceans, shorelines	<ul style="list-style-type: none"> <li>• Feature identification code, name (required)</li> <li>• For shoreline: description of the tidal reference (OHW – Ordinary High Water Mark may be more relevant in Minnesota).</li> <li>• Flow of water, connections between features (optional)</li> </ul>
<b>Orthoimagery</b>	Geo-referenced image prepared from remotely sensed data, preferably high resolution (1 m or finer)	Ground reflectance as a discrete digital value

### ***4.2.3 Inherent Differences between MetroGIS Business Information Needs and NSDI Themes***

There is a fundamental difference between the NSDI Framework Themes and the MetroGIS Business Information Needs identified above. The Framework Themes represent actual data, whereas, the information needs do not necessarily represent specific datasets. However, datasets are available or will be created to fulfill some these Business Information Needs, and some individual datasets will correspond, at least in part, to the Framework Themes.

Datasets necessary to address the MetroGIS Information Needs have been identified (Appendix 5). They do not necessarily have a one-to-one relationship with the information needs themselves. For instance, both parcel and street centerline data sets will be required to deal with the Locations of People, Places, and Things Information Need.

Moreover, MetroGIS's needs may go beyond the data identified in the Framework Themes. Framework guidelines recognize that organizations have individual data needs beyond the data sets identified in the Themes. A cursory review of the 13 top information needs reveals that they exceed the suggested components of the Framework Themes in many respects and fall short in others.

However, strict adherence to all specifications of the Framework is not a requirement for participation in NSDI, at least at this early stage of development. FGDC recognizes that the Framework will take many years to develop fully, as not all specified data are now available. They also recognize that organizations may develop or maintain only themes of interest related to their own activities and may not have internal needs for data at the level of resolution or detail specified.

Moreover, FGDC expects organizations to develop data beyond that specified in the Framework. As stated in the *Framework Introduction and Guide*, the Framework is a minimum requirement. FGDC does not intend the Framework data to provide all the information to meet an organization's business needs. Organizations must supplement Framework data with additional data specific to their business needs. The NSDI model depicts concentric circles, with the inner circle representing the framework data and the surrounding circle representing additional data needed to support user analysis and applications. Even though these additional data may not fit neatly into the Framework Themes, FGDC encourages that they be shared (if appropriate) and be developed using the guidelines for Framework data. These guidelines include using common geographic models, geo-referencing data, developing metadata, constructing continuous coverage, and other good advice.

Table 1 details the information content of the seven NSDI Framework themes, as defined in published information. We compared these to the top 13 Business Information Needs to evaluate to what extent these needs fit the framework model for the following analysis. The results are discussed below and are summarized in Tables 2 through 5.

1. Jurisdictional boundaries of counties and MCDs (minor civil divisions) are required components of the Governmental Units Framework Theme. However, school, police, fire, and watershed districts represent a higher level of detail than suggested by NSDI. Moreover, it is not clear that they are all strictly encompassed by the category "jurisdictional boundaries." Of these, only school districts and watershed districts have taxing authority. However, police and fire districts do have a kind of "jurisdiction" over

their territories. These features are considered as user specific data needs outside of the defined NSDI Framework.

2. Street address ranges are a required attribute for the roads layer of the Transportation Framework Theme. The MetroGIS Coordinating Committee has directed the parcels information needs workgroup to prepare a recommendation to deal with addresses of people, places and things as an attribute of parcels. Addresses may be coded as an additional attribute of parcels. This goes beyond and would be an enhancement to the parcel attributes recommended for inclusion as part of the NSDI Cadastral Theme.
3. Land use plans or development plans officially adopted by public bodies do not correspond directly to any Framework Theme. As a pilot for MetroGIS the North Metro I-35W Corridor Coalition has concluded that existing (and future) land use designations should be carried as a separate dataset as well as an attribute of parcels. See item 7 below.
4. Rights to property (ownership, leases, rights-of-way) are not specified as a required attribute of parcels, but are clearly part of the definition of the cadastral theme.
5. Parcel boundaries for privately owned parcels are not a required component of the Cadastral Theme. However, the Framework recognizes the interest in providing multiple levels of cadastral data. It also provides a means to link data for privately owned parcels into the larger cadastral network. The GPS framework used to establish ground control for parcel boundaries is part of the Geodetic Control Theme.
6. Water features defined by MetroGIS include lakes, wetlands, flood plains, aquifers, and watersheds. Since these are listed as examples, streams and rivers could be assumed to be additional layers. Not all of these meet the content definition of the Hydrography Framework Theme. Wetlands and flood plains do, as surface water features, but are not required. However, if you define a flood plain as a lake or river at a specified stage, then it becomes the lake or river itself and is required. Aquifers and watersheds fail to meet the definition because they are not technically surface water features. However, they are clearly related data. Watersheds could as logically be assigned to the Elevation Framework Theme, as they are derived from elevation and are a relief feature.
7. Existing land use does not correspond directly to any Framework Theme. It could fit the Cadastral Theme if land use is coded as an attribute of parcels. However, if multiple land uses are present on different parts of one parcel, this could be problematic. The North Metro I-35W Corridor Coalition has concluded that existing (and future) land use designations should be carried as an attribute of parcels and as a separate dataset. A separate dataset is required to effectively deal with multiple designations of property. The Coalition has also created an aggregation scheme that permits cross-jurisdictional evaluation and analysis of land use designations maintained by individual cities. The Coalition's aggregate designation scheme will be the starting point for MetroGIS Land Use Information Need Workgroup.
8. Census boundaries (blocks, block groups, tracts) may qualify as part of the Governmental Units Theme if the theme's definition can be stretch to include geographic areas defined by the government. However, they are not units of government, as specified by the content definition. Stretching further, if census boundaries never split parcels, they could be additional attributes of parcels.

9. “Where people live” has been interpreted to mean “addresses of people, places, and things.” As such, there is considerable overlap with the Street Addresses information need (see item 2 above). Address information will be stored as a table for geocoding with the roads layer (Transportation Theme). It may also become an additional attribute for parcels (Cadastral Theme), with associated tables for parcels containing more than one unit. However, addresses are inadequate for locating some people, places, and things. Mileposts, as an attribute of the roads layer, could provide some of this information. Locations of places within large parcels (such as buildings within a park) may require a different data format and source. Whereas landowners can be identified from the parcel attribute data, renters cannot. All of these potential information needs go beyond the scope of the NSDI Framework.
10. Land regulations (e.g. zoning) appear to be beyond the scope of the NSDI Framework. The North Metro I-35W Corridor Coalition has concluded that the legal aspects associated with zoning render it an inappropriate topic for display other than the form of its original community-by-community designations. If MetroGIS concurs, zoning will be found to be an inappropriate subject for an aggregated regional dataset. However, given the high priority of this information need, MetroGIS is likely to take some type of action that would provide access to zoning district designations in the home-community format. It may be possible to code these data as an additional attribute for parcels (Cadastral Theme). This approach will run into problems, however, if individual parcels of land have more than one zoning category.
11. Highway / road networks are part of the required information content for the Transportation Theme.
12. Socioeconomic characteristics of areas may be attributes of a variety of polygon features. Some socioeconomic data (property value, for instance) may be attached to parcels (Cadastral Theme). Other socioeconomic data will be associated with areas in the Governmental Units Theme (counties, cities, census tracts if it is determined that they belong in this theme).
13. Parcel identifiers are a required attribute of the parcels data in the Cadastral Theme.

This breakdown shows that some of the top 13 Business Information Needs fit clearly into the definitions of the information content of the seven Framework Themes. Others do not and may be best conceptualized as the outer concentric ring of the NSDI model as user-specific data. For these information needs, MetroGIS would have considerable leeway to determine their own content and standards. Conformance to the NSDI Framework would be limited to following good GIS practices (continuous coverage, geo-referencing, metadata, etc.) as described in their guidelines. The intention is to make available metadata and data through the Clearinghouse.

**Table 2: Relationship between NSDI Framework Themes and MetroGIS Top 13 Business Information Needs**

Business Information Needs	Framework Themes						
	Geodetic Control	Cadastral Information	Governmental Units	Transportation	Elevation	Hydrography	Ortho-imagery
Jurisdictional boundaries			Counties and MCDs fit NSDI; school, police, & fire districts are beyond NSDI scope.				
Street addresses		An additional attribute of parcels, beyond the scope of NSDI		As address ranges, a required attribute			
Land use plans		An additional attribute of parcels, beyond the scope of NSDI					
Rights to property		An additional attribute of parcels, beyond the scope of NSDI					
Parcel boundaries	Control points and their attributes, required element	Boundaries of privately-owned parcels exceed NSDI scope					
Water features						Rivers, streams, and lakes meet the criteria. Wetlands, floodplains are surface water features, but are not specified. Aquifers and watersheds are related information, but do not meet the criteria.	
Land use, existing	Beyond the scope of NSDI Framework						
Census boundaries	Beyond the scope of NSDI Framework						
Where people live		As an additional attribute of parcels, beyond the scope of NSDI		Address ranges as an attribute of roads, required			
Land regulations	Beyond the scope of NSDI Framework						
Highway / road networks				As centerlines			
Socioeconomic characteristics of areas	Beyond the scope of NSDI Framework						
Parcel identifiers		Required attribute					

**Table 3: Information Needs Clearly Fitting the NSDI Framework**

Information Need	NSDI Theme	Features
Jurisdictional Boundaries	Governmental Units	Counties & MCDs
Street Addresses	Transportation	Address ranges
Parcel Boundaries	Geodetic Control	Control points & their attributes
Parcel Boundaries	Cadastral	Boundaries of publicly owned parcels
Water Features	Hydrography	Rivers, streams, lakes, floodplains
Where People Live	Transportation	Address ranges
Highway / road networks	Transportation	Roads, trails, railroads, navigable waterways, bridges
Parcel identifiers	Cadastral	Attribute of parcels

**Table 4: Information Needs Exceeding NSDI Theme Contents**

Information Need	Framework Theme	Features
<b>Jurisdictional Boundaries</b>	Governmental Units	School, police, fire districts, voting districts/election wards, police precincts, watershed districts
<b>Street Addresses (addresses of people, places, and things)</b>	Cadastral	Attribute of parcels
<b>Land Use/Development Plans</b>	No comparable theme	Future land use Comprehensive plans
<b>Rights to property</b>	Cadastral	Attribute of parcels
	No comparable theme	Easements, right of ways
<b>Parcel boundaries</b>	Cadastral	Boundaries of privately-owned parcels Most identified attributes of parcels
	No comparable theme	Buildings
<b>Water features</b>	Hydrography	Wetlands, flood plains, groundwater flow model, aquifer, wells, watershed boundaries, storm ponds, flood impact areas, ditches, boat launches
<b>Existing land use</b>	No comparable theme	Existing land use
<b>Census boundaries</b>	No comparable theme	Census tracts, census blocks
<b>Where people live (addresses of people, places, and things)</b>	Cadastral	Address as attribute of parcels, tabular data related to parcels
	No comparable theme	EM fields over 200 MGG, high wire locations, location of heavy equipment, hazardous waste sites
<b>Land regulations</b>	No comparable theme	Zoning, MUSA boundary history
<b>Highway/road networks</b>	Transportation	Many attributes of roads, noise, parking lots/structures, pavement/curb, sewers, mile markers, traffic signs, retaining walls, culverts, street signs, guard rail, road geometry
<b>Socioeconomic characteristics of areas</b>	Cadastral	Attributes of parcels
	No comparable theme	Location of births

**Table 5: NSDI Framework Contents Not Identified as MetroGIS Business Information Needs**

Framework Theme	Features	Status
Geodetic control	Control points	Available from work done for orthoimagery.
Orthoimagery	Ground reflectance as a discrete digital value	Already available from Metropolitan Council for cost of reproduction (20,000 ft. altitude, April 1997). Contact: Rick Gelbmann or Tanya Mayer for technical specs
Elevation	Elevations of a regular matrix of points Depth of water	Available at 1:24000 scale (USGS DEMs) Not available; not anticipated to become available during the first phase of data solution development.
Transportation	Bridges and tunnels  Railroads, waterways, airports and ports	May become available from Mn/DOT in the future. Some counties maintain this data  Not anticipated to become available during the first phase of regional data solution development.
Hydrography		Attribute data may not meet NSDI standards
Governmental units	Indian Reservations	Not presently anticipated to become available during the first phase of regional data solution development.
Cadastral information	PLSS  Publicly administered parcels	Accuracy of available data may not meet NSDI standards  Ownership is an attribute of parcel data maintained by all seven counties and is planned for the first phase of parcel attribution.

### 4.3 Roles and Responsibilities Required to Sustain MetroGIS

MetroGIS task tables were developed from the NSDI framework functions presented in the Framework Handbook. For this reason, MetroGIS roles and responsibilities have been organized around the NSDI framework. Consequently, the framework is the starting point for this section. From there, this document attempts to define the correspondence between the roles and responsibilities necessary to develop, integrate, and maintain data for MetroGIS and the seven NSDI Framework Functions. New responsibilities and tasks have been added to the tables as they were identified over the course of the project.

#### 4.3.1 NSDI Framework Functions

The National Spatial Data Infrastructure (NSDI) Framework Functions define tasks and issues that must be addressed to develop and manage the framework data (Appendix 6). These functions are:

1. Executive guidance
2. Coordination
3. Data access

4. Data development, maintenance, and integration
5. Data management
6. Monitoring and response
7. Resource management

FGDC considers the development of the framework to be a group effort. Which players assume the roles and responsibilities that address these functions will vary.

FGDC provides some guidance on the suitability of organizations for performing functions. These include:

- The organization is already performing the function.
- Organizations with data exchange infrastructures might specialize in data access.
- The function is consistent with the organization's own business needs.
- Sometimes an organization that is neutral in issues related to a theme of data is best positioned to facilitate the development of the framework.
- Framework development is based on and reinforces current flows of data among organizations.

Finally, framework functions are flexible. Organizations' roles may be different for different data themes and may evolve over time.

MetroGIS identified tasks that are not explicit in the NSDI Framework functions are presented in Table 6. NSDI Framework tasks that will not be undertaken by MetroGIS are detailed in the same table. Due to the different degree in the level of breakdown between MetroGIS and NSDI identified tasks, it is difficult to distinguish clearly the differences between MetroGIS and NSDI tasks. Some of the tasks outlined in table 6 that have been identified as MetroGIS tasks beyond NSDI potentially could be construed as a subtask of one of NSDI's tasks. Table 6 highlights those MetroGIS tasks that have a focus other than the focus documented by NSDI. For example, the policy of MetroGIS has been to encourage and promote standards, whereas NSDI states a more rigid standards policy. In addition, NSDI emphasizes assessing user satisfaction with data, while MetroGIS has more emphasis on assessing user satisfaction with the provided services.

**Table 6: Differences between MetroGIS tasks and NSDI identified tasks**

<b>Table 6: Differences between MetroGIS tasks and NSDI identified tasks</b>			
<b>Framework Function</b>	<b>NSDI Identified tasks not yet addressed or decided for MetroGIS</b>	<b>Tasks declared as inappropriate for MetroGIS (Sept 1998 – MetroGIS Policy Board)</b>	<b>MetroGIS tasks beyond those identified by NSDI</b>
<b>Executive Guidance</b>	Developing a strategic plan for the enterprise Providing a legal foundation for contracts, liability, and other issues		Advocate for MetroGIS needs and desires with state and federal policy makers.
<b>Coordination</b>	Creating business plans for framework development Ensuring that data are produce for all geographic areas and themes. Mediating and resolving conflicting priorities and disputes among participants.	Enforce policies that foster coordination of GIS among the region’s organizations. Actively coordinate GIS activities of the region’s organizations. Aggregate demand and purchase hardware, software, service contracts, etc. Require standards for telecommunication protocol and networks. Endorse standards for software and hardware. Manage MetroGIS data holdings at centralized MetroGIS site.	Present the Coordinating Committee with plans, studies, and recommendations for action that address policy and other tasks as may be assigned by the Coordinating Committee. (Policy Advisory Team) Perform such other duties as may be prescribed by the Board. (Coordinating Committee)
<b>Data Access</b>	Processing data requests and charges	Manage MetroGIS data holdings at centralized MetroGIS site. Require standards for telecommunication protocol and networks.) Endorse standards for software and hardware. Provide technical assistance to participants with hardware and software problems, application development, and project Provide a centralized service bureau.	Ongoing coordination of the MN clearinghouse and Data Finder sites
<b>Data Development, Maintenance, and Integration</b>	Determining and providing needed data distribution formats		
<b>Data Management</b>	Ensures the continued viability of framework data; ensures that the whole framework can be assembled from it’s parts.	Manage MetroGIS data holdings at centralized MetroGIS site.	Present the Coordinating Committee with plans, studies, and recommendations for action that address policy and other tasks as may be assigned by the Coordinating Committee. (Policy Advisory Team) Perform such other duties as may be prescribed by the Board. (Coordinating Committee)

<b>Table 6: Differences between MetroGIS tasks and NSDI identified tasks</b>			
<b>Framework Function</b>	<b>NSDI Identified tasks not yet addressed or decided for MetroGIS</b>	<b>Tasks declared as inappropriate for MetroGIS (Sept 1998 – MetroGIS Policy Board)</b>	<b>MetroGIS tasks beyond those identified by NSDI</b>
<b>Monitoring and Response</b>	Assess users' satisfaction with the framework data (form, ease of revision and integration with other data, currentness, positional and attribute)		<p>Present the Coordinating Committee with plans, studies, and recommendations for action that address policy and other tasks as may be assigned by the Coordinating Committee. (Policy Advisory Team)</p> <p>Perform such other duties as may be prescribed by the Board. (Coordinating Committee)</p> <p>Assess users' satisfaction with MetroGIS policies and objectives (suggested)</p> <p>Assess users' satisfaction with decision making process</p> <p>Assess users' satisfaction with opportunity for participation</p> <p>Assess users' agreement with policies and objectives</p> <p>Assess users' satisfaction with MetroGIS contract negotiation and administration</p> <p>Assess users' satisfaction with MetroGIS data delivery mechanism (suggest)</p> <p>Assess users' satisfaction with technical services</p> <p>Assess users' satisfaction with Data Finder</p> <p>Assess users' satisfaction with ftp site</p> <p>Assess users' satisfaction with MetroGIS outreach and communication (suggested)</p> <p>Assess users' satisfaction with <i>Coordinates</i> newsletter</p> <p>Assess users' satisfaction with WEB site</p> <p>Assess users' satisfaction with conferences</p> <p>Assess users' satisfaction with guest speakers</p> <p>Assess users' satisfaction with efforts to keep decision-makers informed about issues and opportunities</p> <p>Assess users' satisfaction with efforts to extend the program to other participants</p>
<b>Resource Management</b>			<p>Determine the appropriate mechanisms for development and implementation of MetroGIS.(Policy Board)</p> <p>Advise the Policy Board on matters concerning the operation and development of MetroGIS. (Coordinating Committee)</p> <p>Present the Coordinating Committee with plans, studies, and recommendations for action that address policy issues and other tasks as may be assigned by the Coordinating Committee. (Policy Advisory Team)</p>

### 4.3.2 MetroGIS Roles and Responsibilities

MetroGIS uses the terms “roles and responsibilities” to provide a further breakdown of Framework Functions promoted for the NSDI. In the MetroGIS Data-Related Responsibilities matrix, three “roles” or responsible parties are identified for each framework function (See Table 7 for an example). These are the responsible MetroGIS entities (including advisors), the custodian of the regional dataset, and the custodians of the primary data sources. In the same matrix, the responsibilities of these roles are broken down for each Framework Function as a set of tasks, corresponding to the NSDI suggested tasks. For instance, Counties may assume the role of Custodian of Primary Data. In that role, each County has responsibilities for specific tasks, such as generating and updating data.

**Table 7: Example Roles and Responsibilities Identified by MetroGIS for MCD/County Jurisdictional Boundaries**

Framework Theme	Responsible MetroGIS Entity (Advisor(s) in <i>Italics</i> )	Custodian (Regional Dataset)	Custodian (Primary Data Source)
<b>Executive Guidance</b>	Policy Board ( <i>Coordinating Committee and Policy Advisory Team</i> ) <sup>f</sup>		
<b>Coordination</b>	Coordinating Committee ( <i>Policy Advisory Team</i> ) <sup>f</sup>		
<b>Data Access</b>	Coordinating Committee ( <i>Technical Advisory Team, regarding Data Access</i> ) <sup>1</sup>	Metropolitan Council	
<b>Data Development, Maintenance, and Integration</b>		Metropolitan Council to compile a regional coverage	Each of the 7 counties will be responsible for coverage within their county
<b>Data Management</b>	Coordinating Committee ( <i>Technical Advisory Team, regarding Data Content and Standards</i> ) <sup>f</sup>	Metropolitan Council maintains and re-compiles the regional dataset	Counties maintain primary data sources
<b>Monitoring and Response</b>	Coordinating Committee ( <i>Policy Advisory Team</i> ) <sup>f</sup>		
<b>Resource Management</b>	Policy Board ( <i>Coordinating Committee and Policy Advisory Team</i> ) <sup>f</sup>		

As there may be different organizations playing each of the three roles for a Framework Function, the matrix does not distinguish between specific tasks that must be performed by each responsible party. For example, in the matrix for the Jurisdictional Boundaries dataset, under the Data Development, Maintenance, and Integration function, four tasks and two responsible parties are listed. Additional documentation will be required to make this distinction. The matrix used in this section to demonstrate roles and responsibilities is presented as an example and is incomplete. Completed Roles and Responsibilities matrices, broken down to this level of analysis, are provided in Appendix 7 for each of the thirteen priority information needs.

### 4.3.3 Differences between NSDI Functions and MetroGIS Tasks

There appears to be no conflict between suggested Framework Functions and their associated tasks and the tasks MetroGIS will require to implement their Business Information Needs.

MetroGIS has identified several additional, but complementary, tasks (Table 6). There are other NSDI Tasks, however, that will not be undertaken by MetroGIS (Table 6).

MetroGIS does not yet have a process to decide if and how to address NSDI framework themes. In many cases, there are logical connections between framework themes and MetroGIS Business Information Needs. However, standards and requirements for NSDI framework themes, as defined by FGDC, often differ from MetroGIS's specific needs. This issue should be addressed in an implementation plan.

The MetroGIS business information needs process itself does not include a detailed implementation plan. It defines desired outcomes in terms of target regional data specifications, custodian responsibilities, and candidate custodians. Following the conclusion of the business information needs process; MetroGIS needs to create a business plan to implement each of its priority information needs. Funding to develop detailed implementation plans and actual implementation is not included in the 1999 or proposed 2000 budgets.

#### **4.3.4 MetroGIS Dataset Task Tables**

The roles and responsibilities assigned so far are outlined in Table 7 (Section 4.3.2). However, further breakdown of the responsibilities and their associated tasks for each responsible party was required for each primary data source to support estimation of costs (Appendix 9). One consideration in designing these tables was whether certain framework functions will be the responsibility of the same responsible party for every Business Information Need. Will the Policy Board always provide Executive Guidance? Will Metropolitan Council always provide Data Access as Custodian of the Regional Dataset? Of the three defined roles, some may always be excluded from responsibilities for certain framework functions. For instance, the Custodian of the Primary Data Source is unlikely ever to play a role in Executive Guidance.

Certain aspects of the tables warrant further discussion. First, the use of the term “create” as a function of MetroGIS does not mean the MetroGIS organization but rather a participant which has/will be asked to accept area integrator/custodial responsibilities.

An objective of the business information needs process is to identify candidate organizations (or outsourcing possibilities such as the agreement with The Lawrence Group (TLG) for street centerline data) capable of carrying out these functions. The option of MetroGIS hiring staff to carry out these functions has not been considered, given the emphasis on cultivating a distributed system where the data is maintained by organizations that have a day-to-day business need for the data.

Part of the business information needs process is a Data User’s Forum. MetroGIS prototyped this process on June 3, 1999, by holding a forum for Street Centerline data. The MetroGIS Coordinating Committee approved this process. The Data User’s Forum prototype calls for the designated regional custodian to co-host such forums with MetroGIS on a schedule to be determined by MetroGIS. This may include forums to receive feedback for suggested enhancements to each of the regional dataset solutions after they have been used for six months to a year and then on a revolving basis thereafter. The appropriate MetroGIS advisory groups will discuss the regional custodian’s summary and forward recommendations to the Policy Board. This subtask includes a broad range of functions from data to accessibility that may be best accomplished by more than one subtask and more than one responsible party.

The coding scheme in the level of effort column (Appendix 9) will comprise the skill level along a continuum of expertise needed to carry out the task. The coding scheme would also convert to an estimated salary equivalent that can be multiplied by the staff time needed, stated as an FTE, to arrive at the cost to carry out the task.

#### ***4.3.5 Metadata Roles and Responsibilities***

Lynn Blye and Associate's (LBA) recommendations were accepted summer 1998 by the MetroGIS Coordinating Committee with the understanding they will be tested for a two-year period and, following any recommended refinements, adopted as policy for MetroGIS. In any case, the costs of all tasks suggested by LBA should be estimated as if components of a mature MetroGIS organization. The priority-setting issue will be pertinent when MetroGIS attempts to define a range of staff support needs and associated budget issues. Information provided in this study concerning the big picture of support costs and options for degrees of support will likely be used to decide the appropriate priority in the near term.

#### ***4.3.6 Cost Recovery Functions***

Under current state law, government can impose a fee to recover the cost of developing data with commercial value. Some believe that inconsistent use of this statutory authority is at the root of pending for the 2000 Legislative session that if enacted would eliminate the ability to recoup development costs. This legislative proposal (SF2237) was introduced in the 1999 session and laid over to the Senate Judiciary Committee for consideration in the 2000 session. .

#### ***4.3.7 Suitability of organizations for performing functions.***

Identification of potential regional data custodians, primary data custodians, and organizations to undertake other roles within MetroGIS should be based on the following guidelines:

*Framework Handbook and Guide suggested:*

The organization is already performing the function.

Organizations with data exchange infrastructures might specialize in data access.

The function is consistent with the organization's own business needs.

Sometimes an organization that is neutral in issues related to a theme of data is best positioned to facilitate the development of the framework.

Framework development is based on and reinforces current flows of data among organizations.

*Other, from MetroGIS documentation:*

Has responsive update program for keeping the data current and making corrections

Has most complete and correct data available consistent with endorsed specifications.

### **4.4 MetroGIS Standards**

Data and metadata standards are essential for efficient and effective data sharing. This section outlines standards set by both NSDI and MetroGIS, based on currently available information. Both NSDI and MetroGIS are in the process of defining their standards, which makes it difficult

at this time to do an in-depth comparison. One generalization that can be made is that NSDI's standard spatial resolution is a map scale of 1:24,000, whereas this resolution is considered to be too coarse for the needs of MetroGIS stakeholders. Moreover, the data content needs (attributes) also vary considerably.

There are four standards and guidelines approved by the Policy Advisory Team as of September 1999 for use by MetroGIS stakeholders.

### 1) *Address Guidelines and Issues for Working with Address Data*

**Description:** The recommendations outlined in the document that accompanies the guidelines endorsed by MetroGIS for working with address data are intended to provide information for those who wish to work with addresses and are in *no way* meant to be a set of mandatory rules. They should help those who wish to create new data bases which contain or access address data. The document explains the important issues involved in incorporating address data into a GIS. This information should also assist those who work with existing databases and intend on transferring or sharing data.

**Endorsed:** Approved by the MetroGIS Policy Board on November 19, 1997.

**Information Site:**

MetroGIS Web Site (<http://www.metrogis.org/publications/addguide.html>)

**Contact:** Rick Gelbmann, Metropolitan Council, phone: 651-602-1371, E-mail: [rick.gelbmann@metc.state.mn.us](mailto:rick.gelbmann@metc.state.mn.us).

### 2) *Metadata Guidelines*

**Description:** MetroGIS has endorsed the Minnesota Geographic Metadata Guidelines for use by its stakeholders. These guidelines provide a common approach for documenting all types of geographic data. They have been designed to be straightforward, intuitive and complete and are based on a standard developed by the Federal Geographic Data Committee in 1993. Content Standard for Digital Geospatial Metadata (<http://www.fgdc.gov/metadata/constan.html>). In developing the Minnesota Geographic Metadata Guidelines, the Minnesota Governor's Council GIS Standards Committee sought to create a streamlined implementation of the federal standard that retains the essence of its original content.

**Endorsed:** Approved by the MetroGIS Policy Board on January 28, 1998.

**Information Site:** Minnesota Land Management Information Council Site:

(<http://www.lmic.state.mn.us/gc/committe/stand/metadata.html>)

**Contact(s):** Tanya Mayer, Metropolitan Council, Phone: 651-602-1604,

E-mail: [tanya.mayer@metc.state.mn.us](mailto:tanya.mayer@metc.state.mn.us) and Chris Cialek, Land Management Information Council,

Phone: 651-297-2488, E-mail: [chris.cialek@mnplan.state.mn.us](mailto:chris.cialek@mnplan.state.mn.us).

### 3) *Unique Parcel ID Guidelines*

**Description:** A unique parcel identification number guideline is needed for regional users of parcel data in order to fully integrate county parcel identifier codes and data. MetroGIS will promote use among its stakeholders of the unique parcel identifier scheme adopted by the MN Governor's Council on Geographic Information. Use of this guideline does not require any changes in county business practices.

**Endorsed:** Approved by the MetroGIS Policy Board on January 27, 1999.

Information Site: Land Management Information Council Web Site:

(<http://www.mnplan.state.mn.us/press/gisparcl.html>).

Contact: Sally Wakefield, Land Management Information Council, phone: 651-296-1208,

E-mail: [gc@mnplan.state.mn.us](mailto:gc@mnplan.state.mn.us).

#### 4) *County and Minor Civil Division Coding Exchange Standards*

##### Descriptions:

###### *County Coding Standard:*

The three-digit FIPS and state standard county code as adopted as a standard for state agencies has been adopted as a MetroGIS standard for data exchange. For more information, see

<http://www.state.mn.us/ebranch/admin/ipo/hb/document/std15-1.html>

###### *Minor Civil Division (MCD) Coding Standard:*

The Five-digit FIPS place code for minor civil divisions in the metro area has been adopted as a MetroGIS standard for data exchange. While the FIPS 55-3 contains additional codes for places other than MCD's, for purposes of this MetroGIS standard, we are only concerned with the MCD codes in FIPS 55-3. For more information about the FIPS place code see

<http://www.itl.nist.gov/div897/pubs/fip55-3.htm>

##### Compliance:

Each organization should use whatever codes it maintains for their its internal work. Custodians of endorsed regional datasets will use this code. Organizations are also encouraged to use these guidelines where GIS data or associated attribute data, which contain county and MCD identifiers, are shared. In all such cases, the data sets should contain, at a minimum, the endorsed FIPS county and place codes. The data sets may also contain other codes.

*Endorsed:* Approved by the MetroGIS Policy Board on July 28, 1999.

*InformationSite:* MetroGIS Web Site: (<http://www.metrogis.org/publications/mcdcstnd.html>).

*Contact:* Solveig Berg, Metropolitan Council, Phone: 651-602-1718,

E-mail: [solveig.berg@metc.state.mn.us](mailto:solveig.berg@metc.state.mn.us).

#### **4.4.1 Standards for NSDI Framework Themes**

More than 10 standards have been endorsed by the FGDC and 20+ are still in various stages of development. Identified standards for NSDI framework themes are documented in Table 8.

**Table 8. Standards for NSDI Framework Themes** (*Note: Standards are still being defined by NSDI*)

Framework Theme	Resolution	Positional accuracy	Attributes
Geodetic Control			
Cadastral Information		Boundaries that have been surveyed are the preferred content	
Governmental Units			
Transportation			Linear transportation features identification codes should use linear referencing systems where available.
Elevation	Elevations of land surfaces at post-spacing of 2 arc-seconds (approx. 47.4 meters at 40° latitude) or finer. In areas of low relief, a spacing of ½ arc-second (approximately 11.8 meters at 40° latitude) or finer.	Depths below water surfaces (bathymetry) measured as depth relative to a specific vertical reference surface, usually derived from tidal observations. In the future, vertical reference may be based on the geoid or ellipsoid, the reference for expressing height measurements in GPS.	
Hydrography		Shoreline usually referenced to some analytically determined stage of the tide for coastal water, or other water level for lakes and rivers. Several shorelines, referenced to different stages such as “mean high water” and “mean lower low water,” are included in the framework.	For feature identification code, many federal and state agencies use the Reach scheme developed by the U.S. Environmental Protection Agency
Orthoimagery	For local data needs, high-resolution data (1 m or finer). In some areas, lower-resolution data may be sufficient to support the framework.	Accurately positioned	

#### 4.4.2 Standards for MetroGIS Top Priority Business Information Needs Datasets

Identified and proposed standards for MetroGIS datasets are documented in Table 9.

**Table 9. Standards for MetroGIS Top Priority Business Information Needs Datasets.**

Custodians of endorsed regional datasets will be required to develop and maintain these data based on the UTM coordinate system, NAD83, with units in meters, for vertical and horizontal integration:

Table 9: Standards for MetroGIS Top Priority Business Information Needs Datasets		
Dataset to meet Business Information Needs	Positional accuracy (and resolution for raster data)	Attributes <b>Bolded are approved standards/guidelines</b> <i>Italics indicate suggestions/speculation only</i>
Right of Ways		Right of Way holder
Parcels	Multiple accuracies consistent with primary data custodian accuracies.	<b>Parcel ID</b> Owner Parcel Street Address Lease Holder Value Land use/type information <i>Year Built</i>
Control Points		x-coord y-coord <i>Description of the point (e.g. section corner, street intersection, benchmark)</i> <i>Type of monument</i> <i>Estimate of positional accuracy</i>
Landmarks (poly)		Name Street address Some type of landmark classification code (e.g. golf courses vs. schools vs. shopping centers, vs. parks)
Landmarks (point)		Name Street address Some type of landmark classification code (e.g. golf courses vs. schools vs. shopping centers, vs. parks)
Landmarks (line)		Name <i>Street Address</i>
Street centerlines	Should fall within county parcel data road rights-of-way.	Street Name <b>Address Range</b> Street Type Direction Other address information (city, zip, etc.) <i>See TLG data set for others</i>
Fire districts		District codes
Police districts		<i>District codes</i>
Watershed districts		<i>District codes</i>
School districts		<i>District codes</i>

<b>Table 9: Standards for MetroGIS Top Priority Business Information Needs Datasets</b>		
<b>Dataset to meet Business Information Needs</b>	<b>Positional accuracy (and resolution for raster data)</b>	<b>Attributes</b> <b>Bolded are approved standards/guidelines</b> <i>Italics indicate suggestions/speculation only</i>
CO & MCDs	Should be derived directly from county parcel data sets	<b>FIPS 3-digit County code</b> County name ( <i>in County layer only</i> ) MCD code MCD Name ( <i>possibly multiple formats e.g. upper case, mixed case, Twp. Township, etc.</i> ) <b>FIPS 5-digit MCD code</b> <b>8 digit code (combination of CO and MCD)</b> MCD 6 character abbreviation MCD description; e.g. Burns Township, Blaine (Anoka Co. part) Old Metropolitan Council and Census 6 digit county-MCD code MN Department of Revenue MCD Code; e.g. 0300, 0004 MCD type. C = city, T = Twp, U = unorg. Code to sort alphabetically e.g. "St." is sorted as "Saint" 1990 population for county-MCDs
Socioeconomic Data by MCD (tables)		
Socioeconomic Data by County (tables)		
Socioeconomic Data by Census Blocks (tables)		
Socioeconomic Data by Census Block Groups (tables)		
Socioeconomic Data by Census Tracts (tables)		
Census Blocks		Block Number Block Group Number Tract Number
Existing Land Use	Same as parcels if using parcels as basis for land use change boundaries	land use code
Zoning	Same as parcels	Zoning code
Development Plans	Same as parcels	Future land use code
Land Use Plans	Same as parcels	Future land use code
Flood Plains		Flood frequency
Wetlands		System Subsystem Regime Vegetation type
Lakes		Name Regime
Streams		Name Regime
Aquifers		Formation Yield Depth to top Capped Permeability
Watersheds		Major code Minor code
Not among top 13 needs, but data on hand		
Orthophotos		N.A.
Elevation		Elevation

### 4.4.3 Metadata standards

Table 10 provides a comparison of the metadata standards adopted by NSDI, the Minnesota State Clearinghouse, and MetroGIS.

**Table 10. Metadata standards**

Standard	NSDI	State	MetroGIS
Number of fields	340	101	16 required, 270 encouraged
Data Input	MP: A compiler for formal metadata CNS: A pre-parser for formal metadata XTME: An editor for formal metadata TKME: Another editor for formal metadata	DataLogr recommended	DataLogr
File titles	Meaningful	Meaningful	Concise & meaningful
Theme identification	Provider defines	Provider identifies	Provider recommends; Data Finder staff make final determination
Constraints and limitations	None or Provider defines	None or Provider defines	Provider defines
No information for field	None	Blank or None available or not applicable	Leave blank
Abstract	Free text	Free text	1,024 characters max suggested
Browse graphic	Free text	None or URL	Suggested
Contact information	Free text	Free text	Use alias/generic e-mail
Keywords	None or free text	Provider defined free text	Use MetroGIS thesaurus

## **4.5 Summary and Conclusions**

In this phase of the project, we achieved a detailed breakdown of MetroGIS information needs and the functions required to meet these needs and to sustain a viable MetroGIS organization in the future. We also examined, at a similar level of detail, NSDI Framework Themes and Framework Functions. Comparisons between MetroGIS and NSDI indicate that MetroGIS data will not neatly fit into the NSDI framework, at least not in the near future. Nor are all of the NSDI functions appropriate to MetroGIS. However, there is still substantial overlap between the needs and functions of the two organizations. NSDI may choose to take what it finds useful from MetroGIS, with the realization that additional funding must be provided if MetroGIS is expected to meet suggested NSDI content and standards.

## **4.6 References**

Federal Geographic Data Committee. 1997. *Framework Introduction and Guide*. Federal Geographic Data Committee. Washington, DC.

MetroGIS 1998. *Moving MetroGIS from Concept to Reality: Overview of Metropolitan Council's GIS Data and Cost Sharing Agreement Initiative with Metro Area Counties*. Unpublished report: MetroGIS. Mears Park Centre, 230 East Fifth Street, St. Paul, MN 55101

## **5.0 COSTS OF COLLABORATION**

*Gina Buss, BRW, Inc.*

*John Lunde, Sufficient Systems, Inc.*

### **5.1 Introduction**

The objective of this part of the Fair Share Model Study was to estimate the “costs of collaboration,” which are the costs to support organizational roles and responsibilities, beyond the internal business needs of MetroGIS stakeholders, but necessary to sustain long-term, multi-participant data sharing.

Specifically, the consultant team identified the costs of collaboration for data development and maintenance, as well as the additional costs of providing ongoing data sharing mechanisms for potential regional data solutions. The net value of collaboration to potential participants is summarized in Section 5.7 together with documented assumptions.

The estimates of total costs for regional data sets concentrated on the three highest MetroGIS business need priorities. These are jurisdictional boundaries, parcel boundaries and identifiers, and street highway/road network and street addresses. In addition to the three detailed cost profiles, cost profiles for ten other business needs are provided. The additional ten business needs include land use plans, rights to property, water features, land use, census boundaries, where people live, land regulations and socioeconomic characteristics of areas.

### **5.2 Interviews**

The consultant team conducted a series of surveys and interviews with representatives of organizations that have been identified as potential regional data custodians. The matrices developed in Task A (Appendix 9) were the foundation for these interviews. The interviews were used to validate the tasks as well as identify the amount of effort, expressed as FTEs, and level of expertise needed. From this information, costs were estimated for each task, which provided input into the cost profiles developed for each potential regional data set.

#### **5.2.1 Interview List**

Candidates for potential regional data custodians as well as identified primary data custodians are listed below. Each of the thirteen priority business needs were represented through the interview process by identifying regional datasets and custodians necessary to fulfill information requirements.

**Table 11: Interview List**

MetroGIS Role	MetroGIS Information Need	Organization
MetroGIS Staff	Consolidated Role	Randy Johnson, Theresa Foster, Metropolitan Council
MetroGIS Staff	Metadata (Data Finder)	Rick Gelbmann, Tanya Mayer, Metropolitan Council
Regional Metadata Custodian	Data Finder	Rick Gelbmann, Tanya Mayer Metropolitan Council Chris Cialek, LMIC
Regional Data Custodian	Parcels	Alan Srock NSP
Regional Data Custodian	Land Use, Zoning, Parcels	Jerry Happel, I-35W Coalition Consultant
Regional Data Custodian	Land Use, Zoning	Scott Mareck, St. Cloud Area Planning Org
Regional Data Custodian	Jurisdictional Boundaries (MCD and County)	Mark Kotz (MNPCA), Metropolitan Council
Primary Data Custodian	Jurisdictional Boundaries (School Districts)	Dick Calstrom, TIES
Regional Data Custodian	Addresses Locations Street Centerlines	Jim Maxwell, The Lawrence Group (TLG)
Primary Data Custodian	Parcels, Jurisdictional Boundaries (MCD and County)	Brad Henry, City of Minneapolis
Primary Data Custodian	Parcels, Jurisdictional Boundaries (MCD and County)	Paul Leegard, Anoka County
Primary Data Custodian	Parcels, Jurisdictional Boundaries (MCD and County)	Gordon Chinander, Carver County
Primary Data Custodian	Parcels, Jurisdictional Boundaries (MCD and County)	Jay Wittstock, Dakota County
Primary Data Custodian	Parcels, Jurisdictional Boundaries (MCD and County)	Bob Moulder, Hennepin County
Primary Data Custodian	Parcels, Jurisdictional Boundaries (MCD and County)	Curt Peterson, Ramsey County
Primary Data Custodian	Parcels, Jurisdictional Boundaries (MCD and County)	Jim Hentges, Scott County
Primary Data Custodian	Parcels, Jurisdictional Boundaries (MCD and County)	Jay Krafthefer, Washington County
Regional Data Custodian	Socioeconomic Characteristics	John Carpenter, TLG
Primary Data Custodian	Natural Resources	Susanne Maeder, LMIC
Primary Data Custodian	Natural Resources, Jurisdictional Boundaries (Watershed Districts)	Steve Kloibert, Metropolitan Council

### 5.2.2 Interview Summaries

Survey tools (Appendix 8) were constructed to gather information from both primary and regional potential data custodian candidates. The basic elements that were addressed during the interview phase of Task B were primary data custodian's data readiness for integration into a regional data set and potential regional custodian tasks and costs. Regional custodian tasks were identified in Task A and modified to reflect results of Task B interviews.

A full cost accounting framework for collecting GIS data development and maintenance costs has not been established for any of the current participants of MetroGIS. Task A tables represent an accurate breakdown of tasks that ultimately would be used within a cost accounting system to track costs incurred for tasks beyond internal business in future data development and maintenance activities. Many of the primary data custodians develop data on an “as needs” basis and do not maintain data to the level that would be necessary for a regional custodian role.

### *Primary Data Custodians*

Primary data custodian interviews concentrated on the current state of condition of available data. The results of these interviews are summarized in data use and data readiness assessment tables. Assumptions pertaining to the primary data custodians consist of the following:

- We assume that Primary Data Custodians will assess the completeness of their spatial feature data for their own business purposes and only anomaly checking will be required for MetroGIS purposes.
- We assume that Primary Data Custodians will assess the currency of their spatial feature data at the record level for their own business purposes and no additional assessment will be required for MetroGIS purposes.
- We assume that Primary Data Custodians will assess the validity of their data for their own business purposes and no additional assessment will be required for MetroGIS purposes.
- We assume that Primary Data Custodians will conduct editing the spatial feature and attribute data for their own business purposes and no additional editing will be required with primary datasets for MetroGIS purposes.
- We assume that Primary Data Custodians will achieve and maintain adequate positional accuracy of their spatial feature data for their own business purposes and no additional work with primary datasets will be required for MetroGIS purposes.
- We assume that Primary Data Custodians will assess the completeness of their metadata and remedy any deficiencies found for their own business purposes and no additional assessment or work with primary datasets will be required for MetroGIS purposes.
- We assume that Primary Data Custodians will make pertinent data available via physical media for their own business purposes and no additional work will be required for MetroGIS purposes. This may be done in support of a user group as specified in the data sharing agreements currently in force. Data transfer for MetroGIS purposes will make use of these availability arrangements.

One important goal of the interviews with Primary Data Custodians was to determine how much work would be required, and consequently how much expense incurred, to integrate their data into the regional dataset. This information is summarized in Appendix 8, the Data Readiness Assessments were prepared for counties only. The information in the tables came directly from County personnel. Data readiness Tables for other candidate primary producers were not prepared because of the limited availability of existing information at that level of detail. Many agencies are in the planning stage of data development and do not currently maintain any data.

### *Regional Data Custodians*

Regional Custodian interviews were focused on defining the tasks and costs associated with the development and maintenance of a potential regional data solution. Historically, costs have not been documented to the level of detail defined in the tables engendered by Task A. Costs

recorded in the interviews were generalized and further interpolated based on educated conjecture on the part of the consultant team and list of interviewees. The following assumptions are specific to Regional Custodians:

- Unit costs of the various activities of the Regional Data Custodian will be constant for all data sources for a particular type of dataset except when the consultants have knowledge of particular circumstances that will require modifications to the calculations.
- MetroGIS will be the Area Aggregator/Integrator. This does not necessarily mean MetroGIS staff will do data work, but it does mean the work will be done under the direct authority and responsibility of MetroGIS.
- Technical assistance for users is accounted for in the development and maintenance costs for the particular data set for which support would be supplied.
- MetroGIS will not engage in record level error correction in the data sets it receives from the primary data custodians. It may engage in alteration of spatial feature geometry to improve registration. It may engage in testing for data anomalies that will be recorded in or with the data set and reported to the primary data custodian responsible.
- The standards for data that may be maintained for user access under scenarios 1, 2, 3 & 4 (but not 3A), defined in section 5.6, will be as follows:

Projection: UTM Zone 15 extended

Units: meters

Datum: NAD 83

File format: Open Data Formats (e.g. ESRI shape files, ESRI export files. DGN, MIF)

- The Area Aggregator/Integrator or data set contractor, as appropriate, would create all metadata for regional datasets.

### 5.3 Data Integration

A major assumption concerning input data into a regional model is that primary data providers will not be required to change their current in-house GIS development practices. Integration roadblocks show up in many different ways - inconsistent naming conventions, inconsistent measurement of variables, inconsistent physical attributes of data, inconsistent data format, and so forth. Based on interviews with potential regional data custodians the following guidelines should be followed to assist regional data custodians in data integration endeavors.

1. Integration of primary datasets into a regional dataset requires *consistency* of primary data distribution procedures. Once regional data custodians develop a process for integrating primary data, subsequent data updates can be automated if input data remains constant in content and format.
2. MetroGIS standards and guidelines are not mandatory for participation in MetroGIS, but are established to guide primary data custodians in acquiring a regionally consistent dataset. An incentive program should be developed to reward primary data custodians that meet or exceed MetroGIS standards and guidelines. The definitions of expectations, standards and guidelines should be visible and considered critical to achieving a more cost-effective data sharing mechanism.

3. A feedback mechanism should be provided to primary data custodians to help improve the regional data set's integrity and value.

#### 5.4 Regional Dataset Models to Address the Top 13 Business Information Needs

Appendix 5 outlines which datasets will be needed in order to meet the top 13 business information needs that were identified in the business object model. Below are the minimum requirements of each regional dataset, including feature type and essential attributes. Once a business need is addressed in a peer forum or working group process, a complete list of essential attributes for each regional solution will be adopted. For more details about the relationship between dataset and business information needs see Appendix 5.

**Dataset type**  
Feature Type  
 Essential attribute  
 Essential attribute  
 Essential attribute

##### 1. Jurisdictional boundaries (city, school district, county and watershed districts)

**Jurisdictional Boundaries  
MCD & County**  
Polygons  
 County Code  
 (FIPS 3-digit)  
 MCD Code  
 (FIPS 5-digit)  
 MCD name  
 Co and MCD Code  
 (8 digit FIPS)

**Jurisdictional Boundaries  
School Districts**  
Polygons  
 School District

**Jurisdictional Boundaries  
Watershed Districts**  
Polygons  
 Watershed District  
 Major Code  
 Minor code

## **2. Highway/Road networks**

<p><b>Highway/Road Networks</b> <u>Lines</u> Street Name Address Range City Zip Code Street Type</p>
--

## **3. Land use plans/development plans (officially adopted by public bodies)**

<p><b>Planned Land Use</b> <u>Polygons</u> Land Use Codes</p>
---

## **4. Rights to property (Linked to Parcel Dataset)**

### **5. Parcel Boundaries and Parcel Identifiers**

<p><b>Parcel Boundaries</b> <u>Polygons</u> PIN County Date of Data Error Flag</p>
--

## **6. Land Regulations**

<p><b>Zoning</b> <u>Polygons</u> Zone Code</p>
--

## **7. Census Boundaries**

**Census Boundaries**  
Polygons  
Block Number  
Block Group Number  
Tract Number

**8. Water Features**

**Wetlands**  
Polygons, lines  
NWI Code  
Unique ID

**Rivers, Streams,  
Lakes**  
Polygons, lines  
PWI Code  
name

**9. Socioeconomic Characteristics of Areas**

**Socioeconomic  
Characteristics**  
Polygons  
Unique ID  
State Code  
County Code  
City Code  
Census Tract  
Census Blockgroup

**10. Where people live**

**Where People Live**  
Points  
name  
address

**Landmarks**  
Polygons, Lines, Points  
name  
Street Address

## 5.5 Task Tables

The following assumptions were used to define the FTE level of expertise and costs associated with that level of expertise for two profiles: Regional Data Custodians and MetroGIS Staff. Together, the costs associated with the personnel in these profiles would develop and maintain 11 regional data solutions, provide the 21 core services endorsed for MetroGIS, and manage the affairs of the organization.

One FTE (Full Time Equivalent) is calculated as follows:

2080	Full time hours per year @ 40 hours/week
-80	Two weeks vacation
-40	Sick Time
-80	<u>10 Holidays/year</u>
1880	Hours per year equals one FTE

### *Regional Data Custodians:*

- Expert/Manager skill level is the highest GIS skill level available at the organization. This person solves the most difficult technical problems and has final responsibility for all technical decisions and all spatial data processing work done. This level provides technical and policy guidance for the lower levels. This level also consults on GIS policy issues.
- Intermediate skill is the level at which most GIS data processing work is done. This person works semi-independently following methods and policies developed by the Expert skill level. This level is capable of performing all routine spatial data processing activities.
- Entry Level is the skill level of the intern or recent graduate. This level does only the conceptually simplest and most repetitive work under the direct supervision of a higher skill level.
- These personnel are assumed to be staff of MetroGIS partner organizations, third party contractors, etc

### *MetroGIS Staff:*

MetroGIS staff are not expected to carry out actual tasks involved in regional data development or regional data maintenance. Definitions of positions follow:

The Executive Director leads support to the policy board, is an advocate for Board Directives and leads any strategic planning efforts. The director is also responsible for the budget, personnel management, outreach and general administration of MetroGIS. Additional duties include securing and administering agreements with partners, devising and administering marketing plans and being the liaison for related initiatives.

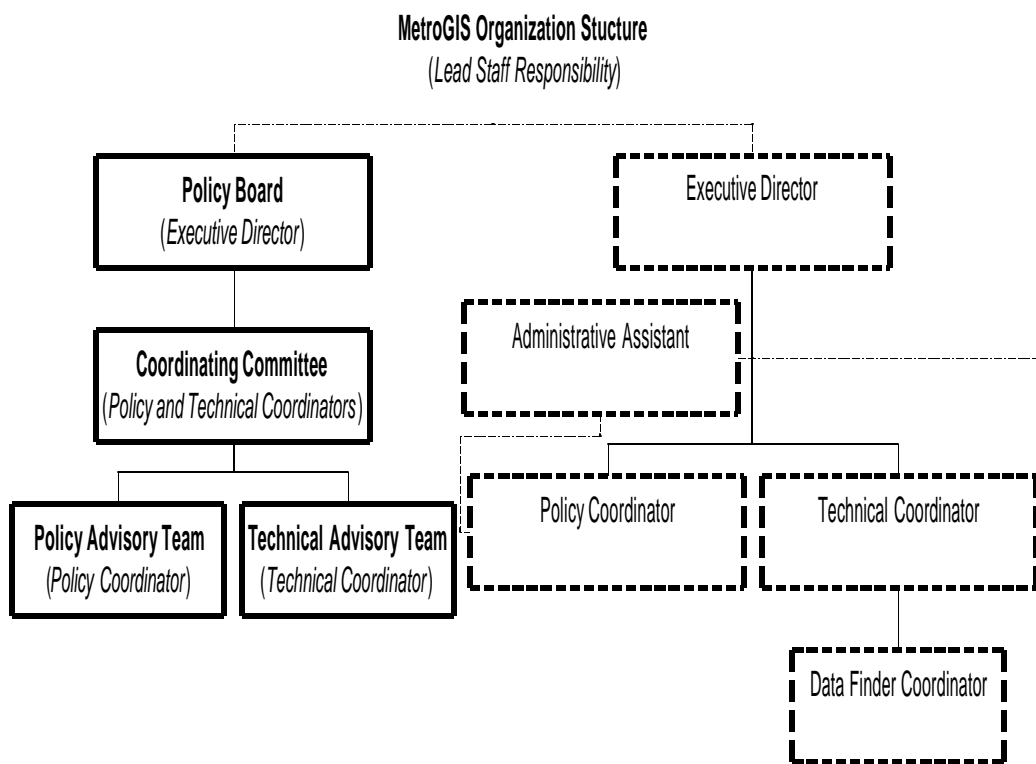
The Policy Coordinator leads support to the Policy Advisory Team and Coordinating Committee. Additional duties include coordinating forums/users groups to discuss issues and opportunities for MetroGIS, identifying GIS continuing education needs and promote participation, monitoring stakeholder satisfaction with MetroGIS objectives and accomplishments.

The Technical Coordinator leads support to the Technical Advisory Team. Responsibilities include managing identification of new priority business information needs, coordinating MetroGIS Fair Share Financial Model

enhancements to established priority datasets, maintaining business object model and overseeing data and telecommunications standards development and refinement. Additional duties include supervising the Data Finder Manager, assisting participants in retrieving, translating and using data.

The Administrative Assistant is responsible for the coordination of mailings for Board and Committee team meetings, posting document and updated listings on the MetroGIS WEB site and maintaining the mail/email listings. Additional duties include arranging meeting and travel itineraries, managing repository of GIS human resource information, procuring materials and services and assisting with research projects.

Below is a schematic showing the current organization structure for the MetroGIS Policy Board, Coordinating Committee and Advisory Team. The structure shown for staff is recommended, assuming a mature MetroGIS Organization.



The costs for each Regional Data Custodian skill level are summarized in Table 12. The costs for each MetroGIS Staff position are summarized in Table 13 and hours are itemized by functions in Table 16. These estimated costs are based on local and national salary information, current salaries of MetroGIS staff, and current -overhead load rates at MetroGIS.

**Table 12: Regional Data Custodian FTE Profile**

	<b>High Skill FTE</b>	<b>Medium Skill FTE</b>	<b>Low Skill FTE</b>
<b>Annual Salary</b>	\$50,000	\$40,000	\$30,000
<b>Load Rate (benefits, etc.)</b>	30%	30%	30%
<b>Cost/FTE</b>	\$65,000	\$52,000	\$39,000

**Table 13: MetroGIS Staff FTE Profile**

	<b>Executive Director FTE</b>	<b>Policy Coordinator FTE</b>	<b>GIS Coordinator FTE</b>	<b>Administrative Assistant FTE</b>
<b>Annual Salary</b>	\$80,000	\$56,000	\$47,000	\$25,000
<b>Load Rate (benefits, etc.)</b>	30%	30%	30%	30%
<b>Cost/FTE</b>	\$104,000	\$72,800	\$61,100	\$32,500
<b>Hours</b>	2155 hours	2106 hours	1956 hours	1880
<b>FTE</b>	1.15	1.12	1.04	1.0*

*\*Administrative Assistant: We assume that three professionals will require the services of one full time support staff member based upon current support levels required and the additional needs of an Executive Director.*

## **5.6 Recommended Operational Scenarios**

Given the technical and organizational complexities of spatial data set creation in the real world, it is seldom possible to specify one set of data set creation and maintenance conditions for several data sets. On the other hand, estimation requires and efficiency suggests that the number of different sets of conditions be well defined and minimized. We approached this problem by specifying 4 general sets of conditions for data set creation and maintenance, and call them scenarios. Each scenario addresses what will be done to create the data set and who will do it. These scenarios generally range over all the major ways such data sets might be produced within the MetroGIS context. We found three of them to be useful to create data sets to meet particular MetroGIS information needs. Scenario three, while included in the list, was not recommended for any of the information needs because it was clearly inferior to the others in every case examined. Its major point of inferiority is the requirement of additional expenditure by primary data custodians.

The four scenarios were defined as follows.

### *1. Area Aggregator*

An Area Aggregator creates and maintains a regional dataset by aggregating several primary datasets. The data is taken 'as is'. The datasets are tested for several standard anomalies and reports of these are returned to the data providers. These datasets are *projected* and *transformed* as needed and *map joined* into a single dataset. *Topology is then built* and *topological errors* flagged and recorded at the record level. No error correction is done.

Edge matching is not done. The Area Aggregator need not be MetroGIS. [Note this very similar to what is being done for the I35W Coalition. It differs in the intended use of Arc/INFO rather than ArcView for processing.]

Strengths:

- Technically relatively easy
- Lower expense than #4.
- Less burden on data provider than in #3
- Helps data providers to improve their data quality.

Weaknesses:

- No control over quality of data as provided by various organizations
- Data quality likely to be very bad where data from differing sources join
- Data more likely to be out of date than for #3

2. *Outside Purchase*

MetroGIS contracts with independent contractor to maintain a regional dataset.

Strengths:

- Technically very easy for MetroGIS
- True integrated, topologically correct regional datasets are possible.
- Moderate expense if pre-existing dataset
- Data quality is good

Weaknesses:

- High expense if dataset must be created for the purpose (but not necessarily more expensive than for #4 below)
- Requires cash for all costs. Budgeted labor and member contributions of labor and facilities can not substitute for cash.

3. *Data Assembly By User*

MetroGIS develops and supports an application which stakeholders can use to directly access primary datasets via FTP as needed. The user can then create regional datasets if required. No additional data processing or topological work is done.

Strengths:

- Greatest flexibility in satisfying particular data needs
- Most up to date datasets
- Low cost to MetroGIS

### Weaknesses:

1. Needs direct, full time, high speed access to file servers of all area data providers, this will be an expense to the data provider for hardware, software, management and coordination.
2. Requires primary data providers to maintain copies of their data in a projection most do not use for internal purposes.
3. MetroGIS has no control over quality of data as provided by various organizations
4. Feature attributes are likely to be mismatched among datasets from different sources.
5. There is no overall quality control work being done.
6. Data quality likely to be very bad where data from differing sources meet
7. Significant maintenance effort required by MetroGIS to keep application current with file server, dataset name and path changes by all data providers.
8. Users will be required to have a fairly high level of GIS knowledge and processing resources to make significant use of this regional resource.

### *3A. Data Assembly By User (Current level of service by Data Finder)*

The same as scenario #3 above but without the direct downloading capability. This largely eliminates weaknesses 1, 2, & 7.

### 4. Area Integrator Dataset Creation

The Area Integrator collects data from the data suppliers and creates a seamless regional dataset. All source datasets are checked for anomalies (see method in #1), *edge matched*, *map joined*, *topology built*, and obvious *topological errors* are flagged in the attribute table.

### Strengths:

- MetroGIS gets data that is somewhat more useful than under scenario #1.
- A single regional dataset will result.
- MetroGIS has more control over data quality than under the other scenarios

### Weaknesses:

- Higher cost than other scenarios
- Data more likely to be out of date than #3.
- Some errors will still exist.
- Parcel shape and size will be somewhat altered by edge matching, this will be most noticeable near boundaries where original datasets did not register well.

Certain problems will remain under #1, #3, & #4 above:

- Errors where source datasets meet will not be entirely resolved.
- Registration between data layers (parcels & water features for instance) will sometimes be inadequate.

- Basic data quality will vary among data providers and not be controllable by MetroGIS.

## 5.7 Cost Estimation Assumptions

### 5.7.1 General Assumptions

- Development of the specified regional data solutions is assumed to occur over a four-year period
- MetroGIS will set data standards which will be goals for participation only, not requirements
- Data consumers will generally support the operating costs of MetroGIS
- Data producers will receive credit toward any costs of participation in MetroGIS for the value to MetroGIS of data provided in cases where the data addresses primary MetroGIS data needs. The amount of credit received by data providers will vary according to the value to MetroGIS of the data provided.
- MetroGIS will have legal status as an organization separate from Met Council.
- On the assumption that past practice is the most conservative guide to future practice, we assume that past Met Council policies in regard to data sharing with MetroGIS will be continued.
- All Data Finder costs beyond the costs to maintain current functionality and service are rolled into the costs of creation and maintenance for certain key datasets since Data Finder would be expanded as the user interface by which MetroGIS data is accessed. Costs for hardware, software, server and telecommunications capacity necessitated by the creation, maintenance, and availability of these data sets are included in their costs.
- To separate Data Finders cost subtract the following costs from the Parcel and Parcel Identifier data set costs: Data Finder Enhancements in year #1: (\$29,039), Annual Data Finder Enhancement Maintenance: (\$11,754), Additional server, systems, GIS software, telecommunications and internet costs in ;year #1: (\$60,512, and Additional server, systems, GIS software, telecommunications and internet annual maintenance costs. (\$30,616).
- Labor pertaining to maintaining current functions of Data Finder is accounted for in “basic non-staff costs. Extended functions are accounted for under Application Development, Application Maintenance, and User Support in the dataset labor calculations for the Parcels dataset. These hours include time to make Data Finder the inclusive user interface for MetroGIS. It provides access to metadata and supports downloads of datasets.
- Server and bandwidth needs of an expanded Data Finder will require additional investment in Maintenance Years. These investments are included with the costs of certain data sets since the addition of these data sets while drive the need.
- In some cases more than one data need will be address by the creation of a single data set, in other cases it may be necessary to create more than one data set to address a single data need.
- The satisfaction of all high priority (top 13) data needs except for surface water features depends on the existence of an adequate road center database with address ranges and a regional parcel base.

- The primary data custodian would do all metadata research for primary data sets. The Area Aggregator/Integrator or data set contractor as appropriate would do all metadata for regional datasets.

### 5.7.2 *Data Set Assumptions*

- Data sharing agreements with counties will continue and counties will receive funds through them at current rates.
- For purposes of estimating costs we are assuming that the "Rights to Property" data need will be satisfied by property ownership information as contained in county tax records. These records will be linked to the regional parcel data set using a concatenated key consisting of county FIPS and PIN. These data would need to gather from the counties annually. We assume cost savings after the first year due to process automation and data access relationships. The MetroGIS Policy Advisory Team accepted this solution as a minimum solution.
- For purposes of estimating costs we are assuming that the "Land Regulations" data need will be satisfied by unaltered versions of city and county zoning information. The data set creation methods to be used will be similar to those used from the land use data sets except that no regional data set will be created. Rather, individual data sets for each jurisdiction will be created to maintain the unique classification systems and definitions of each jurisdiction. The cost per jurisdiction to satisfy this information need will be greater than for any one of the land use information needs. All the cost factors for the creation of the land use data sets apply with the addition of the added cost of creating and maintaining individual data sets and metadata for each jurisdiction.
- MetroGIS would continue to use datasets currently provided by Met Council under existing budgetary arrangements. MetroGIS would not pay cost recovery money to Met Council for these datasets and would continue to pay data maintenance fees at current levels.
- We assume that MetroGIS would continue to receive The Lawrence Group's (TLG) road center and address range data from Met Council for the current annual maintenance fee to them of \$4,000 with no cost recovery charge for initial data set licensing. This is a fully supported commercial data set.
- We assume MetroGIS will receive at no charge the 1990 census geography data set contracted for by Met Council at a cost of \$35,000 and a similar cost for the year 2000 census geography dataset.
- We assume Met Council will create economic activity and development forecasts at a resolution much finer than the current MCD resolution. This is based on a statement from Rick Gelbmann, Metropolitan Council GIS Supervisor, that a regional parcel base will be used for these purposes when it becomes available from MetroGIS. We assume Met Council will provide this data to MetroGIS in exchange for use of the regional parcel base in developing it. The best quality data sets to meet this information need would be developed at the block face level of aggregation. Insight Mapping & Graphics are currently doing such work for some municipalities. The costs included here are for this highest quality data set.
- The experience and practice of the I35W coalition will be used as a guide for procedures and cost estimates in any appropriate case.

- We assume deliverable address data can be acquired free from the USPS. We assume information can be obtained free from NSP as a regulated utility. Data from NSP and water utilities are not essential but would be helpful. Address matching this data using the TLG road center data set will provide a good hit rate and level of accuracy acceptable for most purposes.
- We assume wetland, streams and other surface water features for the Metro Area created by the Metropolitan Mosquito Control District for their own business purposes would be shared with MetroGIS in exchange for the use of the regional parcel and rights to property data needed for MMCD business purposes and to be maintained by MetroGIS.
- Creation and maintenance for the several types of land use data sets have been priced together since the nature of the work and experience needed to create them is highly similar. The regional parcel data set will be used as a base upon which the land use data sets will be created. Although many jurisdictions will be able to provide land use information in a digital cartographic format, we will still need to convert much data from hard copy sources such as planning maps and comprehensive plans. Due to the many data sources (individual municipalities in most cases), variability in physical and logical data format, and the hard copy nature of much data, the creation of this data set will be expensive. It will also be expensive to keep this data set current since many jurisdictions must be checked each year for planning changes. Feature attributes will include at least the municipality name, county name, and general land use classification. Due to the variability of land use classifications across the Metro Area, only highly generalized classification systems can be used for the resulting regional data sets.
- There are currently no water feature data sets that are more accurate or complete than those available from state government sources. Adequate data does not yet exist from which to create metro-wide data sets for any water features that will be suitable for use with existing parcels data or any data sets made using parcels data. We expect that within about a year the Metropolitan Mosquito Control District will complete a metro-wide surface water & wetland data set based upon aerial photography supplied by the Met Council. We suggest that MetroGIS work with MCCD in the development of this data set and use it to fulfill its surface water data needs. It would be very useful for both the MCCD and MetroGIS to have these hydrographic data sets created in reference to the regional parcel base.
- The regional school district data set will be created on the regional parcel base from school district boundary information obtained from the school districts themselves. We expect this information to be provided in hard copy form in most cases, and to consist of marked up city and county maps and in some cases written boundary descriptions. Due to the many data sources, variability in physical and logical data format, and the hard copy nature of most data, the creation of this data set will be expensive. It will also be expensive to keep this data set current since boundary changes for many school districts must be checked each year. Feature attributes will include at least the county name and school district number. TLG currently has a regional school district data set. It covers the most urbanized parts of the metro area. It is not currently up to date and will not correctly overlay a parcel base but may be useful as a general guide in the creation of a high quality regional school district data set.
- After the Regional Parcel base is created it would be used to update the MCD polygon coverage to improve its positional accuracy.
- The regional watershed district data set will be created on the regional parcel base from watershed district boundary information obtained from the watershed districts themselves.

Hydrographic data may also be used as reference as needed. We expect this information to be provided in hard copy form in most cases, and to consist of marked up city and county maps and in some cases written boundary descriptions. Due to the number of data sources, variability in physical and logical data format, and the hard copy nature of most data, the creation of this data set will be expensive. It will also be expensive to keep this data set current since boundary changes for many watershed districts must be checked each year. Feature attributes will include at least the watershed district name.

- The regional parcel boundary data set will be fundamental to the creation of most other data sets contemplated here. Existing parcel data will be obtained from the Metro Area counties in digital cartographic format and processed to create one regional polygon data set. Topological errors will be flagged but not fixed in most cases. Edge matching between source data sets will be done without the use of any information not contained in the source data sets themselves. This will result in better alignment between source data sets as they are joined into a regional data set but will cause minor distortion of some parcel shapes and sizes near the boundaries. Due to source data changes, the entire regional data set will be recreated each year from the latest source data available. Since no hard copy data sources will be used and reasonable consistency of formats and practices can be expected from the counties in the creation of the source data sets, process automation is expected to result in considerable savings in subsequent regional parcel data set creation efforts. Feature attributes should include at least county FIPS, PIN, date of source data, and error flag.
- The marginal costs for creation and maintenance of additional Data Finder functionality to support data set download and related needs is included in the cost estimate for the creation of the regional parcel data set since this data set is fundamental to most others contemplated here and will be done first.

## **5.8 MetroGIS Cost Summary**

### ***5.8.1 Costs of Meeting Data Needs***

The figures in Table 14 include all costs that can be attributed directly to the creation, maintenance, user access, or user support of a particular data set. They do not include any costs accounted for as "Basic Staff" or "Basic Non-Staff" costs listed elsewhere.

Please note the following about cost information contained in Table 14 below:

- The upper cost number represents MINIMUM cost to create the data set according to the assumptions listed below.
- The lower cost number represents MINIMUM annual cost to maintain the data set according to the assumptions listed below.
- The table below represents the top 13 Business Information Needs and their associated data needs taken from the Task A report.

**Table 14: Summarized Costs of Creating and Maintaining Data Sets**

See Appendix 10 for referenced notes.

<b>Business Information Need</b>	<b>Data Set</b>	<b>Scenario</b>	<b>Likely Source</b>	<b>Cost</b>
<b>Jurisdictional Boundaries</b>	Police precincts (polygons)		Police Dept.	Not priced
	School districts (polygons)	4	School Districts	\$109,829 \$40,099
	Fire districts (polygons)		Fire Dept.	Not Priced
	MCDs (polygons)	2	Met Council or PCA	\$4,204 \$1,770
	Counties (polygons)	2		Priced as part of MCDs
	Watershed district boundaries (polygons)	4	Watershed Districts	\$17,709 \$12,509
<b>Highway/Road Networks</b>	Streets (centerlines)	2	TLG	\$0 <i>See notes</i>
<b>Street Addresses</b>		2	TLG	Part of Street Centers
<b>Land Use/ Development Plans</b>	Future land use (polygons) Comprehensive/development plan (polygons)	4	Cities & Counties	\$155,821 \$56,466
<b>Existing Land Use</b>	Existing Land Use (polygons)	4	Counties & MCDs	Priced as part of other Land Use data sets recorded above
<b>Land Regulations</b>	Zoning (polygons)	4	Counties & MCDs	\$102,935 \$50,562
<b>Rights to property</b>	Tabular data linked to Parcels data set	1	Counties	\$24,230 \$17,344
<b>Parcel Boundaries</b>	Parcels (polygons)	4	Counties	\$199,301

	<i>Not all attributes may be available from each Primary data set Custodian</i>			\$86,433
	Control points (points)	4	Counties	Included in Parcels
	Elevation contours (lines derived from existing grid) <i>Elevation contours are not properly a part of a parcels dataset</i>		Counties	Not priced
<b>Parcel Identifiers</b>	<i>Attribute of parcels</i>	4	Counties	Part of Parcels data set
<b>Water Features</b>	Aquifer (points) <i>Data sources not adequate</i>		DNR or other state agency	Not Priced
	Wells (points) <i>Data sources not adequate</i>		MN Dept. of Health	Not Priced
	Lakes (polygons, lines)	2	DNR or LMIC initially, MCCD in one year	\$0 See notes
	Wetlands (polygons, points)	Not Priced	NWI initially, MCCD in one year	\$0 See notes
	Streams (lines)	2	DNR or LMIC initially, MCCD in one year	\$0 See notes
	Floodplains (polygons) <i>Availability very spotty</i>		Local Gov., otherwise FEMA	Not Priced
	Watershed boundaries (polygons)	2	DNR	\$0 <i>See notes</i>
<b>Census Boundaries</b>	Census tracts	2	TLG	\$0

	(polygons) <i>1:1 spatial relationship with parcel boundaries</i>			<i>See notes</i>
	Census blocks (polygons) <i>Only Block Groups will be available.</i>	2	TLG	Priced with above
<b>Where people live</b>	Occupant data (tabular)	4	US West, NSP, water utilities & USPS	\$272,777 \$272,777
<b>Socio-Economic Characteristics of Areas</b>	<i>See notes</i>	2	Insight Mapping & Graphics	\$1.5 Million \$900,000

## 5.8.2 Basic MetroGIS Operating Costs

The figures given below are exclusive of cost that can be attributed directly to the creation, maintenance, user access or user support of a particular data set. Cost for the development and maintenance of particular data sets is reported above.

**Table 15: MetroGIS Basic Staff Time Allocation Used for Estimating Purposes.**

This table shows a reasonable distribution of effort measured in work hours for the three professional positions recommended in this report. This exercise was conducted to test the need for the three positions, actual time allocations will differ. These hours were used to generate costs for column 2 of table 18.

Tasks	Hours/Yr Executive Director	Hours/Yr Policy Coordinator	Hours/Yr GIS Coordinator
Secure financing	120	40	40
Supervise staff	80		
Organizational strategy and policy	160	40	20
Develop Business Plan	60	40	20
Address intellectual property rights issues	8	60	8
Budgeting	45	40	20
Professional Development	80	80	120
Promote & endorse voluntary policies which foster coordination of GIS among the region's organizations	60	120	20
Identify unmet GIS needs with regional significance and act on these needs.	40	100	60
Facilitate data sharing agreements and licensing among MetroGIS stakeholders	120	120	
Develop and endorse standards for GIS data content, data documentation, and data management			160
Require standardized GIS content, data documentation, and data management for regional data sets			8
Endorse standards for telecommunication protocol and networks			80
Provide a repository of GIS human resources information		4	
Develop master contracts for regional GIS projects, when appropriate	80	90	60
Promote development and exchange of GIS applications and procedures that serve MetroGIS needs.	40	40	160
Create and maintain datasets for MetroGIS based upon identified priorities	40	40	160
Fill gaps in metadata based on identified priorities			40
Provide a directory of data within the region and a mechanism for search and retrieval of GIS data (this includes hosting the mechanism) (Data Finder)			40
Provide technical assistance to participants to retrieve, translate, and use data.			40
Undertake research to meet common regional GIS needs	40	100	120
Promote collaborative funding of pilot projects that meet regional needs	80	80	20
Identify GIS training and continuing education needs and encourage participation	40	90	40
Advocate for MetroGIS needs and desires with state and federal policy makers	430	140	20
Maintain liaison relationships with committees/organizations with similar objectives to MetroGIS	500	610	40
Promote forums for MetroGIS stakeholders to discuss common GIS needs and opportunities	80	80	80

Tasks	Hours/Yr	Hours/Yr	Hours/Yr
	Executive Director	Policy Coordinator	GIS Coordinator
Publish MetroGIS Newsletter/Brochures	16	80	340
Maintain MetroGIS world wide web site	16	32	80
Market MetroGIS data and products	20	80	160
<b>Totals</b>	<b>2155</b>	<b>2106</b>	<b>1956</b>

**Table 16: MetroGIS Basic Non-staff Costs**

This table assumes load leveling over four data set creation years.

Budget Use	Data Set Creation Yr	Data Set Maintenance Yr
Promote & endorse voluntary policies which foster coordination of GIS among the region's organizations	\$20,400	\$20,400
Identify unmet GIS needs with regional significance and act on these needs.	\$3,000	\$3,000
Facilitate data sharing agreements and licensing among MetroGIS stakeholders	\$75,000	\$75,000
Develop and endorse standards for GIS data content, data documentation, and data management	\$1,010	\$1,010
Require standardized GIS content, data documentation, and data management for regional data sets	\$1,010	\$1,010
Endorse standards for telecommunication protocol and networks		
Provide a repository of GIS human resources information	\$0	\$0
Develop master contracts for regional GIS projects, when appropriate	\$0	\$0
Promote development and exchange of GIS applications and procedures that serve MetroGIS needs.	\$0	\$0
Create and maintain datasets for MetroGIS based upon identified priorities	\$0	\$0
Fill gaps in metadata based on identified priorities	\$0	\$0
Provide a directory of data within the region and a mechanism for search and retrieval of GIS data (this includes hosting the mechanism)	\$0	\$0
Provide technical assistance to participants to retrieve, translate, and use data.	\$5,000	\$5,000
Undertake research to meet common regional GIS needs	\$3,000	\$3,000
Promote collaborative funding of pilot projects that meet regional needs	\$25,000	\$25,000
Identify GIS training and continuing education needs and encourage participation	\$0	\$0
Advocate for MetroGIS needs and desires with state and federal policy makers	\$0	\$0
Maintain liaison relationships with committees/organizations with similar objectives to MetroGIS	\$0	\$0
Promote forums for MetroGIS stakeholders to discuss common GIS needs and opportunities	\$2,100	\$2,100
Publish MetroGIS Newsletter/Brochures	\$7,150	\$7,150
Market MetroGIS data and products		
Rent	\$20,806	\$18,686
Electric, security, phone & misc. utilities	\$5,722	\$5,139
Office Furniture	\$2,601	\$2,336
General purpose office equipment & computers (excluding web site and GIS processing equipment)	\$20,806	\$18,686
Legal services	\$10,403	\$9,336
Payroll and accounting services	\$7,802	\$7,007
Specialized human resources services	\$2,601	\$2,336
Repair services for copiers, printers, general purpose computers and other office equipment	\$3,901	\$3,504
Travel costs	\$12,137	\$7,786
Professional association and publication costs	\$3,468	\$2,224
* Misc. office, operational, & specialized unforeseen technical	\$14,738	\$13,236
Printing and distribution not counted elsewhere	\$11,000	\$3,000
MetroGIS Web Site maintenance	\$5,000	\$5,000

**Table 17: MetroGIS Data Set General Overhead Costs**

These are costs that are attributable to data set creation and maintenance in general but to no particular data set creation activity such as those shown in Table 14.

<b>Budget Use</b>	<b>Data Set Creation Yr</b>	<b>Data Set Maintenance Yr</b>
Market MetroGIS data and products	\$30,000	\$6,000
Periodic misc. consultant work (This is likely to be data set related but need not be.)	\$65,000	\$65,000
Rent	\$20,806	\$8,008
Electric, security, phone & misc. utilities	\$5,722	\$2,202
Office Furniture	\$2,601	\$1,001
General purpose office equipment & computers (excluding web site and GIS processing equipment)	\$20,806	\$8,008
Legal services	\$10,403	\$4,004
Payroll and accounting services	\$7,802	\$3,003
Specialized human resources services	\$2,601	\$1,001
Repair services for copiers, printers, general purpose computers and other office equipment	\$3,901	\$1,502
Misc. office, operational, & specialized unforeseen technical	\$14,738	\$5,672

### 5.8.3 Basic Data Finder Costs

The core functionality of Data Finder ([www.datafinder.org](http://www.datafinder.org)), the MetroGIS internet-based data search and retrieval tool provides a method for browsing metadata and retrieving current data sets.

In the table below, all hardware and installation costs are fully amortized in the year of occurrence. For example, if no additional functions are added to Data Finder in 2000, but are added in 2001, costs might look like those in Table 19.

**Table 18: Data Finder Costs**

<b>Fiscal Year</b>	<b>Combined Costs</b>	<b>Costs to support current functionality of Data Finder</b>	<b>Costs to support enhanced functions of Data Finder.</b>
2000	\$65,000	\$65,000(includes completing some one-time work on current functions. This includes .5 FTE to maintain metadata currency and maintain functionality of the current version and 1 FTE for a year (intern level \$10/hr) to clear the backlog	No costs in this year. For the purposes of this table Data Finder enhancement is assumed to begin in FY 2001.

		of metadata to be created.)	
2001	\$84,000	\$28,000 (This consists of: \$26,000 for maintenance labor (.5 FTE) and \$2,000 for other costs including computer communications and maintenance.)	\$56,000 (This consists of \$24,894 for labor to add Data Finder functionality, \$11,000 for additional server and network hardware and software, and \$20,710 for installation and first year costs of necessary telecommunications and internet services.)
2002	\$54,566	\$28,000 (This consists of: \$26,000 for maintenance labor (.5 FTE) and \$2,000 for other costs including computer communications and maintenance.)	\$26,566 (This consists of \$7,606 for labor to maintain the enhanced functions of Data Finder, \$3,000 to maintain the server, software, and network, and \$15,960 for telecommunications & internet costs.)
2003	\$54,566	\$28,000 (This consists of: \$26,000 for maintenance labor (.5 FTE) and \$2,000 for other costs including computer communications and maintenance.)	\$26,566 (This consists of \$7,606 for labor to maintain the enhanced functions of Data Finder, \$3,000 to maintain the server, software, and network, and \$15,960 for telecommunications & internet costs.)

## 5.9 Annualized Cost Estimates

**Table 19: Total Estimated MetroGIS Average Annual Costs**

These cost were developed using a four year planning horizon.

<b>Budget Use</b>	<b>Basic Staff</b>	<b>Basic Non-staff</b>	<b>Basic Data Finder</b>	<b>Data Creation &amp; Maint. Overhead</b>	<b>Data Set Creation &amp; Maint.</b>	<b>Line Item Cost Totals</b>
Promote & endorse voluntary policies which foster coordination of GIS among the region's organizations	\$9,053	\$20,400				\$29,453
Identify unmet GIS needs with regional significance and act on these needs. This may include periodic consultant work.	\$8,854	\$68,000				\$76,854
Facilitate data sharing agreements and licensing among MetroGIS stakeholders (This includes the current \$75,000 per year in data agreement payments).	\$11,519	\$75,000				\$86,519
Develop and endorse standards for GIS data content, data documentation, and data management	\$6,883	\$1,010				\$7,893
Require standardized GIS content, data documentation, and data management for regional data sets	\$344	\$1,010				\$1,354
Endorse standards for telecommunication protocol and networks	\$3,442					\$3,442
Provide a repository of GIS human resources information (Cost of determining the adequacy of this service provided by others).	\$163					\$163

<b>Budget Use</b>	<b>Basic Staff</b>	<b>Basic Non-staff</b>	<b>Basic Data Finder</b>	<b>Data Creation &amp; Maint. Overhead</b>	<b>Data Set Creation &amp; Maint.</b>	<b>Line Item Cost Totals</b>
Develop master contracts for regional GIS projects, when appropriate	\$10,665					\$10,665
Promote development and exchange of GIS applications and procedures that serve MetroGIS needs.	\$10,722					\$10,722
Create and maintain datasets for MetroGIS based upon identified priorities <sup>7</sup>	\$10,722				<b>\$155,790</b> (Three top data needs) <b>\$285,563</b> (Eleven top data needs) <b>\$728,757</b> (Thirteen top data needs)	\$166,512 \$296,285 \$739,479
Provide a directory of data within the region and a mechanism for search and retrieval of GIS data (this includes hosting the mechanism and filling gaps in metadata based on identified priorities.)	\$3,441		\$37,250			\$40,691
Provide technical assistance to participants to retrieve, translate, and use data.	\$1,720	\$5,000				\$6,720
Undertake research to meet common regional GIS needs	\$11,436	\$3,000				\$14,436
Promote collaborative funding of pilot projects that meet regional needs	\$8,539	\$25,000				\$33,539
Identify GIS training and continuing education needs and encourage participation	\$7,588					\$7,588

<sup>7</sup> The costs in presented in Dataset Creation and Maintenance column are ¼ of the total cost for each of the three options.

<b>Budget Use</b>	<b>Basic Staff</b>	<b>Basic Non-staff</b>	<b>Basic Data Finder</b>	<b>Data Creation &amp; Maint. Overhead</b>	<b>Data Set Creation &amp; Maint.</b>	<b>Line Item Cost Totals</b>
Advocate for MetroGIS needs and desires with state and federal policy makers	\$30,372					\$30,372
Maintain liaison relationships with committees/organizations with similar objectives to MetroGIS	\$54,176					\$54,176
Promote forums for MetroGIS stakeholders to discuss common GIS needs and opportunities	\$11,121	\$2,100				\$13,221
Publish MetroGIS Newsletter/Brochures, and WWW information creation	\$3,786	\$7,150				\$10,936
Market MetroGIS data and products (estimate based on all 13 data needs addressed)	\$11,237			\$30,000		\$41,237
Secure MetroGIS funding	\$9,994					\$9,994
Supervise MetroGIS staff (annual reviews, etc.)	\$4,434					\$4,434
Establish MetroGIS strategy and policy (where not accounted for elsewhere)	\$11,350					\$11,350
Develop and maintain business plan (time with consultant)	\$5,808					\$5,808
Address intellectual property rights, data access, and privacy issues	\$3,221					\$3,221
Budgeting	\$4,977					\$4,977
Professional development	\$12,841					\$12,841
Rent		\$20,806		\$20,806		\$41,612
Electric, security, phone & misc. utilities		\$5,722		\$5,722		\$11,444
Office Furniture (beyond that currently in use)		\$2,601		\$2,601		\$5,202

<b>Budget Use</b>	<b>Basic Staff</b>	<b>Basic Non-staff</b>	<b>Basic Data Finder</b>	<b>Data Creation &amp; Maint. Overhead</b>	<b>Data Set Creation &amp; Maint.</b>	<b>Line Item Cost Totals</b>
General purpose office equipment & computers (excluding web site and GIS processing equipment)		\$20,806		\$20,806		\$41,612
Legal services		\$10,403		\$10,403		\$20,806
Payroll and accounting services		\$7,802		\$7,802		\$15,604
Specialized human resources services		\$2,601		\$2,601		\$5,202
Repair services for copiers, printers, general purpose computers and other office equipment		\$3,901		\$3,901		\$7,802
Travel costs		\$12,137		0		\$12,137
Professional association and publication costs		\$3,468		0		\$3,468
Misc. office, operational, & specialized unforeseen technical		\$14,738		\$14,738		\$29,476
Printing and distribution not counted elsewhere		\$11,000		0		\$11,000
MetroGIS Web Site maintenance		\$5,000		0		\$5,000
<b>TOTALS</b>	<b>\$268,407</b>	<b>\$328,655</b>	<b>\$37,250</b>	<b>\$119,380<sup>8</sup></b>		

Please note, the elimination of data set creation activities and/or certain activities listed above may have some impact on the costs of other activities and will influence basic staff roles and levels of activity.

Using a four year planning horizon we estimate the average annual MetroGIS costs as follows.

- Normal operations, less development and maintenance of regional dataset, will cost **\$634,312**. This does not include the cost of adding functionality to Data Finder for direct download of regional data assuming the cost of the regional dataset would not be paid by MetroGIS. It also does not include any general overhead associated with data set creation.
- Normal operations and the creation of data sets by MetroGIS for Parcels and Parcel Identifiers, Improved Jurisdictional Boundaries, and Road Centers with address ranges will

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<sup>8</sup> These expenses are assumed to remain constant regardless of the three data development options cited but would not be incurred if data development was not pursued.

cost **\$909,482**. This includes the cost of adding functionality to Data Finder for direct download of these data.

- Normal operations and the creation of data sets by MetroGIS to address all 13 of the identified MetroGIS high priority data needs will cost **\$1,039,255**. This includes the cost of necessary modifications to Data Finder for direct data download.
- Normal operations and the creation of data sets by MetroGIS to address 11 of the identified MetroGIS high priority data needs (excluding high quality "Socioeconomic Characteristics of Areas" and "Where People Live") will cost **\$1,482,449**. This includes the

These figures are based on the following sequence of accomplishments over a 4 year period.

- Year One Accomplishments
  - Parcels and Parcel Identifiers
  - Revised Jurisdictional Boundaries
  - Watershed Jurisdictional Boundaries
  - Data Finder enhancements
- Year Two Cost Accomplishments
  - School District Boundaries
  - Rights to Property
  - Land Use Plans
  - Most of Land Regulation work completed
- Year Three Accomplishments
  - Land Regulation
  - Socio-Economic Characteristics of Areas
  - Where People Live
- Year Four Accomplishments
  - Maintenance of the institution, all data, systems, and software addressing the 13 priority data needs.

## **5.10 Summary and Conclusions**

Technology based operations are one of the most difficult to document historical costs and forecast future expenditures for. Most agencies are just starting to develop cost accounting measures for tracking GIS activities within the organization and only have a very general estimation of the level of effort and cost associated with specific development and maintenance tasks. It is recommended that the costs documented in Task B be used as guidelines and not as budget line items in establishing costs for decision models and analysis. The costs included in this report are forecasts and should be noted as such for any additional analysis beyond the scope of this project.

MetroGIS costs contained within this report focus on the current 21 operational tasks and additional potential custodian tasks associated with developing data solutions for the 13

identified business information needs. It should be noted that no decisions have been made as to whether a regional coverage will exist and no data custodians have been chosen. For purposes of this study a regional solution for parcel boundaries, zoning, existing land use and land use plans was developed that is very similar to work currently being done for the North Metro I-35W Corridor Coalition.

MetroGIS employs a working group process through which data standards are defined by a group of peers. Most of the business information needs have not yet gone through this internal process and therefor MetroGIS has not adopted standards for datasets associated with every identified business need. Costs will increase if standards of a higher degree are adopted after a working group has reviewed the dataset. Regional solutions conceptualized in this report should be used as a starting point from which the working groups will be able to build more detailed assumptions and standards. Currently the hydrology business information need's working group is working in collaboration with the Hydrology Committee of the Governor's Council to develop standards for a hydrographic regional solution.

Technology is rapidly changing and enhancements to Data Finder – the mechanism for MetroGIS data access – will need to be reviewed every 6-12 months. Advancements in the environments in which GIS resides will only improve MetroGIS's success.

The operation costs documented in Task B are inherent in any type of service provider organization and are the most stable of all costs documented. As MetroGIS grows more resources will need to become available to maintain operations at current levels. However, the cost estimates reported here were created specifically as an input to the cost and cost allocation models created in Task C of this project. The Fair Share Financial Models of Task C add another layer of assumptions based upon business considerations and should supercede the estimates recorded in here in all cases.

## **6.0 FAIR-SHARE FINANCIAL MODELS**

*Mark Beauchamp, Virchow, Krause and Company, LLP*

### **6.1 Accountant's Compilation Report**

To the Policy Advisory Team:

We have compiled the accompanying projected statements of operating income and cash flows and other schedules of the MetroGIS project for the first year of the project in accordance with standards established by the American Institute of Certified Public Accountant's.

The accompanying projection and this report were prepared to assist MetroGIS in assessing the financial feasibility of establishing a MetroGIS system to offer its services to a seven county region surrounding Minneapolis/St. Paul Metropolitan Area. The report includes projecting operating revenues, expenses, and cash flows for a mature MetroGIS based on estimated development and operating costs and market penetration rates. This report should not be used for any other purpose.

A compilation is limited to presenting, in the form of a projection, information that is the representation of management and does not include evaluation of the support for the assumptions underlying the projection. We have not examined the projection and, accordingly, do not express an opinion or any other form of assurance on the accompanying statements or assumptions. Furthermore, there will usually be differences between the projection and actual results, because events and circumstances frequently do not occur as expected, and those differences may be material. We have no responsibility to update this report for events and circumstances occurring after the date of this report.

**VIRCHOW, KRAUSE & COMPANY, LLP**

Madison, Wisconsin

August 19, 1999

## 6.2 Introduction

MetroGIS was established by the Metropolitan Council with the intention of providing a Geographical Information System (GIS) to a seven county region that surrounds Minneapolis/St. Paul, Minnesota. The GIS project received a federal grant to develop a fair share financial model to assess the financial viability of a centralized GIS system. The project consisted of four tasks identified as follows:

Task A - Clarification of appropriate roles and framework functions.

Task B - Estimate the costs of collaboration.

Task C-1 - Development of a fair share financial model.

Task C-2 - Recommend an appropriate organizational structure.

This section details the development of the fair share financial model. The objective of this task is to develop a pricing model for the services offered by MetroGIS to area participants that will ensure the long-term financial stability of MetroGIS, while keeping stable or reducing costs for data providers and data consumers.

Certain constraints on prices have been identified to ensure the success of MetroGIS. These constraints limit the fees and costs that can be charged to area participants based on the following factors:

1. Equivalent Effort - No organization will be expected to contribute more to support a MetroGIS data need than it would have to pay to meet its internal needs outside of membership in MetroGIS.
2. Cost of Data Development - Organizations will not be expected to incur costs to develop or maintain data for MetroGIS that exceed what it would cost to meet their own needs without being appropriately compensated.
3. Cost of Data Distribution - Organizations will not be expected to contribute more to a MetroGIS data sharing solution than they would incur to obtain, import, and manipulate data for their own needs unless they are appropriately compensated.
4. Existing Business Functions - Organizations will not be expected to maintain data for MetroGIS unless that organization has an internal business purpose to maintain the data.
5. Forms of Contributions - Contributions may be in several forms, including funding, data, people and equipment.

These constraints place limitations on the prices that can be charged to data users and ensure data producers are appropriately compensated for expenses they incur outside of their normal business function.

To achieve the primary objective of a financially stable MetroGIS, three sub-tasks have been identified for the development of the fair-share financial model:

1. Develop fair user charges
2. Create a pricing mechanism that will compensate data producers and create a financially stable MetroGIS.

3. Develop a financial and pricing model that can be updated and expanded to incorporate future changes in the number of subscribers and cost of operations.

Please refer to Appendix 1 for definitions of terms used in Section 6.

### **6.3 Methodology**

Two pricing methodologies were assessed for use in development of the fair share financial model. A brief discussion of each follows:

#### **6.3.1 *Embedded Cost Methodology***

Embedded cost methodologies were assessed. This methodology accumulates historical costs incurred to date and forecasts operating and maintenance costs for a future period to develop rates based on those costs. This methodology would allocate all costs incurred by the data producers to develop the Geographical Information System to system users. This methodology of rate making would not meet the objectives of MetroGIS for a number of reasons, including:

1. Ownership of the system would need to transfer to a centralized holding entity. This would be needed to separately record not only the historical costs of operations, but also record ongoing future costs.
2. Costs developed using this method would result in prices that would be prohibitive for data users because all costs incurred to date for the project are used to develop the user charges.
3. The primary purpose of this methodology is to ensure cost recovery when an industry has a captive market, the services offered are essential to the public good, the entity's are regulated, and consumers have limited options to receive the essential services.
4. This methodology determines prices in an objective fashion and does not take into account subjective issues such as affordability of the service for data consumers.
5. This methodology uses total system costs and divides them by subscribers. This would result in prohibitive user prices in the early years of operations.

After assessing this option it was felt that the pricing objectives of MetroGIS would not be met because prices developed are based on historical costs and may not accurately reflect service prices on the current and future cost of operations.

#### **6.3.2 *Marginal Cost Methodology***

Pricing services using marginal cost methodology will recover costs based on future operations.

Marginal cost methodology:

1. Uses future or incremental costs to ensure that costs incurred to establish MetroGIS are recovered from data users.
2. Ensures that organization's incurring costs to develop data outside of their own needs will have the ability to recover those costs from data users.
3. Matches future costs with future revenues to ensure cost recovery.

4. Produces prices that may be more understandable to potential participants which may lead to greater price acceptance.
5. Is more likely to result in prices that would mimic market-based prices in a competitive environment.
6. Assumes that past costs are irrelevant and the only costs that are relevant for MetroGIS are costs that will be incurred as a result of the decision of forming a centralized GIS system for potential data users.

After assessing the two options the marginal cost methodology was chosen because it best reflects the philosophy and objectives of MetroGIS.

## **6.4 Development of Fee Structure**

Appendix 11 provides an overview of the fee development process.

### **6.4.1 Establishing Costs**

Costs to operate the MetroGIS organization were developed as part of Task B. The purpose of Task B was to assess the costs of data development, maintenance, integration, and management and is the primary cost input into the pricing model. Certain costs identified as part of Task B were not used in the development of the pricing model. The cost to develop a regional solution for “Socioeconomic” and “Where People” information need was excluded due to the high cost of data development. As the system matures it is anticipated that users will request this information and the benefits will outweigh the cost of developing this information.

### **6.4.2 User Classes**

The following classes of users were established:

1. Municipalities
2. School Districts
3. Metropolitan Government
4. State Government
5. Federal Government
6. Counties
7. Watershed<sup>9</sup>

Other potential users were identified but not included in the initial cost allocation model. Provisions will be made to incorporate these subscriber classes at a later date.

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<sup>9</sup> For purposes of subscriber fee estimates, Water Management Organizations (WMO) have in the past been typically funded exclusively by city government and therefore were assumed to be extensions of city gov't. Subscriptions will be available to WMO's which could have the effect of reducing the estimated watershed fee.

### 6.4.3 Allocation of Costs to User Classes

The following section discusses the allocators used to allocate costs to the user classes.

#### *Operation Cost Allocators:*

1. *Number of Subscribers Allocator* – . Allocation of costs based on the number of subscribers within the class. Used to allocate the “Base Subscriber Fee” to each subscriber class.

Base Subscriber Fee – The annual fixed fee to each subscriber. This amount is the same for all subscriber classes.

2. *Operation Costs-Variable Allocator* – Allocation of the staff costs and non-staff costs based on the sum total of the data element allocation scores<sup>10</sup>. Used to allocate the “Variable Subscriber Fee” to each subscriber class.

Variable Subscriber Fee – The fee to each subscriber based on the number of parcels within their jurisdiction.

#### *Contingency and Other Revenue & Grants Allocation:*

1. *Base Subscriber Allocator* - Allocator for MetroGIS contingency and other revenue and grants. The allocation is based on total dollars previously allocated to base subscriber fees and variable subscriber fees.
2. *Variable Subscriber Allocator* – Allocation of costs to subscriber classes based on operational and data development costs allocated to the variable subscription fee.

#### *County Charge Back Allocators*

1. *Base Subscriber Allocator* – Excluding Counties – Used to allocate the “base subscriber fee” for counties to subscriber classes. Allocation based on previously allocated “base subscriber fees.”<sup>11</sup>
2. *Variable Subscriber Allocator* – Excluding Counties – Used to allocate the “variable subscriber fee for counties to subscriber classes. Allocation based on previously allocated “variable subscriber fees.”

#### *Data Development Cost Allocation*

Data development costs were allocated to user classes based on the “priority rating” and “scale factor” assigned to each subscriber class.

*Priority rating* – A value that reflects both the importance of a data need and the degree to which an organization depends on others for meeting that need. Priority rating was determined from the “MetroGIS Informational Needs Survey”.

*Scale Factor* - A value that reflects the costs of developing data at the appropriate scale to meet the need of most users within the organizational category. A value of 3 reflects large-scale data, which is very costly to develop, while a value of 1 reflects small-scale data, relatively

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<sup>10</sup> Data Element Allocation Score is used to allocate the data development and maintenance costs to subscriber classes.

<sup>11</sup> MetroGIS costs for counties are shown for informational purposes only. County contributions are assumed to be the contribution of their data. These costs are allocated back to the subscriber classes in proportion to the dollars charged to each subscriber class.

inexpensive to develop. A rating of 2 was assigned to all subscriber classes with the exception of state and federal, which were assigned a value of 1. The data needs of state and federal government are not anticipated to require the scale of informational needs as the other user classes. It is recommended that the “Scale Factor” be incorporated into future surveys.

The MetroGIS Information Needs Survey identified thirteen primary information needs of potential subscribers. These thirteen were combined into ten for data development purposes due to the interrelationship between the data elements. The MetroGIS Information Needs Survey was conducted for the primary purpose of identifying the highest priority needs of subscribers. This resulted in some of the survey data needing to be extrapolated separately.

Data development allocators were developed for each of the 10 primary information needs; the cost allocation process is detailed in Appendix 12.4.

#### **6.4.4 Recommended Fee Structure**

*Base Subscriber Fee* – Fees to users based on the estimated costs to maintain each subscriber. This charge will recoup the costs to serve a customer and is the same for all users.

*Variable Subscriber Fee* - A fee based on the number of parcels within each subscriber’s jurisdiction.

*GIS User Group Participation Credit* – A credit of \$1,000 for subscribers that participate in a County GIS Users Group consistent with the county based GIS user groups promoted by MetroGIS.

The subscriber fees at various MetroGIS costs are detailed on Appendix 12.7.

### **6.5 Summary of Significant Assumptions**

#### **6.5.1 Data Development and Operating Costs**

Data development and operating costs for the first four years of operation provided from Task B are detailed below. Adjustments were made to reflect cost of certain data elements.

Projected four-year cost		\$6,873,738
Less:		
Socioeconomic Characteristics	\$2,400,000	
Where People	<u>545,554</u>	
Total Reductions:		<u>\$2,945,554</u>
Adjusted Total Costs		\$3,928,184
Total Four-Year Expenses		<u>\$3,928,184</u>
Estimated Annual Costs (total cost divided by 4 years)		\$982,046
Add:		
Contingencies		\$42,954

Less:

Grants	\$50,000	
Other Revenues	<u>75,000</u>	<u>(125,000)</u>
<b>Total Costs to be Recovered from Subscriber Classes</b>		<b><u>\$900,000</u></b>

### 6.5.2 Operating Expenses

Inflation is assumed at zero (0%), since increases in operating costs will be passed through to subscribers at cost. Staff costs are estimated as follows:

**Table 20: Projected Operating Expenses**

Year	1	2	3	4
<b>Staff Costs</b>	\$270,400	\$270,400	\$270,400	\$270,400
<b>Non-Staff Costs</b>	\$370,526	\$370,526	\$275,524	\$275,524

### 6.5.3 Depreciation

Depreciation expense is not included in projection since subscriber fees are based on the cash basis of accounting.

### 6.5.4 Interest Income

Interest income is excluded from the analysis. The projection assumes that subscriber fees collected will be used to pay operating expenses and data development in the year the fees are collected i.e. Cash balances will not be material.

### 6.5.5 Subscriber (Market) Penetration Rates

Growth in subscriber base is projected at 0% per year. The subscriber base used in the report is the number of potential subscribers for Cities, School Districts, Counties, Watershed Districts, Metropolitan Government, State and Federal Government. The market penetration rates for each class are detailed on Appendix 12.2.

Market penetration rates are a critical component of the study. Assumptions that are very conservative will result in subscriber fees that that may make it difficult to achieve adequate participation. Market penetration rates that are unrealistically high may result in revenue shortfalls. Table 21 shows the projected subscriber market penetration rates used in the report:

**Table 21: Subscriber Market Penetration Rates**

<b>Class</b>	<b>% Market Penetration Subs./Parcels</b>	<b>Projected subscribers</b>	<b>Projected Parcels</b>
<b>Municipalities</b>	15%/35%	26	273,920
<b>School Districts</b>	30%/35%	20	308,920
<b>Metropolitan Gov't</b>	100%	3	882,629
<b>State Gov't</b>	100%	1	882,629
<b>Federal Gov't</b>	100%	1	882,629
<b>Counties</b>	100%	7	882,629
<b>Watershed Districts</b>	30%/35%	4	147,090

Market penetration and parcel penetration rates for municipalities, school districts, and watershed districts are not consistent due to the following:

Some larger units of government represent as much as 15% of the total number of parcels within the seven county region. The addition of one of these large units of government will distort the projection.

It is anticipated that larger users will be the first to subscribe because they have the current resources to utilize the data that is available from MetroGIS.

#### **6.5.6 Parcel Data**

MetroGIS provided parcel data used in the analysis. The estimated number of parcels is included in Appendix 12.2.

#### **6.5.7 County Charge Back**

Costs were allocated to counties for informational purposes only. The cost to serve counties is actually charged back to other subscriber classes. The county's contribution to MetroGIS is assumed to be the source data that will be provided to subscribers.

#### **6.5.8 Subscriber Base Charges**

Staff and non-staff costs related to the operation of MetroGIS are allocated 60% to the variable subscriber fee and 40% to the base subscriber fee. Certain costs related to MetroGIS are unaffected by the size of the subscribing organization, including marketing, training, billing, accounting, building costs, utilities, etc. While it is difficult to determine the exact amount to allocate directly to subscriber base fee, the allocation recognizes the existence of this fixed subscriber cost. If an accounting system is in place that isolates the costs in the manner described above, it may be possible to better estimate these costs.

### 6.5.9 Alternative Means of Contributing

An assumption fundamental to MetroGIS' philosophy is participants may contribute data, funds, people/equipment or any combination thereof to achieve their fair-share of the costs of supporting MetroGIS, provided these contributions are consistent with MetroGIS' needs. Table 22 provides a generalized balance sheet to illustrate preliminary findings how each of the seven organizational classes of prospective participants might meet their fair-share of MetroGIS' expenses. This "balance sheet" concept should be elaborated upon in the proposed Business Plan whereby the contribution options for specific organizations are identified. This next level of detail should be identified for the key organizations to provide a foundation upon which to finalize a proposal to support MetroGIS.

**Table 22: Generalized Options to Achieve Fair-Share Contribution**

<i>Organizational Class</i>	<i>Funds</i>	<i>Data</i>	<i>People/Equipment</i>
Federal	X	?	?
State	X	X	?
Metropolitan	X	X	X
County		X	?
City	X	?	?
School District	X	?	?
Watershed District	X	?	?
Non-Government	Policy pending		

Note: "?" means that the conclusions are pending until the MetroGIS Business Information Needs Workgroup process is completed for all desired regional datasets.

## 6.6 Summary of Significant Accounting Policies

### 6.6.1 Nature of Projection

The financial projection presents, to the best of management's knowledge and belief, MetroGIS' expected results of operations for the projection period. Accordingly, the projection reflects its judgment as of August 19, 1999, the date of this projection, of the expected conditions and its expected course of action. The assumptions disclosed herein are those that management believes are significant to the projection. There will usually be differences between projected and actual results, because events and circumstances frequently do not occur as expected, and those differences may be material.

### 6.6.2 Nature of Operations

This report was prepared to assess the feasibility of establishing a MetroGIS system. If formed, the initial review and recommendation would be to organize MetroGIS under a joint powers agreement involving the seven metropolitan counties, as well as representative cities, watersheds and schools. The system would account for the cost of operations on a continuing basis and be

overseen by a Joint Powers Board. It would provide GIS services to properties and entities within the seven county regions that surround Minneapolis/St. Paul.

### **6.6.3 Revenue Recognition**

Revenues are recorded for service rendered based on number and size of subscribers on the cash basis of accounting.

### **6.6.4 Expenses**

Projected expenses are reported on the cash basis of accounting.

### **6.6.5 Construction Costs and Capital Additions**

Data development costs and capital additions are recorded at original cost, which includes material, labor, overhead, and an allowance for the cost of funds used during construction when significant.

### **6.6.6 Depreciation**

Depreciation was excluded from the analysis as pricing for services is on the cash basis of accounting.

## **6.7 Recommendations**

1. To assist MetroGIS in achieving the goals evaluated in the analysis it is strongly recommended that MetroGIS develop a business plan. This should assist MetroGIS with the following:
  - a) Development of vision statement for MetroGIS that establishes its goals and objectives
  - b) Identification of MetroGIS strengths, weaknesses, opportunities and threats in establishing a successful organization, in meeting the needs of users and in meeting its financial needs
  - c) Management considerations in meeting the goals of the vision statement
  - d) Timing and development of additional services
  - e) Identification of new classes of subscribers to aid in expanding future services
  - f) Data development plan
  - g) Financing objectives which take into consideration that participant contributions may be through data, funds, people/equipment, or any combination thereof provided consistent with the needs of MetroGIS
  - h) Marketing plan to maintain current subscribers and expand the reach of potential areas of data distribution
  - i) Evaluate and recommend organizational plan to achieve the MetroGIS vision statement

2. The success of MetroGIS is largely dependent upon the perceived benefits provided to users. During the early years of operation many top priority data elements may not be developed and perceived benefits to users may not be great enough to offset their cost to subscribe. Federal and State grants may play a role in determining the success of MetroGIS. Grants will provide financial incentives to users and may be critical to achieving the market penetration rates used in the analysis.
3. The user fees developed as part of the study are for a mature MetroGIS system that provides or addresses each of the 22 core and desirable functions endorsed by the MetroGIS Policy Board including regional solutions to eleven of the thirteen priority information needs. Two priority needs not provided by MetroGIS are “Socioeconomic” and “Where People.” However, the model is capable of determining fees based on the MetroGIS budget. It is recommended that the model be updated regularly using the approved MetroGIS budget.
4. The Policy Advisory Team should provide input, recommendations and assistance in establishing the goals of MetroGIS to aid in developing a formal business plan.
5. Future surveys should be conducted of subscribers to determine the appropriate scale factor to use for each data element.
6. MetroGIS should be established provided the user fees, as determined in this study, are acceptable to subscribers, meet the financial costs involved with providing subscriber informational needs, and allow MetroGIS to develop new informational needs of subscribers on a cost-effective basis.
7. If practical, future surveys should isolate the responses for each subscriber class.
8. An accounting system should be established to isolate labor and expenses by function (i.e., marketing, data maintenance, utilities, etc.).

## **7.0 ORGANIZATION STRUCTURE**

*Trudy Richter, Richardson, Richter and Associates  
Yvonne Chaillet, Richardson, Richter and Associates*

### **7.1 Introduction**

The Metropolitan Council, on behalf of MetroGIS, entered into interim data sharing agreements so that individual counties' data and GIS resources could be shared with other governmental units. The goal of MetroGIS was to work collaboratively with users, producers, and integrators. This collaborative model has worked well for MetroGIS. The Council has provided staff for MetroGIS and funded other financial needs of MetroGIS. Committees were established for MetroGIS and counties involved in the data sharing agreements as well as other interested entities became active participants in developing the vision of MetroGIS for the Metropolitan Area.

This task of the Fair Share Model Study was to consider alternative organizational models for MetroGIS. This work was in recognition that renegotiation of the existing interim agreements would soon be necessary and additional rights and obligations for MetroGIS had been identified that needed to be addressed including: issues of data distribution, liabilities and indemnification, and increasing costs for producing key data bases.

The framework for the evaluation of organizational structures included research on alternatives, identification of criteria for evaluating alternative structures, selection of three alternatives for further study and evaluation, and recommendation of an organizational structure.

#### ***7.1.1 Comparison of Organizational Structures***

Alternative organizational structures from around the country and Canada were reviewed and summarized for the Policy Team. A summary of this information is found in Appendix 13. Table 22 summarizes various organizations discussed with the Policy Team.

**Table 23: Comparison of Organizational Structure for MetroGIS Fair Share Model**

<b>Organization</b>	<b>Membership</b>	<b>Funding</b>	<b>Other</b>
<i>San Diego Data Processing Corp.</i>	<i>Joint powers agency as contractor to City; governmental members only</i>	<i>License fee paid by anyone wanting access to data</i>	<i>Agency role limited to maintaining base map, providing access to data and developing relationships with private sector</i>
<i>Cincinnati Area Geographic Information System</i>	<i>Utility, phone co., City and County; only govt. units can be added; current vote: 4 city; 4 county; 1 utility; and 1 phone co.</i>	<i>Sells data consulting services NOT data. (hourly consultant rate thereby avoiding public data problem)</i>	
<i>Dakota County GIS Partnership</i>	<i>Dakota Electric, county and cities</i>	<i>County purchases Partnership's needs, cost sharing by percentage. Database and maps can be sold at prices approved by County Board.</i>	<i>All participants hold joint ownership; participants may use for internal use only; Dakota Electric can designate proprietary or trade secret info and preclude participant from disclosing</i>
<i>Portland Metro</i>	<i>Regional planning government with elected officials. 3 counties are members of GIS component.</i>	<i>No charge to members for data sharing. Otherwise, viewed as a service provider, not record holder. Charges for services and data result in cost recovery program.</i>	<i>Oregon public records law exempts Portland MetroGIS data from its regulations. (This allows it to charge.) County is the primary record holder of the data.</i>
<i>Louisville/Jefferson County Information Consortium</i>	<i>Five formal: City, County, Sewer District, Property Valuation Administration and Water Company; formal lease/purchase agreements exist between all participating agencies</i>	<i>Kentucky Open Records Law amended to allow cost recovery for GIS data and products.</i>	<i>License agreements with cities, fire districts; cooperative agreement with university; negotiations underway with transit, electric utility, regional planning groups.</i>
<i>Mn Public Safety Radio Communication System</i>	<i>A political subdivision; membership is local officials appointed</i>	<i>Council supporting with executive director and staff; bonding authority with Council as issuer; no resale to nonpublic entity unless it is a private entity holding an FCC license; monies for capital costs are appropriated through admin's 911 emergency telephone service account; operating costs are allocated among users; tax levy for deficiencies allowed.</i>	<i>Statute sets out a planning process for Board approval; local users eligible only if county's plan approved</i>
<i>North Metro I-35W Corridor Coalition</i>	<i>Joint Powers Board; any governmental unit bordering or in close proximity to I-35W Corridor, north of and including Minneapolis</i>	<i>Membership fee based on population and tax capacity of each member; annual budget based on population and assessed valuation compared to aggregate valuation</i>	<i>Purpose to jointly and cooperatively plan for and maximize opportunities for regional community development in the North Metro</i>
<i>LOGIS</i>	<i>Consortium of Minnesota local government units; any governmental unit may become a member; contractual agreement between members</i>	<i>3 classes of charges assessed annually: Class 1: organization's general, admin., and operational expenses; Class 2: design and development of computer programs &amp; systems, other capital costs; Class 3: system operation &amp; maintenance</i>	<i>Purpose: provide for establishment, operation, &amp; maintenance of data processing facilities and management information systems</i>
<i>Joint Powers Boards (generally)</i>	<i>Governmental entities only (all must have the powers individually to be able to agree to offer jointly)</i>	<i>One entity can be the fiscal agent for the Board; issue bonds, assess fees based upon Board approved budget, etc.</i>	<i>Examples: Solid Waste Coordinating Board; Light Rail Transit</i>
<i>Inter-county Agreement</i>	<i>Contract with counties to do the work on counties more efficiently.</i>	<i>Each individual member must act on budget; fiscal agent can be contracted; amendments to relationship need to be adopted by each</i>	<i>RDF Advisory Board (5 county group setting policy direction in solid waste)</i>
<i>Voluntary Association</i>	<i>Board of Directors; each member has a vote(s) depending on size;</i>	<i>Membership dues, fees for services</i>	<i>AMC (mission is to help provide efficient and effective county governance to the people of Minnesota)</i>

### ***7.1.2 Development of Criteria***

In addition to researching and considering alternative structures, the Policy Team considered the criteria that should be used to evaluate these alternatives. The initial criteria agreed to included:

- accountability;
- efficiency;
- political feasibility;
- administrative capability;
- equity; and
- service capacity.

When analyzing the options, these criteria were further defined as follows:

- Is the structure flexible (does it allow the involvement of essential participants, can new members be added, can members be both private and public, both metro and non-metro)?
- Is the structure accountable to both producers of data and users of data?
- Is the structure feasible (legal, fair, and equitable)?
- Is the structure efficient and cost effective?

### ***7.1.3 Selection of Three Organizational Structures for Evaluation***

Following the initial study of available alternatives, the Policy Team selected three organizational structures for further study including an intergovernmental or other contractual agreement, joint powers agreement and non-profit corporation. The criteria were then applied to these structures as shown in Tables 23-25.

**Table 24: Intergovernmental or other Contractual Agreement**

Criteria	Intergovernmental or other Contractual Agreement
<p>Flexible</p> <ul style="list-style-type: none"> <li>• Essential Participants</li> <li>• Add membership as needed</li> <li>• Private/public</li> <li>• Metro/NonMetro</li> </ul>	<p>Members can be limited to government or include private members</p> <p>Statewide = yes</p> <p>Other states = yes</p>
<p>Accountable</p> <ul style="list-style-type: none"> <li>• <u>To Producers</u> <ol style="list-style-type: none"> <li>1. Compensated fairly for people, data, funds and equipment</li> <li>2. Property rights preserved</li> </ol> </li> <li>• <u>To Users</u> <ol style="list-style-type: none"> <li>1. Comprehensive service</li> <li>2. Quality control (warranties)</li> <li>3. Market needs met</li> </ol> </li> </ul>	<p>Actual budgets would require each governmental entity’s approval. Since setting charges for data users and establishing credits to providers may impact budget consideration, each governmental member would be involved. A financial services agreement could be approved with one member to manage budget and expenditures and contract for services contemplated by the budget.</p> <p>Can limit contractual powers to only areas involving the joint effort. Functions MetroGIS could provide overtime may be more limited to assure data privacy rights.</p> <p>Maximum involvement of data producers assures comprehensive service.</p> <p>Each individual contracting party would be liable. Private parties, if involved, could create market conflicts.(i.e., in terms of adding additional competitive parties).</p>
<p>Feasible</p> <ul style="list-style-type: none"> <li>• Available legal structure</li> <li>• Fair and equitable</li> </ul>	<p>Yes</p> <p>Yes, private/public checks and balances</p>
<p>Efficient/Cost Effective</p> <ul style="list-style-type: none"> <li>• Minimizes duplication</li> <li>• Minimizes bureaucracy</li> <li>• Accessible to all</li> <li>• Capacity needs met</li> <li>• Continuation of existing relationships</li> </ul>	<p>Yes</p> <p>No</p> <p>Governmental entities can’t discriminate; if private parties involved, may fight competition</p> <p>Yes</p> <p>Yes</p>

**Table 25: Joint Powers Board**

Criteria	Joint Powers Board
<p>Flexible</p> <ul style="list-style-type: none"> <li>• Essential Participants</li> <li>• Add membership as needed</li> <li>• Private/public</li> <li>• Metro/NonMetro</li> </ul>	<p>Members are limited to governmental units that can exercise powers common to all.</p> <p>No private membership.</p> <p>Statewide = yes</p> <p>Other states = yes</p>
<p>Accountable</p> <ul style="list-style-type: none"> <li>• <u>To Producers</u> <ol style="list-style-type: none"> <li>1. Compensated fairly for people, data, funds and equipment</li> <li>2. Property rights preserved</li> </ol> </li> <li>• <u>To Users</u> <ol style="list-style-type: none"> <li>1. Comprehensive service</li> <li>2. Quality control (warranties)</li> <li>3. Market needs met</li> </ol> </li> </ul>	<p>One or more governmental entities can provide services needed by Board. Board can set charges for data users and establish credits to providers; budget is set annually, members appropriate through their individual budgetary process.</p> <p>Can limit powers of Board to maintain individual rights; data privacy maintained</p> <p>May be less comprehensive but Board can contract for data from private sector</p> <p>Board is liable, <u>not</u> individual members</p> <p>Without private representation, may not be as market sensitive</p>
<p>Feasible</p> <ul style="list-style-type: none"> <li>• Available legal structure</li> <li>• Fair and equitable</li> </ul>	<p>Yes</p> <p>Yes</p>
<p>Efficient/Cost Effective</p> <ul style="list-style-type: none"> <li>• Minimizes duplication</li> <li>• Minimizes bureaucracy</li> <li>• Accessible to all</li> <li>• Capacity needs met</li> <li>• Continuation of existing relationships</li> </ul>	<p>Yes</p> <p>Yes</p> <p>Governmental entities can't discriminate</p> <p>Yes</p> <p>Yes</p>

**Table 26: Non-Profit Corporation**

Criteria	Non-Profit Corporation
<p>Flexible</p> <ul style="list-style-type: none"> <li>• Essential Participants</li> <li>• Add membership as needed</li> <li>• Private/public</li> <li>• Metro/NonMetro</li> </ul>	<p>Government cannot create a corporation without specific legislative authorization. (Minn. Stat. 465.715) However, government can participate in a corporation if set up. The Corporation can set criteria for membership with voting rights. The first board of directors can be named in articles of incorporation. Qualifications for directors can be imposed. Quorum and voting rights are set by statute.</p>
<p>Accountable</p> <ul style="list-style-type: none"> <li>• <u>To Producers</u> <ol style="list-style-type: none"> <li>1. Compensated fairly for people, data, funds and equipment</li> <li>2. Property rights preserved</li> </ol> </li> <li>• <u>To Users</u> <ol style="list-style-type: none"> <li>1. Comprehensive service</li> <li>2. Quality control (warranties)</li> <li>3. Market needs met</li> </ol> </li> </ul>	<p>Producers can be reimbursed but there can be no pecuniary gain. Board of Directors would set budget. Note: It may be difficult to limit powers/actions of the corporation. For example, an affirmative vote of a majority of the board may establish committees having the authority of the board in the management of the corporation's business.</p> <p>The corporation could sign a license for the use of the data. The terms and conditions for the license agreement would protect property rights.</p> <p>Private parties as members could create market conflicts.</p> <p>Users could be members and assure quality controls through committees, etc.</p>
<p>Feasible</p> <ul style="list-style-type: none"> <li>• Available legal structure</li> <li>• Fair and equitable</li> </ul>	<p>Yes, except governmental unit cannot create without legislative action</p> <p>Yes, private/public checks and balances</p>
<p>Efficient/Cost Effective</p> <ul style="list-style-type: none"> <li>• Minimizes duplication</li> <li>• Minimizes bureaucracy</li> <li>• Accessible to all</li> <li>• Capacity needs met</li> <li>• Continuation of existing relationships</li> </ul>	<p>Yes</p> <p>Yes</p> <p>Articles of Incorporation and By Laws would determine accessibility.</p> <p>Yes</p> <p>Yes</p>

#### 7.1.4 Evaluation of Organizational Structures

During the discussion of the three alternatives, goals for an acceptable structure were identified. These were:

- It is preferred that membership is inclusive with private and public sectors, including associations; users and producers.
- It is preferred that government retains the organizational lead.
- The entity should be structured in such way as to commercially insure its activities as well as the actions of its board.
- The entity should be able to obtain state and federal funding and be able to finance its capital expenses.

The three alternatives being considered were then further analyzed on the basis of these goals.

##### a) *Intergovernmental or Contractual Agreement:*

Pros: Anyone can be a member (public and private, including associations)

Cons: Each participant would have to carry own insurance; actions of “entity” would not be insurable.

Any action would require each entity to obtain separate approval of its governing body

Grants and other funding mechanisms would not be available to MetroGIS, only to the individual entity.

##### b) *Non-Profit Corporation:*

Pros: Private and public can participate.

Insurance is available.

A separate legal entity in terms of liabilities.

Cons: Private sector could incorporate; government entity would need legislation

Standard financing options would be limited. (i.e. bonding). However, grants could be awarded to a corporation .

##### c) *Joint Powers*

Pros: Favored structure where multiple governmental units.

Insurance is available.

Separate entity, with all powers of entities participating.

Financing options available

Cons: No voting private sector members allowed.

Governmental units only.

Because of the importance of voting rights, further research was requested for the joint powers agreement particularly in the area of membership on the joint powers board. Contact was made with TIES (schools), AMM (cities), and MAWD (watersheds). It was verified that TIES is structured as a joint powers board and is a school district for that purpose. As such, it could be a member of MetroGIS, if structured as a joint powers board.

AMM is an association with a two tiered membership - “active” and “associate” members. Associate members do not have voting rights on Board of Directors. Associations would not be permitted to be a voting member of the proposed MetroGIS JPA. Its representative was sent to MetroGIS, it was by vote of the group.. The Minnesota Association of Watershed Districts (MAWD) is a dues paying state association with a Metro chapter. The Metro chapter does not have bylaws, and relies on the State association staff to assist with its business needs. When the representative was sent to MetroGIS, it was by vote of the group. That representative has received guidance from the group and represented the group then at MetroGIS meetings. Like, AMM, MAWD because it is an association could not have a voting membership on the MetroGIS Policy Board.

The concept of AMM’s “active” and “associate” members was presented to the Policy Board on July 28, 1999 and rejected. The Policy Board was unanimous in its directive that whatever organizational structure is adopted for MetroGIS it must provide full voting membership for all organizations that currently comprise its membership .

The Policy Board also encouraged MetroGIS management to recommend legislative fixes for Board consideration if provision of voting memberships for all current Board members becomes too cumbersome with the organizational options permitted under current law.

### ***7.1.5 Preliminary Recommendation***

The Policy Advisory Team evaluated three legal organization structures options as part of the Fair Share Financial Model and Organizational Structure Project. The Team’s preliminary recommendation is that a joint powers agreement (JPA) best fits the current vision of MetroGIS, assuming voting memberships for cities and watersheds would be accomplished by the representative’s organization entering in the JPA. Prior to making a final recommendation or implementing any changes to the existing structure of MetroGIS, the Team recommends that a Business Plan be completed to confirm that a JPA remains the preferred organizational structure for MetroGIS.

## 8.0 SUMMARY AND RECOMMENDATIONS

*Elizabeth Hobbs, Sufficient Systems, Inc.* MetroGIS will require \$900,000 per year to be sustainable and achieve its goals, assuming \$140,000 in supplemental revenue is received annually from other than the proposed subscription program. Approximately \$635,000 will go to cover basic operating expenses. The remainder will be used to provide data conversion and maintenance. Government units and consultants will provide these services.

The costs estimated in this study are based strictly on providing for the 13 top priority MetroGIS Business Information Needs and providing 21 other core and desirable functions endorsed by the Policy Board. Additional costs of meeting NSDI content requirements and standards were not estimated. It is unlikely that MetroGIS stakeholders will modify internal business practices to comply with NSDI requirements without supplemental funding as is anticipated to be the practice for encouraging compliance with MetroGIS guidelines.

Success in obtaining the necessary funding for MetroGIS will depend on whether participants perceive enough value in what they obtain to support their costs of participation. At the present time, counties seem to perceive only costs, and no benefits, to their participation in MetroGIS. They are primary data producers of parcel and other data critical to regional solutions consistent with stakeholder business operation needs. The data consumers, on the other hand, include a wide array of other government and non-government organizations that realize many benefits from the access to MetroGIS data. Whether the perceived value of the benefits they receive is great enough to support their costs of participation is not yet determined. The results of Dr. William Craig's study of the benefits of MetroGIS may demonstrate benefits that had not occurred to some stakeholders, thereby increasing the value they perceive from participation. This could be a key element in gaining support for the Fair Share Financial Model.

During the early years of operation many top priority data elements may not be developed and perceived benefits to users may not be great enough to offset their cost to subscribe. Federal and State grants may play a role in determining the success of MetroGIS. Grants will provide financial incentives to users and may be critical to achieving the market penetration rates used in the analysis.

The fair share financial model is not static. In its current form, it addresses only 11 of the 13 priority Business Information Needs. The model should be updated regularly as the MetroGIS budget allows further data development or expansion of services. As part of such updates, scale factors for each data element should be adjusted on the basis of a subscriber survey. An accounting system should be established to isolate labor and expenses by function (i.e., marketing, data maintenance, utilities, etc.).

A Joint Powers Board is the initial organization structure recommended by the consultant team. It best meets the current vision of MetroGIS by being insurable, operating as a separate entity with all the powers of the entities participating, and having a variety of financing options. The primary drawback of this structure is that watershed district and city representatives will have to have their respective organizations enter into the JPA to attain voting status. If this work-around becomes too cumbersome, the Policy Board has indicated that it would entertain a legislative fix. To improve the chances of successful legislation, MetroGIS should operate under a JPA for a

short time to both demonstrate the benefits of MetroGIS and to document the problems with available legal structures in terms of achieving MetroGIS' objectives.

Finally, we recommend that MetroGIS develop a business plan. This plan should address the following:

- goals and objectives
- strengths and weaknesses
- management considerations, including further evaluation of the need for MetroGIS to have separate identity from the Metropolitan Council
- staffing and related administrative support, including identifying a host agency
- timing and development of services, including revisiting the assumption that MetroGIS should *not* provide a centralized service bureau
- identification of new subscriber classes
- a plan for data development
- financing objectives
- a marketing plan
- communications plan
- an evaluation of the proposed legal organizational structure plan to achieve the desired authorities

## 9.0 CONCLUSION

MetroGIS should be established, provided:

- User fees, as determined in this study, are acceptable to subscribers,.
- User fees can meet the financial costs involved with providing subscriber informational needs.
- User fees allow MetroGIS to develop new informational needs of subscribers on a cost-effective basis.

The ability to meet the three conditions listed above will depend on the perception by users of the benefits of their participation. If costs (fees) are higher than perceived benefits, MetroGIS will not be sustainable.

In its initial years, MetroGIS should focus on meeting its stakeholders' priority Business Information Needs and regional data sharing goals. Full participation in NSDI, if it includes meeting NSDI data content and other standards, should be deferred until regional needs are met.

Now that costs have been estimated and a fee schedule and organizational structure proposed, MetroGIS should develop a business plan. This plan needs to address critical issues such as goals and objectives, timing of data development, and marketing to the subscribers who must bear the costs. Proceeding without such a plan will reduce the likelihood of achieving a sustainable MetroGIS.

## 10 ACKNOWLEDGEMENTS

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The Consultant Team – MetroGIS Fair-Share Financial Model Project

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<sup>12</sup> The members of the Policy Advisory Team are: Clifton Aichinger (*Ramsey Washington-Metro Watershed District*), Dr. David Arbeit (*LMIC*), David Claypool, Vice Chair Coordinating Committee (*Ramsey County*), Dr. William Craig (*U of M - CURA*), Virginia Erdahl, Chair (*Washington County*), Brad Henry, Chair Coordinating Committee (*City of Minneapolis*), Richard Johnson (*Metropolitan Council*), Margo LaBau and Paul Leegard (*Anoka County*), Patrick O'Connor and Gary Caswell (*Hennepin County*), Dennis Welsch (*City of Roseville*)