



Strategic Technology Plan

***A Technology
Vision for the
Future***

February 2002

**Blum
Shapiro
Consulting**

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I. Executive Summary

A. High Level Overview

The purpose of the Strategic Technology Plan was to develop a technology foundation that would allow Town employees and residents to share and access key information, as well as improve services to the residents of the community. Unfortunately, for many Towns the dollar resources to support such endeavors are in direct competition with shrinking and/or stagnant budgets.

As such, this plan recognizes a multi-year approach and provides a comprehensive “road-map” to the resources and technology required. The Technology Plan was developed in conjunction with Blum Shapiro Consulting to help identify the technology direction that the Town of Greenwich should migrate towards over the next three years.

As part of this evaluation, approximately 30 focus group sessions were conducted to identify the needs and requirements of the Town. Individual interviews were subsequently held with most departments to confirm requirements and view the technology in place first hand. Included in this effort were discussions with the Greenwich Board of Education and Libraries to review current strategies and initiatives to ensure consistency with the selected direction. As part of this overall process, a review was performed to:

- Determine the effectiveness of existing systems
- Review the current technologies and technical direction of the Town
- Assess the progress of technology initiatives underway
- Develop recommendations for the Strategic Technology Plan.

Several common issues were identified as an outcome of the interviews, focus group sessions and general review of operations. In developing the overall plan, we analyzed user needs, current hardware and software inventories, manually intensive processes as well as technology projects currently in progress. Technology alternatives were investigated and considered in order to determine the best solutions possible.

In order to chart a course for the use of technology for the Town of Greenwich, a strategic vision was created to determine how technology could be used to enhance the services and programs provided by the Town more effectively.

The objective for this vision was to define a direction for technology and identify the initiatives and projects necessary to make this vision a reality. By considering various internal and external demands placed on the Town, such as customer service requirements, budgetary constraints and operational needs, we were able to identify the following strategies:

- Strategy 1.** Enhance Services Through An Expanded Web Presence
Develop better customer services by moving toward web-enabled technologies and applications and consolidating the Town’s multiple web sites to a single on-line resource.
- Strategy 2.** Enhance Customer Service Through A Central Service Center
Provide residents with a “one-stop” resource that can simplify the process of working with multiple Town departments and enhance Town employee productivity.
- Strategy 3.** Integrate And Centralize Common Departmental Data Sources
Migrate toward systems and practices that allow common Town information to be more openly shared across departmental lines and with the public, including centralized databases and applications that can maintain common property and non-sensitive resident data.
- Strategy 4.** Implement Technologies That Enhance Business Opportunities And Initiatives
Invest in future technologies based on a comprehensive business analysis by requesting Departments to demonstrate how new systems will improve Town operations, enhance customer service, reduce overall costs and streamline current processes.
- Strategy 5.** Create A Cooperative Environment For Technology Decisions
Establish the mechanisms that enable Town departments to cooperatively identify, prioritize and implement technology solutions in accordance with the Town’s overall business direction.
- Strategy 6.** Enhance Effectiveness of Technology Through System “Ownership”
Emphasize the demand for successful technology solutions through department accountability, or “ownership” for the functional use and management of systems.
- Strategy 7.** Maintain A Secure Operational Environment For Technology Systems
Implement the appropriate controls necessary to ensure the security and integrity of Town information as access to information expands beyond the boundaries of Town Hall.
- Strategy 8.** Ensure The Effective And Productive Use Of Systems
Provide an on-going program of training and instruction on all mission critical applications to help users develop necessary skill sets and communicate established Town standards and consistent business practices.

In developing these strategies, it was necessary to analyze the various functional issues confronting the Town of Greenwich from an operational and technology

perspective. A matrix of four key categories was developed that allowed the project team to assess the common business themes and determine the most effective solutions that would help achieve the Town’s strategic goals.

Outlined below is a brief overview of our findings and recommendations:

1. Business Operations And Controls

Technology now plays a significant role in the Town’s ability to respond to resident requests and services in a timely and effective manner. Over the years, the Town has allowed each Department to individually and independently determine their technology requirements based on personal preferences or perceived needs. As a result, inconsistent technologies have impacted the ability of departments to share information, and in some instances, created the need for duplication of effort in maintaining common information.

The implementation and management of technology within the Town of Greenwich has been affected by the unclear understanding of the IT Department’s responsibilities. Throughout the course of our discussions with Town staff, there was little consistency in what people understood the role of the IT Department to be at a departmental level. While there was general agreement that IT staff are responsible for maintaining the hardware and networking systems used for Town operations, many departments viewed IT as the “owner” of all systems and software applications maintained by the Town, including software management and user support.

Consequently, the IT Department has assumed a broader scope of responsibilities for more than fifteen concurrent major Town technology projects, including the Town Wide Area Network implementation, the MUNIS system, GIS, GeoTMS, PC upgrades and the Town website. As a result of the IT Department’s strong sense of commitment and responsibility to the success of these projects, IT resources have become increasingly overextended. However, limited communications regarding projects have not adequately set expectations with the user community, who has grown increasingly frustrated with the services of the IT Department.

Recommendations:

- *Mandate a New Technology Steering Committee to Provide Consistent Oversight*
- *Improve Project Management and Accountability*
- *Define the Role of the IT Department*
- *Implement an IT Communications Strategy*
- *Implement a Structured Technology Selection Methodology*

- *Enhance Project Management Through the Use of Consultants*
- *Develop an Implementation Schedule Identifying Critical Tasks and Completion Dates For All Technology Initiatives*
- *Establish Standard Network Security Notification Procedures*

2. Technology Foundation

The Town of Greenwich has recently implemented a Town-wide network designed to connect all key departments to key data systems and resources. The underlying objective of this project is to improve the use of the information maintained within the various departments as well as expand access to key applications. However, the lack of an effective data integration and access plan places the success of this project in jeopardy. While each of the departments realize that there are many gains to be obtained through the implementation of the WAN, there remains confusion as to what information will be available and how other key data will be protected.

The use of electronic mail and access to the Internet are limited. The ability to send and receive e-mail messages through the Internet is restricted to few users based on undocumented access requirements. Lack of access to the Internet currently impacts several departments operationally, as they do not have access to key on-line information resources.

The Town's Web site is currently under development with the intent to integrate this technology as a business tool for all departments to share and use for enhanced services to residents. However, there is no documented strategy outlining the key resources, costs and direction for this project. As a result, there is limited understanding outside of the IT Department and the Web Site Committee of what commitments and activities will be involved and the potential impact of these issues on the Town.

The currently approved Geographical Information System has slowly developed into a useful tool and resource for several departments within Town Hall. The effective use of the system, however, has been severely impacted by several key obstacles, including:

- Lack of clear system ownership
- Limited project management
- Lack of user training

As a result, the Town needs to address these key issues in order to obtain the full benefits of the technology and resources available through GIS.

Recommendations:

- *Complete the Implementation of the Community-wide Network*
- *Expand Access to E-mail Services and the Internet*
- *Enhance Use of Electronic Mail To Residents*
- *Document a Strategic Web Site Plan*
- *Establish a Formal Web Site Committee*
- *Have a Town Webmaster*
- *Hire a GIS Coordinator*
- *Reinstate the GIS User Group*
- *Create A Citizens Services Center*
- *Implement Centralized Faxing Capabilities*

3. Data Management And Standards

Although the Town has implemented many standards, they have not been readily or consistently adopted. Town personnel do not fully understand nor have the technology background to implement these recommendations on their own. As a result, each department has implemented its own set of solutions to address specific problems resulting in inconsistencies within the Town. As an example, although the IT Department has a regular backup routine of all data stored on the Town network servers, many departments continue to save documents to the hard drives of their local PCs. The result is backup of critical office automation documents is not always performed, exposing the Town to either loss of information or duplication of effort to re-create a document. Recognizing that these risks exist, the IT Department has initiated technology solutions, such as the migration to the Windows 2000 platform, which will help simplify and further centralize data management and control. This will not, however, relieve users of their basic responsibility to use Town information appropriately.

Additionally, in light of recent events, the need for contingency planning has taken on a new level of importance for many organizations. The Town is in the process of developing a Disaster Recovery Plan to ensure systems can be restored in the event of an emergency. However, any applications outside of Town Hall, including those on the Police, Library and Board of Education networks, will not be included in this study or final plan.

Recommendations:

- *Develop Document Storage and Management Standards*
- *Develop Technology and Operational Policies and Procedures*
- *Develop Standard Backup and Recovery Policies and Procedures*
- *Perform a Data Security Assessment*
- *Confirm MUNIS Disaster Recovery Readiness*

4. Training

For many of the technologies implemented over the past several years, the user training provided has not been coordinated with user access to the applications (i.e., PCs not installed, system access not available, etc.). This dramatically limits the effectiveness of the implemented technology. Excessive “on-the-job” training time is spent by each person to learn software applications, limiting the user’s ability to fully take advantage of the technology. This also promotes inconsistent use and implementation of each technology, limiting the productivity gains to the Town. In addition, greater support is required by the Town’s IT support personnel, affecting their ability to concentrate on other projects and support duties. IT staff should attend regular training classes to ensure they have the necessary skills to maintain the high quality services demanded by Town employees.

Recommendation:

- *Implement a Structured Training Program*
- *Ensure IT Staff Attend Regular Technical Training Classes*

Benefits To Be Achieved

Some of the benefits that can be expected from our recommendations are as follows:

- Enhance communications within and between departments, other Greenwich operations, other organizations (i.e., towns, states, federal government) and residents
- Centralize data management of information (i.e., backup, security, disaster recovery)
- Enhance the ability to maintain and manage consistent Town standards
- Minimize duplication of financial documents (i.e., budgets and reports) independently from MUNIS
- Enhance timeliness and accuracy of information
- Enhance the ability to electronically share documents and schedules and organize functions through a central medium
- Minimize duplication of effort by eliminating redundant data sources
- Improve training, support and maintenance of applications
- Improve Community-wide planning capabilities
- Increase ability to implement future standards and applications
- Provide an infrastructure to allow residents and employees access to Town information
- Enhance communications with residents by providing “24-hour” information services
- Allow access to key information (i.e., permits, tax collector/assessor) from home or business

We recommend a three year approach to implement the designated hardware and software. Key implementation items for each year are outlined as follows:

1. **Year 1 – Complete Technology Infrastructure**

- Complete implementation of Community-Wide Network
- Create and empower a Technology Steering Committee that provides consistent oversight to IT initiatives
- Purchase additional PCs, PC upgrades, Microsoft Office software and printers for various Town departments to complete Town-wide standardization
- Migrate Town desktop computers to Windows 2000 operating system
- Implement Microsoft Exchange electronic mail system
- Hire or contract a full-time GIS Coordinator
- Enhance use and capabilities of GIS data and software
- Provide GIS training to a variety of users
- Implement Fleet management system
- Initiate Permitting System software selection project
- Upgrade Existing Engineering Software
- Implement remote access solution for Town locations not on Community-Wide Network
- Draft and implement Town Web Site strategy
- Institute a formal, on-going training program for key software applications
- Implement centralized Fax capabilities

2. **Year 2 – Integrate New Technologies**

- Implement integrated Permit Management System
- Perform Software Selection project and implement new Fire Management system
- Initiate use of Personal Digital Assistants (PDAs) as pilot program for Law Department
- Implement Rec-Trac Photo-ID Card Management System
- Implement integration software for GIS and Police HTE system
- Continue development of GIS data layers, mapping capabilities and reports for Town and public use
- Initiate creation of Central Service Center
- Initiate second phase of Web Site strategy

3. **Year 3 – Enhance Community Technologies**

- Perform Software Selection project for Nursing Home Management system
- Implement selected Nursing Home Management system
- Introduce Intranet/Extranet capabilities to Town Web Site
- Expand PDA pilot projects to Scheduling and Building Inspectors, and Fire Department
- Continue development of GIS data layers, mapping capabilities and reports for Town and public use
- Implement Rec-Trac Internet Registration System
- Continue replacement/upgrade of PCs across all departments

The costs for implementation by Year are outlined below:

<u>Costs</u>	<u>Year 0</u>	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>
Total	\$1,274,263	\$2,755,380	\$2,803,458	\$2,414,958

These figures represent the total costs for all technology initiatives outlined in the Technology Plan. Some funding is currently set aside in a variety of budgets to cover some of these projects. As such, the above figures do not necessarily represent all new costs to the Town.

II. Introduction

Technology is rapidly evolving and changing month-by-month, year-by-year. All too often, technology choices (both hardware and software) are predicated on the needs of a particular department or small group instead of identifying the requirements of an entire organization. This has contributed to organizations inadvertently spending a great deal of money developing isolated “islands of information” that limit the access and use of information between and within departments and organizations. In addition, incompatibilities between hardware and software products have forced many organizations to “ripout” and replace technology before its useful life has expired.

Although it is difficult to predict the future, it is possible to implement a technology foundation that an organization can build and grow on. This foundation needs to be well thought out and planned in order to encompass the needs and requirements of the entire organization. A technology plan can help to identify hardware, software and networking standards, as well as establish a direction for future growth. As such, this document has been developed to help guide the selection and implementation of new technologies over the next three years.

The issues and concepts presented in this plan address all Town offices/departments. Although the Greenwich Public Schools and Library System have established their own technology strategies, it is important to recognize how the Town, Libraries and Schools can move in a common direction and leveraging the current infrastructure across a Town Wide Area Network.

Prior to the beginning of this project, the Town made several key decisions regarding its core technology infrastructure, including

- Implementing the Wide Area Network
- Entering into a contractual agreement with Compaq USA for the leasing of computers and servers
- Migrating to the MUNIS Application Service Provider (ASP) model

These decisions have had an impact on the direction the Town will take moving forward and, as a result, have been incorporated into the recommendations presented in this plan.

A. Acknowledgements

Blum Shapiro would like to thank the Town of Greenwich, the Greenwich Libraries and the Board of Education, for their participation, support, on-going dialog and feedback during this project. A list of the project participants is provided in Appendix 7.A.

B. References

As part of this project, we also reviewed information from numerous departments within the Town, as well as information provided to us by current and prospective vendors. Outlined below is a list of vendors and information sources that contributed to this overall technology plan:

- Greenwich Library Automation Plan – 1997 - 2002
- MUNIS Contract
- Compaq Windows Assessment Document
- ACS Government Records Management Division
- Plangraphics GIS Technical Assessment and Strategic Plan
- Brodie Group GIS Assessment
- CNS Group

C. Technical Terminology

Unfortunately, in order to describe and document information in this technology plan, it was necessary, in certain instances, to use terms more technical in nature. We have made every attempt to either minimize the use of such terms or describe in detail what is meant by each term. In addition, we have included a section in Appendix 7-B that describes, in detail, the different concepts and terms used in this document.

III. Strategic Vision

A. Mission Statement

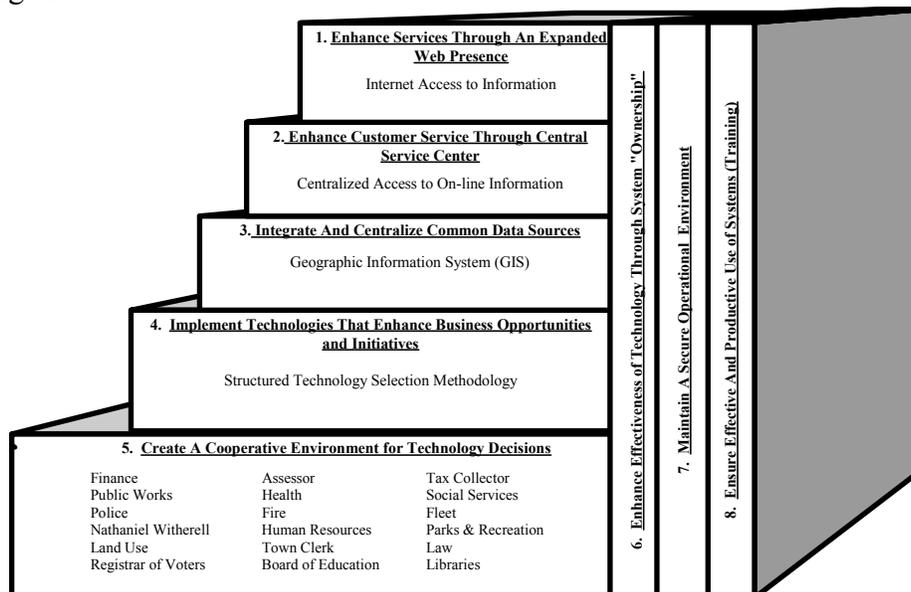
The Town of Greenwich’s primary role is to provide service to its residents utilizing the most efficient and productive means available. The purpose of this technology plan is to provide a framework for a coordinated approach to the implementation of new initiatives and technologies, which will result in more productive Town personnel and the delivery of enhanced, timely services to residents.

In order to chart a course for the use of technology for the Town of Greenwich, a strategic vision was necessary to determine how technology could be used to enhance the services and programs provided by the Town more effectively.

The objective for this vision was to define a direction for technology and identify the initiatives and projects necessary to make this vision a reality. By considering various internal and external demands placed on the Town, such as customer service requirements, budgetary constraints and operational needs, we were able to identify the following strategies:

1. Enhance Services Through an Expanded Web Presence
2. Enhance Customer Service Through Central Services Center
3. Integrate and Centralize Common Departmental Data Sources
4. Implement Technologies that Enhance Business Opportunities and Initiatives
5. Create a Cooperative Environment for Technology Decisions
6. Enhance Effectiveness of Technology Through System “Ownership”
7. Maintain a Secure Operational Environment
8. Ensure the Effective and Productive Use of Systems

The diagram below depicts the interrelationship between all the aforementioned strategies:



Strategy 1 – Enhance Services Through An Expanded Web Presence

One of the most effective solutions for addressing the growing demands of customer service within Town government is to expand and promote the use of the Internet as a key business and communications tool. This approach allows residents to perform many of the services offered by the Town through web-enabled and interactive applications. For the Town of Greenwich, an expanded web presence could allow residents to:

- Apply for building permits and track the status of applications.
- Register for Town programs and services on-line.
- View personal property records and land use data.
- Access other Town related information via the Internet.
- Allow for payment of programs/services.

Meeting the goals of this strategy will require the Town to review and refine its approach to the selection, implementation and use of key data systems and resources. It will demand that all departments be more involved with the management and ownership of data resources to ensure the Town's on-line customers are accessing accurate and timely information. Effective management of the services offered by the Town via the web will also require unifying the various web sites maintained by the Town to a single web portal. This will allow the Town to consolidate development, administration and service costs (i.e., credit card processing, hardware and web management software). The Town will also need to establish an approach to the dissemination of information through the Internet according to the Freedom of Information regulations.

Benefits:

- Residents are able to access key services twenty-four hours, seven days a week.
- Departments are able to push information to a centrally accessible resource
- Consolidated web presence enhances professional image and services of Town
- Payments for services can be processed faster and more efficiently

Plan Recommendations:

- *Document a Strategic Web Site Plan*
- *Establish a Formal Web Site Committee*
- *Have a Town Webmaster*

Strategy 2 – Enhance Customer Service Through Central Service Center

Improving customer service is contingent on simplifying the intake and delivery of information for residents. Through consolidated access to key systems, enhanced use of the Internet and electronic mail, streamlining of key processes and

developing procedures that shift routine departmental tasks to a centralized customer service operation, the Town can better accommodate the residents of the Town of Greenwich. In addition, by offering residents the ability to access key information through public access terminals or through web-based applications, the Town becomes more interactive and responsive as information can be collected and distributed at any time.

Benefits:

- Expanded public access to key information resources
- Demands on staff are reduced as routine information is made more available through multiple on-line sources
- “One-stop” service minimizes number of stops residents must make in Town Hall improving service experience
- Use of electronic mail makes delivery of key information more timely

Plan Recommendations:

- *Create A Central Service Center*
- *Enhance Use Of Electronic Mail and Internet Services*
- *Enhance Use Of Electronic Mail To Residents*

Strategy 3 – Integrate And Centralize Common Departmental Data Resources

In order for the Town to enhance the services it provides to residents, the Town must migrate toward systems and practices that allow information to be more openly shared across departmental lines. Key tools for accomplishing this goal are centralized databases or information repositories that can maintain common property and non-sensitive resident data (i.e., address or vital statistics as opposed to personal health or social services information) and integrate/synchronize with the Town’s critical systems.

For example, the Town’s Geographical Information System (GIS) can provide users across many departments with a common data management and analysis tool for property related information. Through the use of “layers”, the GIS can be designed to take in data from external systems, such as the Assessor’s CAMA system and the Building Department’s Permit system to create a multi-faceted picture of the Town’s properties and residents. In addition, GIS information can be made accessible through the Town web site, providing residents with more in-depth access to Town information.

As new systems are identified, it will be critical to consider integration requirements, such as ESRI standards, and capabilities. This will help minimize any need for redundant databases and duplicate information processing.

Benefits:

- Processes can be streamlined as information is integrated and more readily available.
- Improved inter/intradepartmental data integrity, operability and communications.
- Leverages investment Town has made in GIS.

Plan Recommendations:

- *Hire a GIS Coordinator*
- *Reinstate the GIS User Group*
- *Develop Document Storage and Management Standards*
- *Develop Technology and Operational Policies and Procedures*

Strategy 4 – Implement Technologies That Enhance Business Opportunities and Initiatives

As the Town moves toward an information-centric operation, it will be imperative that Departments demonstrate how new systems they wish to implement will improve Town operations, enhance customer service, reduce overall costs and streamline current processes. It will be critical that the goals and objectives of new technologies be identified, with appropriate cost/benefit analyses developed to identify the anticipated tangible and intangible benefits that can be expected.

Benefits:

- Establishes a unified direction in use of technology and information
- Ensures that implemented systems will promote cost effective business practices
- Encourages departments to find efficiencies and ways of working smarter

Plan Recommendations:

- *Implement a Structured Technology Selection Methodology*

Strategy 5 – Create A Cooperative Environment For Technology Decisions

In order for the Town to achieve its strategic technology goals, it will be critical that decisions regarding the selection, implementation and use of new systems are made in accordance with the Town's overall business direction. This approach will require users and departments to take a more global view of the applications and technologies they wish to purchase, and accept more responsibility for the success of these systems.

Benefits:

- Improved technology selection decisions as Town needs are evaluated according to a structured methodology

- Cooperative reviews and decisions that will help lead to improved use of Town data across Departments
- Higher quality of service and better use of IT Department resources

Plan Recommendations:

- *Mandate a New Technology Steering Committee to Provide Consistent Oversight*
- *Implement an IT Communications Strategy*
- *Develop an Implementation Schedule Identifying Critical Tasks and Completion Dates For All Technology Initiatives*

Strategy 6 – Enhance Effectiveness of Technology Through System “Ownership”

While training can help promote the use of a technology, users will continue to need technical and functional support. While users will not be expected to maintain the computers and operating systems needed to run an application (e.g., technical support), this strategy promotes the concept of departmental responsibility for ensuring users adopt and integrate technology into their business operations. Departmental users will then have more accountability, or “ownership”, for the success of the respective technology solutions. Under this approach, the IT Department continues to remain clearly responsible for assisting with all technical issues and support, while the departments address the functional use of systems.

Benefits:

- Departments are held accountable for the success of technology solutions based on defined financial and operational expectations
- Technology decisions are made based on available resources and support within departments and IT Department.
- IT Department resources are used more effectively
- Users gain more intimate knowledge regarding how a technology can and will improve departmental operations

Plan Recommendations:

- *Define the Role of the IT Department*
- *Improve Project Management And Accountability*

Strategy 7 – Maintain A Secure Operational Environment For Technology Systems

As the Town begins to expand access to data and information resources, the need to maintain a secure, controlled environment becomes increasingly more critical to ensure the integrity of the information maintained on Town systems. This requires that appropriate policies, procedures and practices be implemented and understood by all Town employees and users of Town information management resources. In addition, the maintenance of a secured environment is the responsibility of all

Town users and relies on the clear communication of any activities or changes that may impact the Town’s technology, such as:

- Hiring and terminating staff
- Loading new software onto computing resources
- Potential virus attacks via software or electronic mail

The result of this approach will help to ensure that systems can be maintained and restored, even in the event of a major catastrophe.

Benefits:

- Consistent approach to data security is maintained
- Impact of external threats, i.e., viruses, “hackers”, etc., is minimized
- Controlled approach to business recovery in the event of a disaster
- Staff develop and maintain necessary skills to effectively manage information technology resources

Plan Recommendations:

- *Confirm MUNIS Disaster Recovery Readiness*
- *Ensure IT Staff Attend Regular Technical Training Classes*
- *Perform Data Security Assessment*
- *Establish Standard Network Security Notification Procedures*
- *Develop Standard Backup and Recovery Policies and Procedures*

Strategy 8 – Ensure The Effective and Productive Use of Systems

The successful use of any technology tool relies heavily on the ability of users to effectively apply those tools to the processes they manage. By providing an on-going program of training and instruction on all mission critical applications, the Town helps users develop the skill sets necessary to use key systems while communicating standards and developing consistent practices throughout the Town.

Benefits:

- Trained users can improve the efficiency within a Department by maximizing the use of the technology tool
- Sufficient training helps minimize support needs from the IT Department
- New processes/workflows can be developed to expedite operations
- Contributes to successful integration of technology and operational improvements

Plan Recommendations:

- *Implement a Structured Training Program*

B. Goals of the Plan

The purpose and intent of this plan is to provide a consistent and logical technology “road-map” for the Town. In order to build a technology foundation and plan, there are several areas that need to be evaluated, including:

- The technology needs of all departments and associated costs;
- On-line access to key information for Town personnel, including financial and GIS-based information;
- The overall approach to selecting and implementing technology at the department and Town-wide level;
- Identification of new technologies that will substantially improve productivity and/or efficiencies in areas within the Town;
- Alignment of IT Department responsibilities to successfully support Town strategic business, customer service and technology goals;
- Management and protection of data and information resources;
- The level and amount of training provided to all Town employees.

We have further defined the objectives as outlined below.

1. Business Objectives

The business of managing technology in a complex environment like a municipal government requires cooperation and collaboration by users and technical staff. Communication of goals and an understanding of mutual objectives will help the Town stay on-track and achieve the objectives identified in the Strategic Plan. Key elements to this effort include:

- a. Establish a central oversight body to help prioritize and negotiate the implementation of key systems and technologies
- b. Institute necessary policies and procedures that provide guidance and direction for the use of Town technologies
- c. Implement appropriate methodologies that provide a structured approach to selecting and implementing technologies according to the common goals of the Town.
- d. Empower departments to take increased responsibility for the selection and implementation of systems designed to enhance and improve their operations and services to public
- e. Utilize all available tools to communicate current and future technology initiatives to ensure all Town staff are aware of impending changes.

2. Technology Objectives

Over the past several years, the Town has purchased and implemented several different local area networks to support individual department needs in order to share information and resources. Unfortunately, data continues to be “locked” within these departments creating “islands of information” that prevent the Town from achieving many business improvement goals. Software, meanwhile, has become more sophisticated and complex. As such, the objectives of this aspect of the plan are to:

- a. Develop a technology foundation that will grow as more departments and groups need access to centralized data;
- b. Provide a consistent and tangible “roadmap” for implementing and integrating practical technology solutions for the Town;
- c. Complete the implementation of the Town’s Community-wide network so that Town personnel and residents can access key information, share documents and communicate with one another more effectively;
- d. Improve the level of network and application support in order to take advantage of technologies and enhance user productivity;
- e. Use technology to enhance and streamline the delivery of services to Town customers.

3. Communications Objectives

Advances in technology have changed the way citizens, organizations, departments and people communicate. Improving the Town’s ability to electronically communicate between departments and offices and with residents is required. Achieving this goal will include the use of communication technologies available today, such as the Internet and a Community-wide network. Key communications objectives are to:

- a. Improve interoffice, departmental and public communications within the Town.
- b. Use existing and future equipment/software to enhance communications.
- c. Develop a standard mechanism of communicating with all users on the Community-wide network.
- d. Expand use of the Town’s website to provide information and services to residents *as well as* Town employees

4. Training Objectives

Training is one of the most critical components for effectively utilizing productivity tools, including software products. An application may provide all the required capabilities, but it is of little value if a user does not understand how to take advantage of the system’s features. As such, some of the key training objectives are:

- a. Confirm the level and amount of training provided to employees;

- b. Identify ways to enhance the current training curriculum;
- c. Identify the resources required to support, maintain and train users on the standard set of applications;
- d. Ensure IT technical staff continue to develop their knowledge and understanding of new technologies.

IV. Findings and Recommendations

To better understand the functional issues confronting the Town of Greenwich from an operational and technology perspective, the project team tracked information obtained during focus group sessions, individual interviews and departmental discussions. This information was then analyzed to determine the common characteristics of the Town's needs and requirements.

Common themes raised by many groups included:

- A solid technology foundation presently exists
- Access to information and resources is inconsistent
- Implementation of network and document standards has been inconsistent
- User training on existing applications is limited
- Standards for documents and correspondence do not exist
- User training on existing systems needs to be formalized

These items were repeatedly brought up as obstacles to a productive and efficient work environment and considered barriers to providing the level of consistently high-quality services demanded by Town official and residents.

Based on this, we have grouped our findings into the following categories:

- A. Business Operations and Controls
- B. Technology Foundation
- C. Data Management and Standards
- D. Training

For each category, we will discuss the critical issues involved and provide specific recommendations.

A. Business Operations And Controls

1. Roles And Responsibilities Of IT Department Are Not Well Defined

The implementation and management of technology within the Town of Greenwich has been affected by the unclear understanding of the IT Department's responsibilities. Throughout the course of our discussions with Town staff, there was little consistency in what people understood the role of the IT Department to be at a departmental level.

Although most staff agreed that IT staff are responsible for maintaining the desktop and mainframe computers, the Town Hall network and common applications, such as electronic mail, there was little agreement on the IT Department's boundaries beyond those key areas. Many departments viewed

IT as the “owner” of all systems maintained by the Town, including software management and user support. Consequently, the IT Department has assumed a broader scope of responsibilities for several key projects, including:

1. MUNIS Financial System
2. RecTrac
3. Fleet Management System
4. Traffic System
5. GIS
6. GeoTMS
7. ProVal/KVS Conversion
8. ACS Land Records Management System
9. Voter Registration System
10. WellTrac Conversion

In addition, the IT Department is also responsible for the implementation of several sizable and complex technology projects that have a broader impact on Town-wide operations, including:

1. Greenwich Wide Area Network
2. Windows 2000 Operating System Conversion
3. PC Upgrades
4. CBT (Computer Based Training)
5. Town of Greenwich Web Site

Because all of these initiatives require careful supervision and direct project management, compounded by a strong sense of responsibility for their success on the part of IT management, the resources of the IT Department are being overextended. In addition, there is a growing degree of frustration from many departments with the services provided by the IT Department. In most cases, however, it is because expectations have never been clearly set with the user community.

2. Project Management Has Not Been Effectively Provided For Technology Projects

Project management for many of the Town’s recent technology initiatives has not been as effective as necessary. As the IT Department has accepted responsibility for driving an increasing number of the Town’s technology-related projects, the time and resources available to each effort has diminished, resulting in projects that have not met implementation dates or have missed user expectations. However, there has also been limited acceptance of ownership or accountability on the part of user departments to ensure that project issues are effectively communicated and key tasks completed according to deadlines.

Recommendation – Mandate a New Technology Steering Committee to Provide Consistent Oversight

In order to promote more consistent oversight to the selection, purchase and implementation of technology, the Town should consider formalizing a Technology Steering Committee. The responsibilities of the Technology Steering Committee will be:

- Evaluating a project’s goals, objectives and costs in order to determine how the success of the project can be measured.
- Monitoring start and completion dates of all project activities.
- Evaluating the impact any particular project may have on the overall schedule. Certain projects may require additional technical resources or, due to time constraints, impact the implementation of other projects. This Committee would be responsible for identifying potential issues and working with the IT Department and Sponsoring Department to address them accordingly.
- Confirming the support resources required to successfully implement a technology and/or project.
- Identifying the person(s) (i.e., sponsor and owner) who will make the project successful.

In this capacity, the Technology Steering Committee can be more responsive to the needs of the Town and its residents. As the use of technology grows, this Committee will be in a better position to proactively oversee and implement the changes necessary to support the goals of the Town.

In addition, once the technology plan has been approved, this Steering Committee will assist with the implementation of the Strategic Technology plan initiatives. The Technology Steering Committee will be responsible for reviewing hardware and software budgets, prioritizing all project requests and new initiatives received by the IT Department. We recommend that the review process used by the Steering Committee follow a standard analytical approach to ensure all critical business and technology issues have been considered, such as:

- Hardware requirements
- Software modifications
- Data integration
- Conversion
- Training needs
- Overall project costs.

We have included an example of a checklist (see Appendix VII.C) that can be used by the Steering Committee and requesting departments.

The various Boards and Commissions should confirm the need for this Town-wide approach and adopt this new oversight Committee. The Steering Committee should consist of seven members selected from the major boards of the Selectman’s Office, Board of Estimation and Taxation, and appointing authorities, as well as a representative from the IT Department itself. We also recommend that for the first six months, the Town consider hiring a facilitator to help the Committee define the guidelines and procedures it will use to provide the oversight and direction necessary.

Recognizing that the Greenwich Libraries and Board of Education (BOE) are separate entities managing technology initiatives independent from the Town, we recommend that a representative from these business areas participate on the Town Technology Steering Committee to ensure open communications and maintain consistent technology standards. We also suggest reciprocal representation from the Town’s Technology Steering Committee on the technology committees of these two organizations. This approach will allow the Libraries and Board of Education to maintain their independence while protecting the Town’s overall technology investments.

Recommendation – Improve Project Management And Accountability

A key component for enhancing project management and accountability is the establishment of project “ownership”. Project “ownership” comes in two forms:

- a. A Project “Sponsor” is the person ultimately responsible for the success or failure of the project. It is under their direction that key tasks and activities must be accomplished on-time and within budget. The Project Sponsor is also responsible for addressing and responding to issues raised by the Technology Steering Committee regarding the progress and decisions made over the life of the project. “Sponsors” are typically senior level managers who have an intimate understanding of all the business and functional operations that will be impacted by the project’s outcome, whether it is the result of a new technology or a re-engineering of the processes involved. For projects that impact several departments, the Steering Committee can recommend the use of a consultant to facilitate the implementation process, transitioning full ownership of the system to a designated sponsor over the course of the project.
- b. A Project Implementation Manager is the person responsible for ensuring the day-to-day activities of the project are performed according to established time schedules and budgets. This person works closely with all project team resources to address and resolve issues, and ensure that all deliverables are completed as required. The Manager reports to the Project Sponsor on a regular basis to keep the project on-track and raise any concerns that may be more suitably resolved at the Sponsor-level.

By establishing these roles and responsibilities for all technology initiatives, the Town will promote accountability and technical leadership at the departmental level.

Recommendation - Define the Role of the IT Department

The role of the Town’s IT Department needs to be clearly defined in order to more effectively serve the needs of the Town of Greenwich. Due to the limited personnel resources available in the IT Department, and the expansion of responsibilities that will result from the implementation of the WAN, documenting and communicating the services that the IT Department will provide as well as user responsibilities will be important to ensuring IT resources are used effectively. We recommend that the Town of Greenwich consider narrowing the focus of the department’s responsibilities into three key areas:

- a. *Technical Consulting Services* - IT staff should be available to the management of the Town and the Departments to provide assistance with the assessment and selection of data processing systems. Staff would work with Departments to help determine and develop system requirements according to a structured methodology. IT staff would be able to provide a more global perspective regarding common data source and application needs.

The Information Technology Department would also have responsibility for facilitating the Information Technology Strategic Planning process. Working with the Technology Steering Committee, IT Management would be responsible for:

- Reviewing and prioritizing IT project proposals
 - Confirming applications and hardware meet established Town standards
 - Making recommendations for projects to the Technology Steering Committee
 - Developing and monitoring the Town’s Strategic Technology Plan.
 - Updating the Strategic Plan in conjunction with the annual budget.
- b. *Project Management Services* - In this role, IT staff would work with the “owners” of applications in an advisory capacity to help ensure the successful technical implementation or upgrade of a new system. Staff would assist departments with any technical issues that will help bring projects in on time and within budget. Key tasks would include:
 - Managing according to established project schedules
 - Confirm data conversion requirements
 - Address technical configuration issues

- c. *Technical Support Services* - The IT Department would retain the traditional support role for those systems it directly manages and controls. Services in this area include:
- Computer Operations – The IT Department would be responsible for access to and operation of the data processing environment for all applications, including data security, system administration, backup and recovery. This includes establishing performance benchmarks and goals that can be used to measure expectations for not only users but for IT management.
 - Desktop Support – IT staff will support the Town’s standard desktop software applications, including installation and support of workstation hardware and software required to perform a job, and provides local and remote access to electronic mail and groupware applications, such as scheduling and calendar functions.
 - Infrastructure – All connectivity to local and wide-area data communication networks will be managed through the IT Department and related parties (i.e., Lightpath).
 - Application Support – The IT Department is responsible for providing first-level operational support of application software, such as troubleshooting and correction of technical processing problems (i.e. inability to access an application). Functional problems that involve more detailed use of the applications should be addressed directly by the software vendor. IT support staff can assist in this process, but would not be responsible for problem resolution.
 - Backup and Recovery - Data backups will be performed daily according to an established routine and schedule. Data recovery, when required, will be completed in accordance with the Town’s Disaster Recovery Plan procedures.

In addition, a “guaranteed support call response time” should be defined, identifying how users should report a problem (i.e., the mechanisms available – telephone, on-line support request, etc.), how quickly a user can expect a response from IT support staff, and what information a user should have at hand to ensure the support process works effectively and efficiently for everyone. These expectations should be documented and communicated to all Town users.

Recommendation - Implement an IT Communications Strategy

The IT Department needs to develop a consistent approach that ensures information regarding technology is communicated to the Town of Greenwich users on a regular basis. This strategy should address the communications tools available, including electronic mail, the Town web site, newsletters and voice mail, and how they can be effectively used to disseminate a variety of information on technology within the Town, including, but not limited to:

- Project updates
- New technology initiatives
- Tips and tricks
- Frequently Asked Questions
- General policies, procedures and standards

The goal of this strategy should be to ensure users and the public feel more involved with the technology they have at their disposal, and encourage a more interactive environment to help ensure systems, tools and resources are used productively and effectively.

3. A Structured Technology Selection Process Does Not Exist

Technology decisions over the past several years have been predicated on the needs and requirements of individual departments. As such, each group has been allowed to pursue and implement their own solutions to address specific departmental problems following inconsistent evaluation and selection methods. The involvement of the IT Department in these selections has been haphazard, at best, creating several issues, including:

- Systems that do not satisfy all critical departmental needs
- Incompatibilities with existing hardware or networking environments
- Inability to effectively integrate with other applications or data sources
- Data conversion issues
- Limited user training
- Increased technical support requirements for the IT Department
- Lack of “ownership” of implemented systems by departments

As a result, the Town has found that it has invested in systems that do not meet all of the needs of the various departments. For instance:

- a. The permitting process for the Town of Greenwich involves several departments that have various inspection and approval requirements. In addition, many building and environmental codes particular to the State of Connecticut affect how decisions are made regarding the approval of permit applications by the different Town departments. Although the Permitting System selection team made every attempt to identify key requirements, many of the integrated permit processing issues were not considered or documented, affecting the eventual analysis and selection of the GeoTMS system. As a result, the Town now uses two different permitting systems, GeoTMS for the Land Use departments and Cornerstone for the Building Department, both of which are supported by manually redundant procedures to ensure accuracy and communication of permit application information between these business areas.

- b. The Parks and Recreation department, in evaluating systems to improve the management of programs and facilities, identified many of the critical functions and features the department would require from the new application, including key fields, necessary inquiry capabilities and reporting requirements. The IT Department was also consulted regarding technical hardware and networking specifications to ensure whichever system was selected would work compatibly in the Town’s computing environment. Despite all of this preparation, however, the department had no formal protocol for evaluating vendor demonstrations. Parks and Recreation staff reviewed several systems, but had not developed any mechanism for comparing the Department’s system requirements against the demonstrations provided by the vendors. As a result, while the RecTrac system is a very powerful and feature-rich application, it was not until the system was implemented that the Parks and Recreation staff found inconsistencies with their needs, requiring additional programming of the RecTrac system.

Recommendation – Implement a Structured Technology Selection Methodology

One of the key benefits of new technology is the ability of these systems to improve productivity and efficiency through streamlining processes and the use of consolidated data. However, the complexity of such systems requires the careful consideration of all information and process elements involved. While an application may be predominantly used by a single department, the information the system uses may come from or impact many other sources. This makes proper planning and analysis a key part of the selection process. By applying a structured selection approach, many of the pitfalls that are usually encountered in such projects can be avoided, and help a project team to:

- Examine the current access to and flow of information within and between departments
- Analyze and evaluate all data management and reporting requirements
- Review and compare all computer system and resource requirements
- Confirm the current and long-term business needs that will be supported by the system
- Assist in the creation of a detailed Request For Proposal
- Review integrated software packages that meet the needs of the department and Town
- Develop recommendations for a final decision by department management and the Town Technology Steering Committee.

To accomplish all of these goals, the approach should be divided into manageable tasks that will produce the deliverables necessary. The recommended approach should consist of five key tasks

- *Identify User Needs* – This step should address and document all of the key functions and features needed in the desired system. Tasks include:
 - Obtain user input
 - Review all key processes
 - Identify all information sources and destinations
 - Evaluate all reporting needs
 - Confirm all regulatory guidelines

- *Determine Technical Requirement* – An assessment of the hardware, networking and other technology requirements should be performed to ensure that the selected system is compatible with the short and long term directions of the Town. The project team should work with the IT Department to determine what environmental requirements will be necessary for the effective operation of the new system, including any and all database management needs, client PC configurations and possible telecommunications issues.

- *Develop Request for Proposal* – The Request for Proposal (RFP) should include all system specifications as well as an overview of the Town’s objectives for implementing the selected system. Each of the potential vendor RFP responses should be compared against the defined user requirements to determine which system most closely meets the Town’s needs. The costs and benefits of each response should be compared, including technical considerations, to identify a limited number of potential vendors for review.

- *Conduct “Test Drives”* – The “test drive” process is the Town’s opportunity to confirm the functionality of a technology system. Staff can directly evaluate the look and feel of the technology, make sure of its ease of use and confirm its ability to meet the performance requirements. All staff who will be using the system should be involved in this process to ensure any questions or concerns are addressed. We recommend that “operational scenarios” designed to describe current and desired process outcomes be developed to help provide vendors with a more intimate sense of the Town’s needs and make their presentations solutions-based.

- *Management Review* – At the conclusion of the “test drives”, the project team should develop a final recommendation and present their findings to the Technology Steering Committee. This final analysis should include, at a minimum:
 - A recommendation for a specific system identifying why a selected vendor was chosen
 - Cost estimates for implementing the selected system, including system installation, data conversion services, and user training
 - Proposed staffing requirements based on the selected recommendation

- Anticipated operational benefits and the overall impact the new system will have on current processes

Prior to the start of any Selection Project, the Town should identify a Project Sponsor and Project Manager to ensure effective project leadership and system “ownership” is established.

Recommendation – Enhance Project Management Through Use Of Consultants

For complex systems that will critically affect the operations of one or more departments, we recommend contracting with project management consultants to facilitate many of the tasks involved with the system selection and implementation process. Consultants can help departments overcome many of the obstacles often encountered when attempting to evaluate operational needs, identify process improvement opportunities and manage change by providing an objective, third party viewpoint.

In addition, the use of external experts will help minimize the time and Town resources that would otherwise need to be dedicated to the detailed activities required of the selection process. Selection of consultants should be coordinated with the IT Department to ensure appropriate business and technical expertise and skill sets are obtained.

Recommendation - Develop an Implementation Schedule Identifying Critical Tasks and Completion Dates For All Technology Initiatives

The newly created Technology Committee should work with the IT management staff and project sponsor to develop a detailed implementation schedule for all current and planned technology projects. Creating and communicating such a plan on a regular basis establishes a priority list of activities under development and appropriately sets the expectations of Town employees. Users can better plan their departmental schedules based on the implementation of new system features and capabilities. In addition, an implementation schedule should identify the “owners” of each project as well as provide key target dates for vendors to meet.

4. **User Access Security Procedures Need Improvement**

At the present time, the IT Department does not consistently receive notification of newly hired or terminated employees from departments or Human Resources Department on a timely basis. Without the appropriate lead-time, the IT Department is unable to take the necessary steps to establish or disable an employee’s access to the Town’s network that ensures appropriate control over critical systems and data.

Recommendation – Establish Standard Network Security Notification Procedures

The IT Department and the Human Resources Department should establish a notification process that provides the IT Department with satisfactory lead-time to address the network security requirements of newly hired or terminated employee. Procedures should ensure that network administration staff have enough time to respond to these requests, and provide confirmation to Human Resources that all user ID related tasks (i.e., network ID, e-mail address, specific application IDs, etc.) have been completed as required. We recommend that for new hires, the IT Department should be notified at least two days prior to an employee’s start date to allow the IT Department to confirm with department management the systems and data resources that will be needed. For terminated employees, the IT Department should be made aware of termination situations with sufficient lead-time to ensure the terminated employee’s user ID can be disabled.

B. Technology Foundation

1. Sharing Information Between Departments and Locations Is Being Enhanced

In the past, the ability to share information within and between departments and locations has been inconsistent and affected by a variety of obstacles. Although the departments in Town Hall share a single network, many departments have not had access to the applications and data resources that could enhance their operations. Many users continued to rely predominantly on hard copy reports or the transfer of data by diskette from one computer to another. The result was redundant data entry and outdated/inconsistent information.

For example, many departments maintain similar data regarding residents and property information (names, addresses, etc.). This includes the Tax Assessor, Town Clerk, Planning and Zoning, Police and Parks and Recreation. Ensuring that this data is continually accurate within and between departments has been a difficult, redundant and time-consuming task performed by multiple Town employees using various data management tools. Although these departments may have access into key systems, such as the Assessor’s CAMA system or the Town’s GIS, much of this data is re-entered into secondary data systems or local databases for specific processing. For example:

- a. The Tax Collector currently cannot print motor vehicle tax bills that require corrections to information obtained through the Department of Motor Vehicles’ database. Collector’s Office staff have developed an alternative method that requires entering basic taxpayer and vehicle

data (name, address, Vehicle Identification Number, registration information) into an Excel spreadsheet in order to generate a corrected statement. At present, the Collector's Office can print approximately 100 bills per day using this process, which has a strong impact on staff productivity.

Minimizing the amount of time to maintain this information can increase resources available to perform other work. Enhancing access to a single source of official "resident" information will help eliminate this problem.

- b. The current land record index data maintained in the Town Clerk's Office must be manually re-entered into the Assessor's PROVAL system.

Several departments within the Town have installed centralized application servers to accommodate their departments' specific business needs. These departments utilize the application servers as follows:

- a. The Assessor's Office currently maintains an IBM RS/6000 AIX server for the KVS property assessment system. This server will be removed from service once the migration to the new PROVAL system is completed. The PROVAL system runs on a Windows NT platform with the server housed in the IT Department.
- b. The Finance Department recently implemented the MUNIS Application Service Provider (ASP) that allows users to access the Town's financial data over the Internet. This replaced the IBM RS390 mainframe computer that maintained the Town's finance system. At the time of this project, most of the primary modules had been converted to the new system.
- c. The Town of Greenwich Public Library has a heterogeneous network to manage the various systems and resources required for library operations and customer services. The Innovative Interfaces on-line catalog system runs on a DEC Alpha UNIX server. Two Novell 4.1 servers are used for general file and print services as well as management of the CD-ROM library. Internet access and the Library web site are also managed through a separate Novell server. The two branch libraries, Byram and Cos Cob, and the Perrot Library access these systems through 56Kb leased lines.
- d. The Board of Education has an extensive Windows NT and Apple network to support the administrative and academic operations of the Town's schools, including the recently implemented STAR student

management system, as well as a Frame Relay network that connects each of the schools to the main Board of Education data center.

- e. Nathaniel Witherell has a Novell 4.1 network with 50 workstations to support its nursing care operations. Primary applications include the Keene Clinical System, Groupwise electronic mail and a link to the Greenwich Hospital to receive laboratory test results.
- f. The Police Department has two networks, one secured to manage access to the Police records systems and Police Dispatch operations solely within the Police station, and the other unsecured for the interchange of information and external e-mail between locations outside of the Police station.
- g. The Fire Department has a Novell server for file and print management services for 15 PCs as well as for Groupwise e-mail.
- h. The Fleet Maintenance Department has a Novell 4.1 server, which connects seven workstations using the current fleet management software system. Fleet will be replacing this network with a new ASP-based application.
- i. The Town Clerk operates their land records index system on a UNIX server provided by the ASC software vendor. This system will be migrating to a browser based front-end that will make it accessible through PCs.

2. Continue to Enhance the Use of the MUNIS Financial System

The most commonly used information within all of the Town departments is financial in nature. Managing and generating budgets, invoices, billings and reports on a timely basis are critical to the successful operation of each department. Prior to the implementation of the Internet-based MUNIS system, departments found other means to maintain financial records, either in manual ledgers or electronically using a variety of PC applications (Quicken, Quickbooks, etc.). While these departments made every attempt to ensure that this information was up-to-date and accurate, they redundantly tracked data maintained by the MUNIS financial system.

With the introduction of the WAN and the expanded availability of the MUNIS system via the Internet, users at all Town locations can now access their financial data. A key result of this improved access will be the need for consistent procedures for all departments as well as the opportunities for improving how financial transactions are processed (e.g., purchase requests, invoices, etc.) through MUNIS.

Recommendation – Complete the Implementation of the Community-Wide Network

Many of the data sharing objectives desired by the Town are currently being addressed through the implementation of Wide Area Network, or WAN. Recently, the Town of Greenwich completed the first phase implementation of the Town's Wide Area Network. The objective of the WAN is to provide employees in remote locations throughout the Town access to common data, applications and other information resources through the use of high-speed telecommunications technology.

The benefits of the WAN will come in the form of productivity improvements and standardization. A WAN will also help to eliminate many of the communication and operational obstacles that have arisen due to the lack of integration of multiple locations. Data that is currently isolated because of distance can now be maintained centrally for all users to access, ensuring the consistency and accuracy of information used and reported. The Town will also experience other benefits, as follows:

- a. Expanded access will help reduce the need for users to create databases of information maintained in other departments. Single source databases or applications will provide up-to-date information for all users, ensuring accuracy and reliability of the data.
- b. All locations will use a consistent internal electronic mail system improving the sending and receipt of messages and attachments throughout Town departments. As the Town will be moving to Microsoft Exchange, a single e-mail platform should be adopted across all locations, including the Board of Education and Town Libraries, to simplify system maintenance and synchronization of a common address book for all Town email addresses.
- c. The capabilities of the MUNIS financial system are available for all authorized users through the consolidated Internet access to track budgets, requisitions and invoices from a single "official" source regardless of location. Business processes will be streamlined as redundant steps are eliminated. For instance, budgets can be entered directly into MUNIS, improving the data entry, validation, and overall budget processing cycle.

At the time of this report, the hardware implementation phase of the project had been completed, with the necessary telecommunications equipment installed in all of the primary Town locations. The next phase is to determine how each of the various locations will access the expanded set of information resources available.

We recommend that as a critical task in this next phase, the IT Department work with key departments to develop a comprehensive strategy that identifies how the WAN will be used by the various departments, including:

- a. A security scheme should be developed for each application at the network operating system and application levels to ensure adequate protection is in place over programs and data. In most cases, users who have not had access to such systems will require, at most, inquiry access to key fields or data screens. The Town should consider performing a thorough security evaluation of all data systems to confirm all possible exposures and controls are addressed.
- b. Allow inquiry access to key applications within the Town. In particular users mentioned that inquiry access to the Assessor, Land Records management, Permitting and GIS systems would be extremely helpful for responding to resident questions involving information maintained by other departments. Employees would not need to keep duplicate, potentially inaccurate or incomplete information if access to these systems were available.
- c. Retain the application specific network servers (application servers) used by Nathaniel Witherell and Town Clerk departments. Rather than consolidate these applications to a single server, migrate these computers to the Town Hall Data Center and integrate them into the overall WAN. This will minimize any data conversion or operating system issues while achieving the overall goal of centralized maintenance and management of network resources. Users in these departments, as well as other authorized users, will continue to have access to the department-specific applications and information they need from their PCs. This will also allow critical information to be controlled by the respective departments.
- d. Continue to centralize the backup of Town data maintained in remote locations to the main Town Hall servers via the WAN. Again, this includes users located in the Town Hall, Fire, Public Works, and the Senior Center. This approach will ensure that critical documents, files and applications are recoverable quickly and easily. A regular, scheduled backup routine should be implemented, including storing tapes at an off-site facility, such as a bank safe-deposit box or at the Police station, in the event of a disaster. As data backup requirements increase, the IT Department should consider other data storage alternatives to meet these needs.
- e. Implement the Citrix Metaframe communications software system on a Windows 2000 server to provide staff at locations not connected by the WAN with direct access to the applications and information stored

on the Town Hall network. The creation of a “Virtual Office” will allow staff located in these locations, such as the Waste Treatment Facility, the Town fire stations or users at home, to access and utilize key business applications, like GIS, PROVAL and electronic mail. Since the applications are installed and updated on centralized servers instead of individual PCs, the complexity, time and resources required to manage applications and data across an organization can be significantly reduced. Additionally, Citrix uses the Internet as a cost effective way to provide the type of interconnectivity needed by the organization. This will help minimize redundant and inconsistent data; as well as ensure staff have access to key applications. See Appendix VII.E for additional information regarding remote access through Citrix versus Microsoft Terminal Services.

3. Access to Electronic Mail and the Internet is Limited

While not all employees need e-mail or Internet access, the current approach relies on inconsistent determinations by department heads, who have no Town-wide policy to help guide their decisions. In addition, department managers are not familiar with the monitoring tools currently available to the IT Department for tracking e-mail and Internet usage. As a result, user access to e-mail and the Internet is determined on an “as-needed” basis rather than offered globally, limiting the effectiveness of these business tools.

Electronic mail has steadily become an indispensable business tool. The ability to exchange information, including files and documents, electronically enhances how employees communicate both within the organization but with external contacts as well. Although the Town has an internal e-mail system through Groupwise, the inability to send and receive messages outside of the Town Hall network prevents staff from using all available means to obtain information and, more importantly, respond to resident requests.

The use of the Internet as an information access, research tool, and communications vehicle has several dynamic possibilities for the Town of Greenwich. However, because access to the Internet is limited, the Town is not effectively taking advantage of potential information resources and services currently available and/or under development. This includes:

- The Center for Disease Control, along with the Connecticut State Departments of Health and Environmental Protection provide access to various databases and information resources that various Town departments, such as Health, Human Services, Fire, Police, may need to improve services to Town residents and overall preparedness.

- State, federal and private organizations provide information on grants and other funding opportunities that would otherwise remain unknown by Town employees.
- The State of Connecticut is making increasingly more use of the Internet for its own information collection and dissemination purposes. The State has begun to increase its Internet presence by relying more and more on Internet e-mail as a means to communicate with Town officials. Communications range from simple messages to documents, forms and spreadsheets transmitted between users for projects and other reporting purposes.
- Information resources such as the State Legislature and the Internal Revenue Service (IRS) use their Internet web sites as a means to communicate changes in laws and statutes faster than or in place of paper records.
- Online price information and quotes for hardware, software, training, services, vehicles, and e-commerce is available to help departments in their purchasing request decisions.

Recommendation – Expand Access To Electronic Mail Services and the Internet

The Town should modify its current position regarding Email and Internet access for Town employees by making these services a standard desktop business tool. Additionally, the Town should develop and implement an Internet Access policy (an e-mail policy currently exists) that outlines employee responsibilities and acceptable uses.

The IT Department should also implement a regular program of web traffic monitoring by using tools available with the recently installed Checkpoint Firewall software system. Key reports should be developed to track Internet traffic according to specific criteria and generate key usage reports. An exception report should also be designed and generated on a weekly basis to spot accesses to inappropriate sites or potential misuse. The Town policy should have a clearly defined procedure for dealing with these situations. See Appendix VII.A for sample policies that have been developed.

Recommendation - Enhance Use Of Electronic Mail To Residents

Electronic mail is an easy to use, inexpensive mechanism to communicate information about events, activities and relevant changes in Town operations to residents. Establishing a free e-mail subscription service would allow the Town to disseminate periodic and immediate updates about various topics from emergency closings, new municipal services and upcoming program offerings.

Residents would sign up for the service through the Town web site by providing an e-mail address that would allow bulletins to be delivered directly from Town Hall. All e-mail “blasts” would be coordinated through a central services unit to ensure control and accuracy of the information released.

4. A Web Site Strategy Needs To Be Documented

The Internet has had a profound impact on the way municipalities communicate and transact business both internally and with their residents. The concept of the “Virtual Town Hall” has grown as a valid enhancement to the services offered by Towns nationally, providing residents access to information and programs beyond the traditional business hours of the Town’s offices. The Town of Greenwich, recognizing the opportunities available through the Internet, has initiated the development of a web site for the Town. A consultant has been hired to work with the First Selectman’s Office and IT Department to establish a stronger presence for the Town on the World Wide Web.

During the course of our review, we found that many of the departments in Town have developed ideas that they would like incorporated into the web site, for example:

- On-line registration for programs conducted by the Parks and Recreation Department
- Access to GIS maps and information
- Service requests to the Public Works Department
- Health notices concerning the residents of the Town of Greenwich
- Registration for e-mail notification of Town events and changes in services
- Tax bill payments
- Permit status information

However, these ideas have not been incorporated into a documented Web Site Strategy that identifies the resources, costs and technologies that will be required to implement and maintain a web site capable of these services. As a result, there is limited understanding outside of the First Selectman’s Office Web Site Committee of what commitments and activities will be involved and the potential impact of these issues on the Town.

Recommendation - Document a Strategic Web Site Plan

We recommend that the Town document a comprehensive Strategic Web Site Plan that identifies the goals, objectives and priorities for developing and enhancing the Town’s use of the Internet as a complete, interactive business tool. Elements of this plan should address:

- Web site design standards
- Web site support and enhancement requirements
- Integration of data systems and business processes
- Potential integration opportunities with other Town web sites (Library and Schools)
- Information submission and publishing procedures
- On-line payment processing standards and requirements
- Prioritization of the defined initiatives including potential high impact pilot test opportunities
- Personnel requirements, i.e., a Town Webmaster – in-house and/or contracted
- Technology requirements
- Cost/Benefit analyses
- Implementation scheduling

The Plan should also consider other web-based opportunities, such as the development of a Town Intranet. For instance, implementing an Intranet could provide Town employees access to key internal operational information such as documents, schedules and budget information. An Intranet provides access to information for internal users only. In the case of a municipality, an Intranet can optimize a user's ability to access data across the network. An Intranet utilizes the existing network infrastructure in this case, the Town of Greenwich's Wide Area Network.

By having a structured, documented approach, the Town will be able to identify new opportunities and better plan for enhancements for the overall web site project.

Recommendation – Establish a Formal Web Site Committee

Achieving the goals of the Town's Web Site strategy will require on-going collaborative input and decision-making from all departments. To facilitate this process, we recommend that the Town establish a Web Site Committee to "sponsor" the development and evolution of the Web Site. Directed by the First Selectman's Office and comprised of members from various Town departments, the key responsibilities of this Committee will be to:

- Provide functional oversight and direction for the development and maintenance of the Town Web Site
- Identify, discuss and prioritize Web Site needs and requirements common to all departments
- Develop and review policies and procedures for Web Site use and development
- Act as a sounding board for departments regarding Web Site decisions

The Committee would work in concert with the IT Department to ensure all technical management issues, including hardware and software requirements, are appropriately addressed. The Web Site Committee's first task would be to document the Strategic Web Site Plan. The Committee should also work and help to address any issues that will ensure the success of the effort.

Recommendation – Have a Town Webmaster

The key element to any web site, on the World Wide Web or on an Intranet, is keeping it current and valuable to the people using it. As Greenwich begins to offer more services through its website, e.g., a "Virtual Town Hall", a dedicated resource will be required to ensure information is kept up to date and help coordinate the introduction of new services for both external and internal users. The Webmaster position would be responsible for all of the key tasks required to maintain both the external website and the Intranet site, taking "ownership" for enhancing the capabilities and services of each site, including:

- Overall project management
- Overall site maintenance and web page development
- Integration with other applications
- User training on site management tools

At present, the Town is working with an external consultant on the development of the website. We recommend that as the website begins to expand, the management of the site transitions to a more permanent position within the First Selectman's Office.

5. Use of GIS Is Limited

The Town's GIS is not currently used as effectively as possible. Although several key departments use the system on a regular basis to support key operations, including the Assessor, Wetlands, Conservation, Planning and Zoning and Parks and Recreation, many project tasks have not been completed as outlined in the existing GIS Implementation Plan developed by Plangraphics, Incorporated in 1996.

The GIS at present is used for a variety of property and land use purposes, including creating maps for the public, site plan reviews, planning and zoning analysis, and assessment reports. There are presently twenty regular users of the ArcView GIS software who have varying degrees of skill with the functions and features of the system.

Although many layers are in place, including the digitized aerial maps, town facilities, property line, the accuracy of some information remains questionable. While this does not prevent staff from utilizing the system for general planning and inquiry, it does impact the reliability of more detailed

analysis. For example, Topologically Integrated Geographic Encoding and Referencing (**TIGER**) data has not been loaded into the system as planned. As a result, the Town currently relies on property line data that is not fully accurate and has not been confirmed by on-site surveys. While most departments have adjusted to this inconsistency, other departments, such as Public Works, have limited use of the current GIS data as they require more accurate and detailed information.

6. A GIS Training Program Does Not Exist

Training on the use of GIS has not been provided on a regular or substantive basis. Users have been left to their own devices, learning from internal “experts” with prior experience with the ArcView system or through “on-the-job” training, which limits their abilities to make the most of the current features of the GIS. For example:

- a. The Planning and Zoning department has continued to expand its use of GIS through the definition of layers for unused space and watershed areas within the Town. Most of the development and reporting work has been performed by a departmental “expert” as a result of specific needs in the Land Use area. This person came to the department with an understanding of GIS, but also worked closely with the former GIS Coordinator as data layers and reports were developed.
- b. The Assistant Assessor and a contract employee have been given the responsibility for developing GIS reports for department use. Neither person has received formal training on the system and, as a result, relies on their own understanding of how the ArcView system functions to develop the statistical and analytical property reports requested by the Assessor and building appraisers.

As the needs and uses of the GIS expand through other departments, a more formal training program specific to the needs of the Town of Greenwich will be necessary to ensure the system is used effectively.

7. Ownership of GIS Is Not Clear

During our discussions with the departments that use GIS, it was not clear that a project “owner” had been defined for the GIS project. While the IT Department was identified as working with a contractor to ensure the system was maintained, no specific individual with ultimate responsibility for the GIS system was identified. As such, the success of many of the initiatives outlined in the Plangraphics implementation plan is at risk.

In the past, a GIS User’s Committee existed for the purpose of having the various departments work collectively to implement the GIS project. This

body was chaired by the Finance Department and served to help coordinate many of the initial planning and organizational tasks involved in setting up a multi-user GIS system. This committee, however, ceased to function effectively as more responsibilities were assumed by the GIS Coordinator.

With the departure of the GIS Coordinator, The Brodie Group, a GIS consulting firm, was hired to serve this role in a temporary capacity, and has worked with the IT Department to ensure the system continues to meet the current service requirements of the Town, but little additional significant development has occurred.

8. GIS Lacks Effective Project Management

The Town currently does not have a dedicated resource to manage routine and on-going requests and system development, such as.

- Addition of new layers and databases
- Maintenance of current layers and databases
- User training
- Creation of new reports
- Implementation of on-going initiatives, i.e., CAMA integration, digitized zoning maps, land use mapping, etc.

The lack of a GIS Coordinator dedicated to managing the development, maintenance and data quality of the various data layers, user support, training programs, and driving the Town's long-term GIS strategy has had a negative impact on the overall effectiveness of the GIS and the investment made by the Town.

Recommendation – Hire a GIS Coordinator

Managing a complex data system like GIS, especially for a Town the size of Greenwich, requires the attention of a dedicated resource. In order for the Town to attain the level of use and return on investment from the GIS system, a full time resource should be hired or contracted. The GIS Coordinator would be responsible for all of the key tasks required to maintain the current system as well as take “ownership” for enhancing the capabilities and services of the system, including:

- Overall project management
- Database and layer development
- Integration with other applications
- User training

At present, the Brodie Group has been retained to provide basic maintenance on the existing GIS. If the Town decides to extend its contract with the Brodie

Group, the additional services required for further development and expansion of GIS for the Town should be outlined to provide appropriate direction to the consultants fulfilling the Coordinator role.

Recommendation - Reinstate the GIS User Group

As a means of enhancing the effectiveness of the GIS Coordinator’s role and function, the Town should reinstate the GIS User Group. The GIS User Group should be a sub-set of the Town Technology Steering Committee with members representing all of the major GIS user departments (including, but not limited to, Planning and Zoning, Conservation, Assessor, Parks and Recreation, Public Works, Environmental Health, Public Safety). The function of this User Group will be to:

- Provide oversight and direction to the GIS Coordinator for project initiatives
- Identify, discuss and prioritize GIS system needs and requirements common to all departments
- Develop and review policies and procedures for GIS use and development
- Evaluate and make recommendations on GIS funding issues (e.g., wetlands grant)
- Act as a sounding board for departments regarding GIS decisions

A key responsibility of the GIS User Group will be the functional “ownership” of the GIS. The role of Project Sponsor will fall to the User Group chairperson, who will have the ultimate responsibility for the success of the implementation and use of the GIS by the Town. Technical “ownership” should remain with the IT Department to ensure all hardware and software management issues are appropriately addressed.

One of the immediate tasks that should be undertaken by the GIS User Group is to update the current GIS Implementation Plan. Working with the GIS Coordinator, the User Group should review the existing plan to:

- Confirm the current status of stated project tasks
- Identify outstanding technical and operational issues
- Develop steps to complete incomplete activities
- Establish completion dates for all tasks
- Assign responsibilities to ensure accountability
- Revise the plan according to current needs and requirements

The User Group should meet on a regular basis to review the project status and address any issues that may impact the successful completion of the system’s implementation.

Recommendation – Create A Central Service Center

As part of the drive to improve customer assistance, the Town should consider creating a Central Service Center to provide residents with a central, “one-stop” location capable of addressing and processing most basic service issues typically presented to the various Town departments. The Service Center would act not only as a clearinghouse for most standard questions and requests, but would be responsible for:

- Handling of inquiries, service requests, complaints, suggestions, compliments, and staffing for Town Hall Information Desk.
- Timely and accurate response to all requests, usually within 24 hours; with follow-up to ensure customer satisfaction.
- Providing free Public Notary Service
- Maintaining on-line meeting and events calendar information
- Supporting emergency management operations
- Providing maps, directions and referrals to local, state, federal and community-based agencies.
- Distributing municipal publications and forms
- Coordinating the release of e-mails to residents regarding Town activities, programs and time sensitive information
- Community Event and Ticket Information

Staff of the Central Service Center would need to have, at minimum, a basic understanding of the work and information flows critical to the various Town departments. In the event a customer required additional assistance, Service Center staff would refer them to the appropriate department. However, any and all preliminary information would be collected and entered into relevant software systems by the Service Center, allowing departmental staff to focus on the issue at hand and not the data collection process.

In addition, the Central Service Center would have several public PCs available with inquiry level access to key Town systems, such as GIS, ProVal, Tax Collection, ACS and RecTrac. For support, Service Center staff would be trained in these systems to provide direct, hands-on assistance to customers.

9. Limited Fax Capabilities Affects Department Operations

A limited number of fax machines service the departments and organizations within the Town Hall causing problems on several levels, including security, confidentiality and productivity. For departments with sensitive or confidential information (Health, Human Services, Tax Collector, Town Clerk, etc.) this becomes problematic. These departments do not always have a person available to retrieve or send a fax immediately or on demand.

Recommendation - Implement Centralized Faxing Capabilities

One of the benefits of networking technologies is the ability to centralize and share other office automation services, such as the ability to send faxes directly from a user's desktop. By centralizing this function through the Town Hall network and remote locations, user concerns regarding security and confidentiality can be minimized and monitored more closely. If users wish to send an existing paper document, small desktop scanners, such as Visioneer's Paperport, will allow users to quickly scan in documents and direct them to the centralized faxing service or network printer. Several network faxing systems are available, including Castelle and RightFax, that each operate on the Microsoft 2000 Server platform and integrate with the Microsoft Exchange e-mail system. We recommend that the IT Department perform a detailed assessment of each solution based on the technical and functional requirements of the Town.

C. Data Management And Standards

1. Current Forms of Data Management Need Improvements

Technology decisions over the past several years have been predicated on the needs and requirements of individual users and departments. Each group has implemented its own set of solutions to address specific problems, resulting in pockets of repetitive information maintained within and between departments. The result delays the efficient processing of information and increasing the potential for creating dissatisfied customers.

2. Data Storage Methods Need Improvement

Many Town departments maintain and utilize the same information, such as resident name, address, age, phone number, etc. Each department may store that data in one of several formats, including index cards, word processing lists, spreadsheets, PC databases or departmental data systems.

Another problem is where and how this information is stored. Many users currently store data files to their local PC hard drives. In most cases, this has been the result of prior concerns raised by the IT department over available network disk space. While the IT Department resolved this situation, many users continue to store information on their PC hard drives, creating problems when others need to access this information and the lack of effective data backup. For instance:

- a. The Fire Department maintains an MS-Access database that identifies the training received and required for the department. This database was stored on a local PC rather than on the Town network and as such was not backed up on a regular basis.

- b. The Parks and Recreation Q&A program registration database is maintained on a single PC, limiting access by other department users to this information. This PC has not been backed up, which will make it difficult for the department to recover this information in the event this PC is damaged.
- c. The First Selectman's Office maintains many correspondence and documents, including the agendas, minutes and other official documents of public meetings conducted by the Town. All of these files are maintained on the local PCs of the Selectman's Office staff and not on the Town network. These files are also not backed up on a regular basis, and are submitted in hard copy only to the Town Clerk's Office for retention purposes.

Recommendation - Develop Document Storage and Management Standards

Standardizing application development and document formats and managing the placement or location of a document will be extremely important to the Town with the implementation of the Wide Area Network. We recommend that the Town utilize the Technology Steering Committee to establish a core set of standards for the Town as regards to directory and file management. As part of this process, this group should perform the following:

- a. Prior to the development or implementation of any application/database, the Town should confirm that similar information does not exist in another application in another department. This approach will minimize the creation, maintenance and potential inaccuracy of redundant data and enhance the use of any current applications that may serve as the solution for the particular business need.
- b. Prior to the selection of any new data system, the Town should confirm with other departments who might maintain or have use for the data managed by the new application. This approach will help move the Town to more centralized data systems and enhance the return on the technology investment.
- c. The advent of the Wide Area Network increases the sensitivity to effective file and document management. As the number of resources available through the WAN increase, it will be critical that document storage standards be in place. All users will be responsible for storing documents in specified locations (i.e., drives, folders and subfolders) on the Town's network. The Technology Steering Committee should evaluate the current file management approach to develop a unified, high level strategy for all departments, identifying how and where information should be stored, and then communicate these standards to all users. The Committee should then work with the IT Department to ensure adherence to this standard.

By standardizing and centralizing the storage of documents, the Town will minimize duplication of efforts and enhance user access to common documents (assuming a user has the appropriate level of security). In addition, centralizing the storage of documents will improve the Town's data recovery capabilities through nightly back up of all documents on the network.

Please review Section 5.C for additional information on standards.

- d. With the implementation of a document storage strategy, the Town should then develop an archiving strategy that provides direction and guidelines for managing files and data that will be migrated from the main directory structure. This strategy should identify the Town's approach to cycling data from the Town's network to near-line and off-line formats (i.e., optical storage, backup tapes, etc.) and the procedures for accessing this data once archived. In preparing such a strategy, the Town should take into consideration the various legal and management issues that influence the administration of public information including State retention requirements (per Connecticut Statutes and Public Act 97-89) and Freedom of Information Act procedures.

3. Technology-Based Policies and Procedures Are Not Adequate

The Town of Greenwich has adopted some standard policies designed to direct and set employee expectations regarding the use of Town resources. However, with the introduction of new technologies, such as the Internet and the Wide Area Network, specific policies and procedures have not been fully established to ensure consistency of use or the security and effective management of the Town's information. At present, the only documented policy pertains to the use and management of electronic mail.

In addition, the Town does not have a consistent security policy in place. While network security measures are in place as a matter of operating procedure by the IT Department, a documented policy for the Town does not exist. With the implementation of the Wide Area Network, the use of technology and access to information will increase, demanding that more stringent data security measures are adopted within the Town.

Recommendation - Develop Technology and Operational Policies and Procedures

The Town should develop a complete set of standard policies and procedures to secure and protect its information. These policies should be concerned with high-level matters concerning strategy as well as details such as:

- Privacy of personal resident data maintained on Town systems
- Acceptable speed of responses for various forms of inquiries
- Amount and types of information to make available across internal and external networks (e.g., LANs, the WAN and the Town web site)
- Security measures to be taken to protect data
- Who should be given access to different types of data
- Appropriate penalties for abuses of access privileges.

We recommend that the IT Department develop policies and procedures and the Technology Steering Committee approve them in the following areas:

- a. Network Security – Document how network security will be implemented, how often passwords should be changed, and who can share passwords. This document should also identify remote access, other network services, software policies, and file system standards. This policy should also include a statement of employee responsibility for the awareness and protection of Town data.
- b. Internet – Document how the Internet should be utilized within the Town and what types of Internet sites should and should not be accessed. The development of this policy should consider the key business requirements of staff in various Town departments, such as the Health Department, Parks and Recreation, and Public Works.

Appendix 7-C provides some examples of a variety of policies that have been developed. The Technology Steering Committee should consider working with the Board of Education and Town Library to provide consistent messages to employees and residents. Many of these policies may already be documented.

4. Backup of Documents and Applications Is Not Consistently Performed For All Platforms

Critical systems such as GeoTMS, Cornerstone, Proval, and other applications are backed up on a routine basis through the Town’s central network backup system. During our interviews, however, we found that many departments store documents and files on their local PCs rather than to the Town’s network. Because a Town-wide policy on data backup does not exist, backup of these files is inconsistent and not performed on a regular basis. As a result, some key databases and documents across the Town are at risk in the event that a PC crashes or a file becomes unusable (i.e., data corruption).

At the present time, there is no documented disaster recovery procedure in place, departmentally or for the Town. The IT Department is currently developing a comprehensive plan with IBM that addresses the restoration of all Town Hall-based systems. However, any applications outside of Town

Hall, including those on the Police, Library and Board of Education networks, will not be included in this study or final plan.

Recommendation - Document Standard Data Backup and Recovery Policies and Procedures

The Town should document the current standard backup policies and procedures used to protect the data on PCs and networks. Users should understand and appreciate that as long as information is stored on a network, the Town will back up the information on a daily basis. Users should also recognize that if information is stored on a local PC, that they are now responsible for backing up the information and protecting the data themselves. For these situations, standard backup software should be implemented.

Once the Town's Disaster Recovery Plan is implemented, we recommend that the procedures outlined in the plan be tested on a quarterly basis to ensure that all tasks remain applicable to the current technology environment. As new systems are implemented, the Plan should be updated and tested with the necessary procedures for successful recovery.

We also recommend that Disaster Recovery Plans be developed for all locations outside of Town Hall that will continue to maintain networks with mission critical applications and highly sensitive and/or confidential data, specifically the Police Department, the Greenwich Libraries and the Board of Education. The framework of such Plans can follow the Town's approach, identifying all of the key personnel, systems – hardware, software and telecommunications – and vendors particular to that location and the critical steps necessary to ensure the recovery of these systems in the event of an emergency.

Additionally, we recommend that the Town implement a redundant connection to the Internet, such as a high-speed DSL (Digital Subscriber Line) connection, from Town Hall. In the event the WAN should be damaged or Internet access through the WAN becomes unavailable for any reason, the Town would have this secondary access method to provide limited access to key systems via the Internet, e.g., MUNIS.

Recommendation – Perform a Data Security Assessment

We recommend that the Town contract with a data security specialist to perform a comprehensive review of the current controls over Town systems to confirm their effectiveness in the new technology environment of the Wide Area Network. The objective of this assessment will be to review the current approach to data security and identify potential risks to Town data resources. Results of the study should provide recommendations for eliminating exposures to internal and external threats, and enhancing current data security procedures.

5. MUNIS Disaster Recovery Planning Has Not Been Confirmed

According to the MUNIS contract, MUNIS will provide fully redundant telecommunications access to the Town's data with requisite power and hardware to ensure continued access in the event of a disaster or system failure. The chart outlined in Exhibit 9 of the contract provides clear definition of the various risks and failsafe actions for each. However, the Town of Greenwich has not performed an on-site review of the MUNIS data center to confirm that the stated controls are in place. With the increased risks associated with managing the Town's financial data through an Application Service Provider (ASP) over the Internet, these controls need to be assured.

Recommendation – Confirm MUNIS Disaster Recovery Readiness

The release of direct control over the MUNIS software and Town financial data to the MUNIS data center increases the level of risk of interrupted access to the system and Town data. Although we do not doubt the preparedness of MUNIS, we strongly recommend that the Town of Greenwich visit the MUNIS data center to confirm that the replication and fault tolerance of hardware, software and telecommunications meets the Town's expectations. As part of this visit, the Town should also confirm the frequency of backup testing, as well as testing procedures for the data center's disaster recovery plan.

D. Training

1. Employees Have Not Received Adequate Training on Town Applications

Training for the Town of Greenwich has not been consistent with the implementation of key applications. In many cases, staff has received training on systems before computers have been installed in their departments, limiting the effectiveness of the training provided.

This has resulted in the following:

- a. Excessive "on-the-job" training time is spent by each individual to learn certain functions of the implemented software application. This limits a user from taking full advantage of an application's features and functions.
- b. Limited training has minimized the level of standards maintained within the departments and the Town as a whole. As users rely on their own solutions, the Town becomes less able to leverage its resources for standard upgrades or improvements. Additionally, the lack of standards affects the consistent presentation and information provided to Town management, employees and residents.

- c. Users require greater levels of support to answer basic questions on application use. This drain on limited support resources has a domino effect to other more critical projects to which time cannot be committed.
- d. Departments have contracted their own external training programs to meet the needs of their staff.

Recommendation - Implement a Structured Training Program

The Town should develop and implement a regular training program for all major software systems in use, including MUNIS, ArcView GIS, electronic mail, Internet and office automation software. Training should be an ongoing, incremental program throughout the year. It is recommended that with the installation of any new PC, the user should be required to attend a requisite training class demonstrating the operating system, network access, Internet use and standardized file management requirements established by the Town.

In the first year of the plan, all current PC users should be evaluated for skill level within the applications they will use most often. The user should then be assigned to the appropriate training class for those applications. Each training class should contain enough material for a 3 - 4 hour session. Training classes should be tailored to the Town's needs and requirements of that application to ensure that the software is effectively and efficiently utilized. This includes developing a core set of templates that will be used during training.

In addition, the Town's new employee orientation program should include requisite training on the use of technology and systems within the Town. This overview class can be presented by the IT Department to provide new staff with an understanding of the Town's network, general applications (electronic mail, Internet), data management standards (e.g., directory structure, file naming conventions, etc.) and data security.

Recommendation – Ensure IT Staff Attend Regular Technical Training Classes

As the Town begins to implement more sophisticated technologies, such as Windows 2000/XP and the Community Wide Network, it will be crucial that the IT staff regularly attend appropriate training classes to ensure they have the skill sets necessary to sufficiently support these new systems and, most importantly, the Town's users.

We also recommend that IT staff attend key seminars and technical conferences to help keep them current with both existing and new technologies that may benefit the Town. Staff should also be encouraged to obtain any supplemental certifications, such as a Microsoft Certified Software Engineer (MCSE), or expertise with key systems and protocols, such as SQL Server or TCP/IP, that would enhance their level of skills, expertise and ability to provide continuous high quality service to the Town.

V. Implementation

A. Schedule and Costs

We recommend a phased approach to implement the technologies proposed in this Strategic Plan. This approach takes into account the cost and resource constraints the Town faces. By initially developing a core technological foundation for the Town, new hardware, software and other technological capabilities can be implemented incrementally over the next three years. Our plan for the Town of Greenwich includes:

- Year 0 – Current Fiscal Year Implementation
- Year 1 – Complete Technology Infrastructure
- Year 2 – Integrate New Technologies
- Year 3 – Enhance Community-Wide Technologies

Key items for each Year are outlined below. Cost summary and line item detail information is also provided in Exhibit 5-A at the end of this section.

<u>Costs</u>	<u>Year 0</u>	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>
Total	\$1,274,263	\$2,755,380	\$2,803,458	\$2,414,958

Assumptions and Notes:

- The Town of Greenwich has decided to lease computer hardware from Compaq. This includes both servers and personal computers. Because final lease information was unavailable, in order to develop costs for the technology plan, the project team utilized server and computer information from the Compaq website. In particular we configured PCs utilizing Compaq website data and applied a 3 year lease payment schedule with a \$1 buyout option.
- The financial information identified in Year 0 represents on-going technology projects for the current fiscal year. Most of these projects have already been budgeted for with the monies approved and allocated.
- Enclosed is a schedule that outlines proposed personal computer distributions over the next year. Approximately 240 new PCs will be purchased in the current fiscal year (Year 0). In addition, the remaining PCs (approximately 211) with a CPU processor that is greater than 350MHz will be upgraded with MS-Office 2000, virus protection and e-mail.
- One of the key elements of this technology plan is the need to implement standards at the desktop level. Critical to this task, is the need to ultimately replace or upgrade PCs to the Windows 2000 desktop environment. This will allow the IT Department to centrally “push” software and other updates to each desktop without the need to be physically present. Based on this, we assumed that in Year 1, we would replace PCs with 350-650 MHz processors. These replacements would be leased PCs.
- Included in the cost estimates are previously approved and budgeted technology projects. This includes some funding for GIS layer development and the Fleet Department’s software and hardware.

- A dedicated GIS Coordinator MUST be engaged to assist with the implementation of the Town’s GIS technology. This person or consulting group will be instrumental to successfully implement and manage the remaining elements of the GIS plan. We strongly recommend not undertaking new GIS initiatives without committing a dedicated resource to the GIS implementation project.

Year 0 – Current Fiscal Year Implementation

Presently, the Town of Greenwich is well underway in implementing the Wide Area Network (WAN). As identified previously, the WAN will connect all Town Hall departments, Libraries and Schools (including BOE) together electronically. Other major activities included in this current year are:

- New servers are implemented to enhance security and allow the migration of data and some applications to central file servers from remote department locations.
- Among the new servers is a “deployment” server using the Altiris software. This enhances IT’s ability to distribute and upgrade software at the PC level without having to be present at each PC during the installation.
- The Town significantly upgrades the PCs within most departments. Approximately 240 new PCs are leased and other PCs re-distributed within the Town’s departments. Since so many PCs will be leased and re-distributed, we included costs associated with hiring an outside PC/network support resource to assist with the distribution of PCs. We assumed that IT would also commit the necessary resource(s) to assist with the implementation of the new PCs.
- The Town of Greenwich purchases Windows 2000 network client licenses to begin the migration to the Windows 2000 server and desktop environment.
- The Town of Greenwich purchases, upgrades and begins to standardize all office automation software to one version: Microsoft Office 2000. By standardizing on this software product, the Town is now in a position to offer training classes and other related technologies (i.e. templates) to all employees.
- To protect the Town and its employees from viruses and other harmful programs, the Town implements e-mail scanning and filtering services via a third party firm. All e-mail is routed through this outside service, which detects and removes viruses from both inbound and outbound e-mails and attachments in real time - including both known and unknown macro viruses.
- The Town of Greenwich documents a Web Site Strategy designed to significantly enhance their current web site to extend customer services and be more interactive.
- The Building Department will upgrade their current building inspection application (Cornerstone). Costs are included within the plan to upgrade both the software and IVR system.

- A new Fleet Management Software solution is implemented for the Fleet Department. The Fleet Department implements a software product using an Application Services Provider (ASP) model. Training and conversion are provided as part of the implementation.

Year 1 – Complete Technology Infrastructure

By the end of Year 1 the Town should expect to fully implement the WAN, migrating servers, applications and user data, and upgrade PCs on the new network. Major activities included in this year are:

- The Town implements a single DSL Internet connection as a “fail-safe” measure in case Internet access is interrupted for a period of time from LightPath. This is particularly important to ensure access to the MUNIS financial management software via the current ASP model is continually maintained. This 1.54 Mps line will be obtained from a separate and independent Internet Service Provider (ISP).
- In order to enhance standards and minimize the IT Department’s need to continually circulate throughout the Town to correct technical issues on PCs, all desktop computers are migrated to the Windows 2000 desktop and network client. As part of this effort, the Town leases approximately 210 new PCs. As identified in Year 0, since so many PCs will be leased, we included costs associated with hiring an outside PC/network support resource to assist with the distribution of PCs. We assumed that IT would also commit the necessary resource(s) to assist with the implementation of the new PCs.
- A new remote access solution is implemented allowing users not connected directly to the WAN access to critical information. We propose that a Citrix solution be implemented. Citrix MetaFrame provides the power to deploy any application to any device via any network, Internet or wireless connection. By shifting application processing to the server, IT can ensure the rapid, user-friendly deployment of business-critical applications with a higher level of performance predictability.

Citrix can be utilized from various PCs including, Macintosh® computers, UNIX® and Linux® workstations, laptops, wireless devices and other network appliances. It maintains a consistent user experience across the enterprise, complete freedom and mobility, exceptional speed and simplified management. See Appendix 7.E for additional information.

- Microsoft Exchange E-mail is implemented for all network users, replacing the existing Novell Groupwise system. Training is provided to all users to help them better utilize this tool. In addition, this training will provide a forum to set “e-mail” use expectations. As the Town will be moving to Microsoft Exchange, a single e-mail platform should be adopted across all locations, including the Board of Education and Town Libraries, to simplify system maintenance and synchronization of a common address book for all Town email addresses.

- Integrated with the new e-mail solution is centralized faxing. Town employees will be able to fax and receive documents at the desktop through this solution. Faxes received can be transferred directly to an employee’s unified mailbox, minimizing the need to manually retrieve these incoming documents.
- A formalized training program will be introduced to Town employees, which provides Windows 2000 and MS-Office training to users. Appropriate training will also be provided to users as additional capabilities are introduced within the MUNIS software (i.e. purchase order requisition, electronic budgeting).
- Prior to the implementation of the MUNIS Tax Collection software (part of the current MUNIS ASP lease program), the Town should initiate a “mini” software selection project. Although the intent of this project is not to select a different tax software system, we are recommending a review of the functional capabilities of the MUNIS module. This will help alleviate staff concerns during the implementation phase and eliminate any “surprises” or configuration issues up-front.
- A GIS Coordinator is contracted to work with a GIS Steering Committee to develop an implementation schedule based on the current progress of tasks in order to enhance the current GIS system.
- The GIS Coordinator provides additional GIS training to key users of the GIS system. The GIS Coordinator also develops basic training courses for general users.
- Based on the Web-Site Strategy, the Town identifies a full-time web-designer to begin the development and implementation of a new web site. Over the next several years, the Town creates the Greenwich “Virtual Town Hall”, consolidating and enhancing the services of the various web sites maintained by the Town.
- The Department of Public Works upgrades the existing Autodesk software to the most current version. This Department also signs-up for on-going maintenance releases for these software modules.
- The Law Department obtains additional training on their current software solution, “Time Matters”. New management reports are created to better utilize the information captured within the system.
- The Planning and Zoning Department hires an outside consultant to perform a software selection project for a “permitting” software system. As part of this initiative, system requirements for other departments involved in the permitting process are considered including: Building Inspection, Conservation, Wetlands and Health, as well as integration with the GIS.

Please note: the current GEOTMS software that was purchased prior to this report may not be the “right” solution. The aforementioned task will help to confirm or deny the best way to proceed with an integrated permitting solution.

Year 2 – Integrate New Technologies

Once the WAN infrastructure is in place and working flawlessly, the Town will initiate additional technologies and applications. As part of Year 2, the following initiatives will be implemented.

- On-going training is provided to users that receive the new PCs and Microsoft Office applications.
- Following the implementation plan, the GIS Coordinator and GIS Steering Committee continue to enhance the GIS system.
- Additional GIS training is provided to other key users of the GIS system.
- The Town of Greenwich continues to enhance their current Website.
- After the review of various “permitting” applications, the Planning and Zoning Department (along with other key departments) either selects a new application or decides to continue with the current GEOTMS software solution. The current plan addresses all customizations and includes all costs associated with implementing a new solution.
- The Fire Department currently uses Fire Management Software that is no longer supported by the original vendor (no longer in business). As a result, the current application is internally maintained by Fire Department staff. Since reporting requirements and functional capabilities are constantly changing, we recommend a new Fire Management Software solution be selected and implemented. As part of this effort, a software selection project would be initiated to identify the best solution for the Town of Greenwich Fire Department. Once selected, the software would be implemented within the same year.
- In order to enhance efficiency, the Law Department “pilots” integrating the use of PDA technology with the ‘Time Matters’ software system. A PDA will help the attorneys better schedule their daily activities in and out of court as well as provide them with immediate access to client and conflict information. The use of PDAs should be precipitated on the support for these devices by the ‘Time Matters’ software. Although the specific requirements will be dictated by ‘Time Matters’, we recommend utilizing the Windows CE operating system as it can directly interface with Citrix for remote access to Town information resources.
- Utilizing the Town’s GIS, the Police Department implements the HTE Public Safety system interface for the ESRI GIS system. Police are able to track incidents by location and view trends by different incident types.
- The Parks and Recreation Department enhances the capabilities of the current RecTrac software and implements the Photo-ID solution for the Marina. This could be used as a “pilot” program to confirm not only how well the system works, but also the practical usage of photo-ids within the Town.

Year 3 – Enhance Community Technologies

Once the WAN and other technologies become an integral part of each employee's daily activities, new community-based initiatives can be implemented. The infrastructure for a community-wide network will be in place and fully operational. Initial development of an Intranet/Extranet will begin. Residents will also have the ability to obtain more detailed information from Town departments, programs and issues via the Extranet. Tasks performed during this Year include:

- On-going training is provided to users that receive the new PCs and Microsoft Office applications.
- Following the implementation plan, the GIS Coordinator and GIS Steering Committee continue to enhance the GIS system. General information about the Town's parcels through the GIS is provided over the Internet. Privacy of resident information is maintained.
- The Town of Greenwich continues to enhance their current Website and begins to build an Extranet site.
- After implementation of the new Fire Management Software, the Fire Department should, if supported by the new software, consider introducing PDA hand-held devices. This wireless technology would serve several purposes. First, it would be used as a telephone in the field allowing inspectors and key fire officials constant in-field communications. It would also serve as a vehicle for inspectors to record inspections directly in the field and update the information in-house quickly and easily. It can also be used in the field as a hand-held device to access the Town's network and GIS system.
- A software selection project is initiated for a new Nursing Home management system for Nathaniel Witherell. As part of this initiative, an outside consultant is hired to help with the selection process. Once selected, the software would be implemented within the same year.
- The Park and Recreation Department enhances the capabilities of the current RecTrac software and implements the registration for various programs over the Internet. This would allow residents to sign-up for programs 24 hours a day, 7 days a week. Credit card processing for payments could also be implemented.

B. Policies/Procedures/Guidelines

In order to successfully implement a Community-wide network, proper controls and procedures need to be in place to ensure the integrity and accuracy of information. As such, all users must understand their roles and responsibilities when using the technologies and/or accessing Town information on the network.

Presently the Town of Greenwich has successfully implemented an Electronic Mail policy that employees are required to sign. However, there are several other similar policy recommendations that should be addressed. The areas are:

- Network Usage
- Internet/World Wide Web

It is difficult to recommend a policy without directly involving Town of Greenwich employees as well as the First Selectman's Office. The process of enhancing the policies and practices should be undertaken by a core group of people directly involved in the management of information systems, with final approval from the First Selectman's Office. We recommend the Technology Committee take responsibility for this task. Instead of creating policies for the Town, we have incorporated into the appendix several policies and guidelines created by other organizations that address similar needs. Outlined in Appendix 7-C are examples of these policies and guidelines.

We have, however, outlined key items that should be incorporated into a new policy, procedures and guidelines statement. They are as follows:

1. All user passwords will be held in strict confidence and will not be shared with either Town employees or residents.
2. Users will be held responsible and accountable for any non-business use of the Town's technologies.
3. User access to the Internet should be for professional and/or business purposes only. In addition, users should be prevented from accessing inappropriate Internet sites.
4. E-mails sent through the Internet must be initiated using the Town of Greenwich's internal electronic mail system.
5. Users should assume that their e-mails are being monitored.
6. Attempts to access unauthorized information or networks are strictly prohibited.

C. Standards

1. Document Management

Standardizing document formats and managing the placement or location of a document will be extremely important to the Town. As previously identified, there have been times when a department could not easily locate a document or had multiple formats for the same type of document. We recommend that the Town take advantage of the Technology Committee (or subcommittee) to establish a core set of standards for the Town. As part of this process, this group should:

- a) Develop standard document naming conventions so users can store and retrieve information easily. Take advantage of the “long file naming” convention used in Windows NT/2000. Having a long document/file name can be advantageous if used properly. Clearly, it is important for all users, departments and groups to standardize the naming conventions.
- b) Develop a document storage standard. This means that all users will be responsible for storing documents in specified locations (i.e., drives, folders and subfolders) on the Town’s network. The Committee should establish how and where information is stored. By standardizing and centralizing the storage of documents, the Town will minimize duplication of effort and enhance users’ capabilities to access documents (assuming a user has the appropriate level of security). In addition, centralizing the storage of documents will improve the Town’s data recovery capabilities by backing up all documents each night on the network.
- c) Identify a core set of document “templates” (standard documents) that establish and set the formats for the entire Town. When a particular type of document is created, it will have the same “look and feel” from one user to another, as well as from one department to another.
- d) Confirm the person or group that will be responsible for creating the templates as outlined by the Technology Committee. The templates should be tested and confirmed to be correct before distribution to users. Users should also be trained on the use and implementation of the standard templates.
- e) Identify a mechanism to distribute and update these templates on users’ PCs so that when a document type is selected, the most recent version is used. As the Town implements the Windows 2000 platform, this process will get easier due to the inherent workstation management capabilities of these operating systems.

2. Equipment

As part of this project, we reviewed a variety of hardware configurations for the Town. As identified in the recommendations section, we support the implementation of Windows 2000 as the PC client and Windows 2000 as the primary network operating system software for the server.

As previously mentioned the Town will be leasing computer equipment (servers and personal computers) from Compaq. It is the project teams understanding that the equipment will be leased for three years. As technology continues to rapidly change, the Town must consider how new operating systems (i.e. Windows XP) will impact their overall operations. In particular, as the Town leases new equipment in Year 2 and beyond, there will be a point in time where

Windows 2000 will not longer be available as the standard desktop operating system. As a result, the IT Department must test these new operating systems with the current compliment of applications prior to their implementation in order to understand potential issues or problems.

D. Freedom of Information and Privacy Constraints

Please Note: The information provided below is the opinion of Blum Shapiro Consulting only. The reader is advised to consult the Connecticut General Statutes and the Law Department of the Town of Greenwich for official codification of the law.

During the information-gathering phase of this project, it became apparent that there was a general concern about access to resident information both internally and via the Internet. It was also clear during these discussions that there was inconsistency on how information requests were fulfilled given the general constraints identified with Connecticut's Freedom of Information legislation. Overall Town officials, Town employees and residents were concerned about the type of information provided or made available to the general public.

Although the Freedom of Information Act is quite extensive, for purposes of discussion the following excerpt provides a brief overview of computer related public records information:

Sec. 1-211. (Formerly Sec. 1-19a). Disclosure of computer-stored public records. Contracts. Acquisition of system, equipment, software to store or retrieve nonexempt public records. (a) Any public agency which maintains public records in a computer storage system shall provide, to any person making a request pursuant to the Freedom of Information Act, a copy of any nonexempt data contained in such records, properly identified, on paper, disk, tape or any other electronic storage device or medium requested by the person, if the agency can reasonably make such copy or have such copy made. Except as otherwise provided by state statute, the cost for providing a copy of such data shall be in accordance with the provisions of section 1-212.

The Freedom of Information Act does not require the disclosure of information in the following situations:

- Preliminary draft documents
- Personnel or medical files
- Records of law enforcement agencies
- Records pertaining to strategy and negotiations with respect to pending claims or pending litigation
- Trade secrets
- Commercial or financial information given in confidence

- Test questions (i.e. Licensing examination)
- Privileged attorney-client relationship information
- Names or addresses of students enrolled in public school
- Information technology records that could compromise the security or integrity of a technology system

We recommend that the Town officials, in conjunction with the First Selectman's Office develop standards for information requests. In particular, we would recommend that resident based information (i.e., owner, address, etc.) be made available only through the current information access terminals at Town Hall. As part of this recommendation, we suggest that no reports (paper or electronic format) or specific requests to "list" information across the entire Town be made available to the general public. Clearly "the public" can still request individual parcel information, as is done currently, but generalized requests for Town wide parcel lists of information should not be fulfilled. Although this may be an inconvenience to some Town residents, this should allow the Town to maintain FOI requirements and not set precedence for information requests.

We would also recommend that no detailed Assessor information be made available through the Internet. However, this does not mean that the Town of Greenwich should not consider implementing "Virtual Town Hall" capabilities on their Internet site. On the contrary, we strongly encourage use of the Internet/Extranet to disseminate information, albeit in a controlled and appropriate manner. Examples of this would be as follows:

- Town of Greenwich community calendar
- Application of simple building permits on-line
- Access to permit status information
- Registration for Park and Recreation and Senior Center programs
- Access to all forms, applications and requests for proposals
- Code enforcement on-line entry
- Public notices
- Resident feedback
- GIS digital map information

The overall goal of creating the Town of Greenwich "Virtual Town Hall" is to allow resident's access to Town related programs, services and/or information, while affording the same protections and controls to individual resident information that would be found in Town Hall itself.

Strategic Technology Plan
Proposed Costs By Year
As of February 2002

	Annual Cost	Current Fiscal Year Implementation			Complete Technology Infrastructure			Integrate New Technologies			Enhance Community Technologies		
		Year 0			Year 1			Year 2			Year 3		
		Unit	Unit Price	Total Price	Unit	Unit Price	Total Price	Unit	Unit Price	Total Price	Unit	Unit Price	Total Price
Town of Greenwich - Department													
1. Assessor's Office													
Lease Standard PCs	✓	11	\$ 549	\$ 6,039	11	\$ 549	\$ 6,039	11	\$ 549	\$ 6,039	11	\$ 549	\$ 6,039
Lease Standard PCs (Replace 350Mhz - 750Mhz PCs)	✓				10	\$ 549	\$ 5,490	10	\$ 549	\$ 5,490	10	\$ 549	\$ 5,490
MS-Office Software Maintenance	✓	21	\$ 47	\$ 977	21	\$ 93	\$ 1,953	21	\$ 93	\$ 1,953	21	\$ 93	\$ 1,953
Purchase Additional PCs for Use at Counter	✓				2	\$ 549	\$ 1,098	2	\$ 549	\$ 1,098	2	\$ 549	\$ 1,098
2. BET -MIS													
Wide Area Network Usage Cost	✓	1	\$ 496,207	\$ 496,207	1	\$ 992,414	\$ 992,414	1	\$ 992,414	\$ 992,414	1	\$ 670,214	\$ 670,214
Greenwich Failsafe Internet Connection (DSL Connection) - 1.54 Mbps Annual Cost	✓				1	\$ 2,160	\$ 2,160	1	\$ 2,160	\$ 2,160	1	\$ 2,160	\$ 2,160
Purchase Altiris Deployment Software Management System		242	\$ 27	\$ 6,534	211	\$ 27	\$ 5,697						
Purchase Altiris Software Maintenance	✓	242	\$ 8	\$ 1,936	453	\$ 8	\$ 3,624	453	\$ 8	\$ 3,624	453	\$ 8	\$ 3,624
Implement Centralized Fax Services Annual Maintenance	✓				1	\$ 1,600	\$ 1,600	1	\$ 1,600	\$ 1,600	1	\$ 1,600	\$ 1,600
Implement Remote Access Connectivity Purchase and Implement Citrix Server	✓				1	\$ 10,380	\$ 10,380	1	\$ 10,380	\$ 10,380	1	\$ 10,380	\$ 10,380
Annual Maintenance	✓				1	\$ 1,000	\$ 1,000	1	\$ 1,000	\$ 1,000	1	\$ 1,000	\$ 1,000
Virus Protection Software Annual Support	✓	1	\$ 4,250	\$ 4,250	1	\$ 8,500	\$ 8,500	1	\$ 8,500	\$ 8,500	1	\$ 8,500	\$ 8,500
Implement Central Email Capabilities Exchange Server	✓				1	\$ 10,380	\$ 10,380	1	\$ 10,380	\$ 10,380	1	\$ 10,380	\$ 10,380
Third Party Mail Scanning/Filtering Virus Protection	✓	453	\$ 12	\$ 5,436	453	\$ 24	\$ 10,872	453	\$ 24	\$ 10,872	453	\$ 24	\$ 10,872
Obtain Consulting services to Assist with Email Migration					1	\$ 9,000	\$ 9,000						
Webmaster Internal Support Resource (with salary & benefits)	✓				1	\$ 62,500	\$ 62,500	1	\$ 65,625	\$ 65,625	1	\$ 68,906	\$ 68,906
Implement Extranet Access Capabilities Extranet Software Server	✓										1	\$ 5,808	\$ 5,808
Administrative Services Lease Standard PCs	✓	3	\$ 549	\$ 1,647	3	\$ 549	\$ 1,647	3	\$ 549	\$ 1,647	3	\$ 549	\$ 1,647
Lease Standard PCs (Replace 350Mhz - 750Mhz PCs)	✓				1	\$ 549	\$ 549	1	\$ 549	\$ 549	1	\$ 549	\$ 549
MS-Office Software Maintenance	✓	4	\$ 47	\$ 186	4	\$ 93	\$ 372	4	\$ 93	\$ 372	4	\$ 93	\$ 372
Lease Standard PCs	✓	11	\$ 549	\$ 6,039	11	\$ 549	\$ 6,039	11	\$ 549	\$ 6,039	11	\$ 549	\$ 6,039
Lease Standard PCs (Replace 350Mhz - 750Mhz PCs)	✓				16	\$ 549	\$ 8,784	16	\$ 549	\$ 8,784	16	\$ 549	\$ 8,784
MS-Office Software Maintenance	✓	29	\$ 47	\$ 1,349	29	\$ 93	\$ 2,697	29	\$ 93	\$ 2,697	29	\$ 93	\$ 2,697
GIS Internal Support Resource (with salary & benefits)	✓				1	\$ 93,750	\$ 93,750	1	\$ 98,438	\$ 98,438	1	\$ 103,359	\$ 103,359
Lease Professional Workstation for GIS Coordinator	✓				1	\$ 1,098	\$ 1,098	1	\$ 1,098	\$ 1,098	1	\$ 1,098	\$ 1,098
Purchase Office Automation Licenses Upgrade Cost For MS-Office 97 Professional to XP		2	\$ 235	\$ 470									
Upgrade Cost For MS-Office 2000 Professional to XP		28	\$ 235	\$ 6,580									
Replacement Cost for MS-Office Standard		267	\$ 320	\$ 85,440									
Additional MS-Office Licenses Required		146	\$ 320	\$ 46,720									

Strategic Technology Plan
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As of February 2002

Annual Cost	Current Fiscal Year Implementation			Complete Technology Infrastructure			Integrate New Technologies			Enhance Community Technologies		
	Year 0			Year 1			Year 2			Year 3		
	Unit	Unit Price	Total Price	Unit	Unit Price	Total Price	Unit	Unit Price	Total Price	Unit	Unit Price	Total Price
Implement Exchange Email Service												
Exchange Server License				1	\$ 3,950	\$ 3,950						
Exchange Client Licenses				453	\$ 59	\$ 26,727						
Obtain Consulting services to Assist with Email Migration				1	\$ 9,000	\$ 9,000						
Purchase Windows 2000 Client Licenses	242	\$ 30	\$ 7,260	211	\$ 30	\$ 6,330						
General Training - Microsoft Office												
- Windows 2000 Course				24.2	\$ 450	\$ 10,890	20	\$ 450	\$ 9,090	10	\$ 450	\$ 4,500
- File Management, Network Usage, Printing Course				44.4	\$ 225	\$ 9,990						
- Introduction to MS-Word Course				24.2	\$ 450	\$ 10,890	20	\$ 450	\$ 9,090	10	\$ 450	\$ 4,500
- Intermediate MS-Word Course				12.1	\$ 450	\$ 5,445	10	\$ 450	\$ 4,545	5	\$ 450	\$ 2,250
- Advanced MS-Word Course				6	\$ 450	\$ 2,723	2	\$ 450	\$ 900	3	\$ 450	\$ 1,125
- Introduction to MS-Excel Course				24.2	\$ 450	\$ 10,890	20	\$ 450	\$ 9,090	10	\$ 450	\$ 4,500
- Intermediate MS-Excel Course				12.1	\$ 450	\$ 5,445	10	\$ 450	\$ 4,545	5	\$ 450	\$ 2,250
- Advanced MS-Excel Course'				6	\$ 450	\$ 2,723	2	\$ 450	\$ 900	3	\$ 450	\$ 1,125
- Introduction to MS-PowerPoint Course				12.1	\$ 450	\$ 5,445	10	\$ 450	\$ 4,545	5	\$ 450	\$ 2,250
- Intermediate MS-Powerpoint Course				6	\$ 450	\$ 2,723	2	\$ 450	\$ 900	3	\$ 450	\$ 1,125
-Outlook/Email				44.4	\$ 225	\$ 9,990						
GIS Database Development				1	\$ 228,000	\$ 228,000	1	\$ 228,000	\$ 228,000	1	\$ 228,000	\$ 228,000
(See "GIS Info" Schedule for additional information)												
GIS Software Maintenance												
- Arcview GIS	✓			20	\$ 349	\$ 6,980	20	\$ 349	\$ 6,980	20	\$ 349	\$ 6,980
- ArcCAD	✓			1	\$ 225	\$ 225	1	\$ 225	\$ 225	1	\$ 225	\$ 225
- Map Objects IMS	✓			1	\$ 1,000	\$ 1,000	1	\$ 1,000	\$ 1,000	1	\$ 1,000	\$ 1,000
- Arc/Info	✓			1	\$ 3,000	\$ 3,000	1	\$ 3,000	\$ 3,000	1	\$ 3,000	\$ 3,000
- SDE for SQL Server	✓			1	\$ 3,000	\$ 3,000	1	\$ 3,000	\$ 3,000	1	\$ 3,000	\$ 3,000
- SDE for SQL Server Maintenance and Tech Support	✓			5	\$ 1,150	\$ 5,750	5	\$ 1,150	\$ 5,750	5	\$ 1,150	\$ 5,750
GIS Training												
- ArcView				5	\$ 800	\$ 4,000	1	\$ 800	\$ 800	1	\$ 800	\$ 800
- ArcCAD				2	\$ 800	\$ 1,600	2	\$ 800	\$ 1,600	1	\$ 800	\$ 800
- Advanced Arc/Info				2	\$ 1,800	\$ 3,600	2	\$ 1,800	\$ 3,600	1	\$ 1,800	\$ 1,800
- SDE (Prog/Admin)				2	\$ 2,000	\$ 4,000	1	\$ 2,000	\$ 2,000	1	\$ 2,000	\$ 2,000
- Introduction to MO IMS (Inter/Intranet)				5	\$ 500	\$ 2,500	2	\$ 500	\$ 1,000	1	\$ 500	\$ 500
Additional Network Servers												
Domain Controller-GHTDC1		1	\$ 13,567	\$ 13,567								
Domain Controller-GHTDC2		1	\$ 13,567	\$ 13,567								
Deployment Server - Altris		1	\$ 13,567	\$ 13,567								
Main File and Print		1	\$ 22,321	\$ 22,321								
VPN Server - Redeployment of Firewall Server						No-Charge						
Purchase Miscellaneous Items	1	\$ 9,500	\$ 9,500	1	\$ 9,500	\$ 9,500						
Purchase Centralized Fax Services				1	\$ 8,000	\$ 8,000						
Implementation and Support Assistance												
Support with the implementation of New PCs (hourly)	460.8	\$ 100	\$ 46,075	252.5	\$ 100	\$ 25,250						
Implement Remote Access Connectivity												
Purchase and Implement Citrix				1	\$ 8,900	\$ 8,900						
Upgrade Town of Greenwich Web-site												
Web-site Development				1	\$ 30,000	\$ 30,000	1	\$ 15,000	\$ 15,000	1	\$ 15,000	\$ 15,000
Perform Network Security Study				1	\$ 85,000	\$ 85,000						

Strategic Technology Plan
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As of February 2002

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		Year 0			Year 1			Year 2			Year 3		
		Unit	Unit Price	Total Price	Unit	Unit Price	Total Price	Unit	Unit Price	Total Price	Unit	Unit Price	Total Price
3. Commission on Aging													
Lease Standard PCs	✓	2	\$ 549	\$ 1,098	2	\$ 549	\$ 1,098	2	\$ 549	\$ 1,098	2	\$ 549	\$ 1,098
MS-Office Software Maintenance	✓	2	\$ 47	\$ 93	2	\$ 93	\$ 186	2	\$ 93	\$ 186	2	\$ 93	\$ 186
3. Community Development													
Lease Standard PCs (Replace 350Mhz - 750Mhz PCs)	✓				2	\$ 549	\$ 1,098	2	\$ 549	\$ 1,098	2	\$ 549	\$ 1,098
MS-Office Software Maintenance	✓	2	\$ 47	\$ 93	2	\$ 93	\$ 186	2	\$ 93	\$ 186	2	\$ 93	\$ 186
4. Conservation Commission													
Lease Standard PCs (Replace 350Mhz - 750Mhz PCs)	✓				2	\$ 549	\$ 1,098	2	\$ 549	\$ 1,098	2	\$ 549	\$ 1,098
MS-Office Software Maintenance	✓	2	\$ 47	\$ 93	2	\$ 93	\$ 186	2	\$ 93	\$ 186	2	\$ 93	\$ 186
5. Department of Public Works													
Lease Standard PCs	✓	42	\$ 549	\$ 23,058	42	\$ 549	\$ 23,058	42	\$ 549	\$ 23,058	42	\$ 549	\$ 23,058
Lease High-end PCs	✓	9	\$ 1,098	\$ 9,882	9	\$ 1,098	\$ 9,882	9	\$ 1,098	\$ 9,882	9	\$ 1,098	\$ 9,882
Lease Standard PCs (Replace 350Mhz - 750Mhz PCs)	✓				11	\$ 549	\$ 6,039	11	\$ 549	\$ 6,039	11	\$ 549	\$ 6,039
MS-Office Software Maintenance	✓	63	\$ 47	\$ 2,930	63	\$ 93	\$ 5,859	63	\$ 93	\$ 5,859	63	\$ 93	\$ 5,859
Upgrade Existing Engineering Software													
Autodesk Land Development					4	\$ 445	\$ 1,780						
Autodesk Civil Design					4	\$ 295	\$ 1,180						
Autodesk Survey					4	\$ 145	\$ 580						
Autodesk CAD Overlay					4	\$ 80	\$ 320						
PondPack					1	\$ 4,995	\$ 4,995						
Culvert Master					1	\$ 795	\$ 795						
HEC-HMS					1	\$ 995	\$ 995						
Maintenance of Autodesk Software Existing Engineering Software													
Autodesk Land Development	✓							4	\$ 150	\$ 600	4	\$ 150	\$ 600
Autodesk Civil Design	✓							4	\$ 150	\$ 600	4	\$ 150	\$ 600
Autodesk Survey	✓							4	\$ 150	\$ 600	4	\$ 150	\$ 600
Autodesk CAD Overlay	✓							4	\$ 150	\$ 600	4	\$ 150	\$ 600
Upgrade Cornerstone Software (May not be required)													
Purchase of IVR Hardware								1	\$ 9,500	\$ 9,500			
Application Software								1	\$ 12,500	\$ 12,500			
Migration services(Data Conversion, Installation, Consulting)								1	\$ 4,000	\$ 4,000			
Upgrade Cornerstone Software System (May not be required)													
Cornerstone Software Server	✓							1	\$ 5,808	\$ 5,808	1	\$ 5,808	\$ 5,808
Cornerstone Software Training								1	\$ 8,000	\$ 8,000			
Cornerstone Software Maintenance Agreement	✓							1	\$ 2,500	\$ 2,500	1	\$ 2,500	\$ 2,500
Purchase Additional PC For Counter	✓				1	\$ 549	\$ 549	1	\$ 549	\$ 549	1	\$ 549	\$ 549
Purchase PDA For Scheduling and Building Inspections Entry													
Hand Held Wireless Windows CE Device											5	\$ 250	\$ 1,250
6. Office of Comprollers													
Lease Standard PC	✓	17	\$ 549	\$ 9,333	17	\$ 549	\$ 9,333	17	\$ 549	\$ 9,333	17	\$ 549	\$ 9,333
Lease Standard PCs (Replace 350Mhz - 750Mhz PCs)	✓				8	\$ 549	\$ 4,392	8	\$ 549	\$ 4,392	8	\$ 549	\$ 4,392
MS-Office Software Maintenance	✓	25	\$ 47	\$ 1,163	25	\$ 93	\$ 2,325	25	\$ 93	\$ 2,325	25	\$ 93	\$ 2,325
Purchase Treasury PCs													
Lease Standard PC	✓	3	\$ 549	\$ 1,647	3	\$ 549	\$ 1,647	3	\$ 549	\$ 1,647	3	\$ 549	\$ 1,647
MS-Office Software Maintenance	✓	3	\$ 47	\$ 140	3	\$ 93	\$ 279	3	\$ 93	\$ 279	3	\$ 93	\$ 279
Financial Munis Software (GL, AP, AR, FA, PR)	✓	1	\$ 334,500	\$ 334,500	1	\$ 334,500	\$ 334,500	1	\$ 334,500	\$ 334,500	1	\$ 334,500	\$ 334,500
Tax & Sewer Billing Munis Software	✓				1	\$ 46,008	\$ 46,008	2	\$ 46,008	\$ 92,016	2	\$ 46,008	\$ 92,016
Tax Assessment Munis Software	✓				1	\$ 61,500	\$ 61,500	3	\$ 61,500	\$ 184,500	3	\$ 61,500	\$ 184,500
Munis Software Training													
Additional Training Days					18	\$ 1,020	\$ 18,360	9	\$ 1,020	\$ 9,180	4.5	\$ 1,020	\$ 4,590

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		Year 0			Year 1			Year 2			Year 3		
		Unit	Unit Price	Total Price	Unit	Unit Price	Total Price	Unit	Unit Price	Total Price	Unit	Unit Price	Total Price
7. Fire Department													
Lease Standard PC	✓	13	\$ 549	\$ 7,137	13	\$ 549	\$ 7,137	13	\$ 549	\$ 7,137	13	\$ 549	\$ 7,137
Lease Standard PCs (Replace 350Mhz - 650Mhz PCs)	✓				1	\$ 549	\$ 549	1	\$ 549	\$ 549	1	\$ 549	\$ 549
MS-Office Software Maintenance	✓	14	\$ 47	\$ 651	14	\$ 93	\$ 1,302	14	\$ 93	\$ 1,302	14	\$ 93	\$ 1,302
Implement a New Fire Management System													
Perform Software Selection (outside vendor)								1	\$ 70,000	\$ 70,000			
Application Software								1	\$ 14,000	\$ 14,000			
Migration services(Data Conversion, Installation, Consulting)								1	\$ 7,000	\$ 7,000			
Implement Fire Management Software													
Fire Management Software Server	✓							1	\$ 5,808	\$ 5,808	1	\$ 5,808	\$ 5,808
Fire Management Training								1	\$ 7,000	\$ 7,000			
Fire Management Software Maintenance Agreement	✓							1	\$ 12,600	\$ 12,600	1	\$ 12,600	\$ 12,600
Purchase PDA To Remotely Access Network													
Hand Held Windows CE Device											10	\$ 650	\$ 6,500
Purchase Laser Printer					1	\$ 2,950	\$ 2,950						
8. Fleet													
Lease Standard PCs	✓	3	\$ 549	\$ 1,647	3	\$ 549	\$ 1,647	3	\$ 549	\$ 1,647	3	\$ 549	\$ 1,647
Lease Standard PCs (Replace 350Mhz - 650Mhz PCs)	✓				5	\$ 549	\$ 2,745	5	\$ 549	\$ 2,745	5	\$ 549	\$ 2,745
MS-Office Software Maintenance	✓	8	\$ 47	\$ 372	8	\$ 93	\$ 744	8	\$ 93	\$ 744	8	\$ 93	\$ 744
Implement a New Fleet Management System													
Perform Software Selection (outside vendor)					1	\$ 25,000	\$ 25,000						
Application Software					1	\$ 50,000	\$ 50,000						
Migration services(Data Conversion, Installation, Consulting)					1	\$ 10,000	\$ 10,000						
Implement Fleet Management System													
Fleet Management Software Server	✓				1	\$ 5,808	\$ 5,808	1	\$ 5,808	\$ 5,808	1	\$ 5,808	\$ 5,808
Fleet Management Training					1	\$ 5,000	\$ 5,000						
Fleet Management ASP Software	✓				1	\$ 9,000	\$ 9,000	1	\$ 9,000	\$ 9,000	1	\$ 9,000	\$ 9,000
9. Health													
Lease Standard PCs	✓	40	\$ 549	\$ 21,960	40	\$ 549	\$ 21,960	40	\$ 549	\$ 21,960	40	\$ 549	\$ 21,960
Lease Standard PCs (Replace 350Mhz - 650Mhz PCs)	✓				9	\$ 549	\$ 4,941	9	\$ 549	\$ 4,941	9	\$ 549	\$ 4,941
MS-Office Software Maintenance	✓	49	\$ 47	\$ 2,279	49	\$ 93	\$ 4,557	49	\$ 93	\$ 4,557	49	\$ 93	\$ 4,557
10. Human Resources													
Lease Standard PCs	✓	6	\$ 549	\$ 3,294	6	\$ 549	\$ 3,294	6	\$ 549	\$ 3,294	6	\$ 549	\$ 3,294
Lease Standard PCs (Replace 350Mhz - 750Mhz PCs)	✓				7	\$ 549	\$ 3,843	7	\$ 549	\$ 3,843	7	\$ 549	\$ 3,843
MS-Office Software Maintenance	✓	13	\$ 47	\$ 605	13	\$ 93	\$ 1,209	13	\$ 93	\$ 1,209	13	\$ 93	\$ 1,209
11. Inland Wetlands													
Lease Standard PCs	✓	3	\$ 549	\$ 1,647	3	\$ 549	\$ 1,647	3	\$ 549	\$ 1,647	3	\$ 549	\$ 1,647
Lease Standard PCs (Replace 350Mhz - 650Mhz PCs)	✓				6	\$ 549	\$ 3,294	6	\$ 549	\$ 3,294	6	\$ 549	\$ 3,294
MS-Office Software Maintenance	✓	9	\$ 47	\$ 419	9	\$ 93	\$ 837	9	\$ 93	\$ 837	9	\$ 93	\$ 837
12. Law													
Lease Standard PCs	✓	1	\$ 549	\$ 549	1	\$ 549	\$ 549	1	\$ 549	\$ 549	1	\$ 549	\$ 549
Lease Standard PCs (Replace 350Mhz - 650Mhz PCs)	✓				11	\$ 549	\$ 6,039	11	\$ 549	\$ 6,039	11	\$ 549	\$ 6,039
MS-Office Software Maintenance	✓	12	\$ 47	\$ 558	12	\$ 93	\$ 1,116	12	\$ 93	\$ 1,116	12	\$ 93	\$ 1,116
Additional Time Matters Software Training					2	\$ 1,000	\$ 2,000						
Purchase PDA For Scheduling and Access to Client Database													
Hand Held Wireless Windows CE Device								5	\$ 250	\$ 1,250			
Develop Time Matter Software Reports (10 reports)					10	\$ 350	\$ 3,500						

Strategic Technology Plan
Proposed Costs By Year
As of February 2002

	Annual Cost	Current Fiscal Year Implementation			Complete Technology Infrastructure			Integrate New Technologies			Enhance Community Technologies		
		Year 0			Year 1			Year 2			Year 3		
		Unit	Unit Price	Total Price	Unit	Unit Price	Total Price	Unit	Unit Price	Total Price	Unit	Unit Price	Total Price
13. Nathaniel Witherell													
Lease Standard PCs	✓	1	\$ 549	\$ 549	1	\$ 549	\$ 549	1	\$ 549	\$ 549	1	\$ 549	\$ 549
Lease Standard PCs (Replace 350Mhz - 650Mhz PCs)	✓				30	\$ 549	\$ 16,470	30	\$ 549	\$ 16,470	30	\$ 549	\$ 16,470
Lease Standard PCs (Replace 750Mhz - 1Ghz PCs)	✓										7	\$ 549	\$ 3,843
MS-Office Software Maintenance	✓	48	\$ 47	\$ 2,232	48	\$ 93	\$ 4,464	48	\$ 93	\$ 4,464	48	\$ 93	\$ 4,464
Implement a New Nursing Home Management System													
Perform Software Selection (outside vendor)											1	\$ 50,000	\$ 50,000
Application Software											1	\$ 100,000	\$ 100,000
Migration services(Data Conversion, Installation, Consulting)											1	\$ 20,000	\$ 20,000
Implement Nursing Home Management Software													
Nursing Home Management Software Server	✓										1	\$ 5,808	\$ 5,808
Nursing Home Management Training											1	\$ 10,000	\$ 10,000
Nursing Home Management Software Maintenance Agreement	✓										1	\$ 18,000	\$ 18,000
14. Park & Recreation													
Lease Standard PCs	✓	24	\$ 549	\$ 13,176	24	\$ 549	\$ 13,176	24	\$ 549	\$ 13,176	24	\$ 549	\$ 13,176
Lease Standard PCs (Replace 350Mhz - 650Mhz PCs)	✓				7	\$ 549	\$ 3,843	7	\$ 549	\$ 3,843	7	\$ 549	\$ 3,843
MS-Office Software Maintenance	✓	31	\$ 47	\$ 1,442	31	\$ 93	\$ 2,883	31	\$ 93	\$ 2,883	31	\$ 93	\$ 2,883
Purchase Laser Printer					2	\$ 1,550	\$ 3,100						
Implement Rec-Trac Photo-ID Card Management System													
Application Software								1	\$ 5,000	\$ 5,000			
Migration services(Data Conversion, Installation, Consulting)								1	\$ 1,000	\$ 1,000			
Implement Rec-Trac Photo-ID Software (Marina)													
Photo-ID Software Training											1	\$ 1,000	\$ 1,000
Photo-ID Software Maintenance Agreement	✓										1	\$ 1,000	\$ 1,000
Implement a Rec-Trac Internet Registration Management System													
Application Software											1	\$ 13,800	\$ 13,800
Migration services(Data Conversion, Installation, Consulting)											1	\$ 3,000	\$ 3,000
Credit Card Processing Software											1	\$ 1,000	\$ 1,000
Migration services(Data Conversion, Installation, Consulting)											1	\$ 1,000	\$ 1,000
Implement Rec-Trac Internet Registration Software													
Internet Software Server	✓										1	\$ 5,808	\$ 5,808
Webtrac Software Training											1	\$ 3,000	\$ 3,000
WebTrac Software Maintenance Agreement	✓										1	\$ 2,500	\$ 2,500
Credit Card Processing Software Training	✓										1	\$ 300	\$ 300
Credit Card Processing Software Maintenance Agreement	✓										1	\$ 500	\$ 500
15. Planning & Zoning													
Lease Standard PCs	✓	6	\$ 549	\$ 3,294	6	\$ 549	\$ 3,294	6	\$ 549	\$ 3,294	6	\$ 549	\$ 3,294
Lease Standard PCs (Replace 350Mhz - 650Mhz PCs)	✓				6	\$ 549	\$ 3,294	6	\$ 549	\$ 3,294	6	\$ 549	\$ 3,294
MS-Office Software Maintenance	✓	12	\$ 47	\$ 558	12	\$ 93	\$ 1,116	12	\$ 93	\$ 1,116	12	\$ 93	\$ 1,116
Implement Permitting Management Software System													
Permitting Software Server	✓							1	\$ 5,808	\$ 5,808	1	\$ 5,808	\$ 5,808
Permitting Software Training								1	\$ 12,000	\$ 12,000			
Permitting Software Maintenance Agreement	✓							1	\$ 16,000	\$ 16,000	1	\$ 16,000	\$ 16,000
Implement an Integrated Permitting Management System													
Perform Software Selection (outside vendor)					1	\$ 50,000	\$ 50,000						
Application Software								1	\$ 80,000	\$ 80,000			
Migration services(Data Conversion, Installation, Consulting)								1	\$ 55,300	\$ 55,300			

Strategic Technology Plan
Proposed Costs By Year
As of February 2002

	Annual Cost	Current Fiscal Year Implementation			Complete Technology Infrastructure			Integrate New Technologies			Enhance Community Technologies		
		Year 0			Year 1			Year 2			Year 3		
		Unit	Unit Price	Total Price	Unit	Unit Price	Total Price	Unit	Unit Price	Total Price	Unit	Unit Price	Total Price
16. Police													
Lease Standard PCs	✓	9	\$ 549	\$ 4,941	9	\$ 549	\$ 4,941	9	\$ 549	\$ 4,941	9	\$ 549	\$ 4,941
Lease Standard PCs (Replace 350Mhz - 650Mhz PCs)	✓				44	\$ 549	\$ 24,156	44	\$ 549	\$ 24,156	44	\$ 549	\$ 24,156
MS-Office Software Maintenance	✓	53	\$ 47	\$ 2,465	53	\$ 93	\$ 4,929	53	\$ 93	\$ 4,929	53	\$ 93	\$ 4,929
Interface Software Training								1	\$ 1,200	\$ 1,200	1	\$ 1,200	\$ 1,200
Interface Software Maintenance Agreement	✓							1	\$ 2,160	\$ 2,160	1	\$ 2,160	\$ 2,160
Implement Integration Software with GIS and HTE													
Purchase ESRI -HTE software interface (estimated)								1	\$ 12,000	\$ 12,000			
Migration services(Data Conversion, Installation, Consulting)								1	\$ 2,400	\$ 2,400			
Disaster Recovery Plan					1	\$ 60,000	\$ 60,000						
17. Purchasing													
Lease Standard PCs	✓	3	\$ 549	\$ 1,647	3	\$ 549	\$ 1,647	3	\$ 549	\$ 1,647	3	\$ 549	\$ 1,647
Lease Standard PCs (Replace 350Mhz - 650Mhz PCs)	✓				5	\$ 549	\$ 2,745	5	\$ 549	\$ 2,745	5	\$ 549	\$ 2,745
MS-Office Software Maintenance	✓	8	\$ 47	\$ 372	8	\$ 93	\$ 744	8	\$ 93	\$ 744	8	\$ 93	\$ 744
18. Registrar of Voters													
Lease Standard PCs	✓	4	\$ 549	\$ 2,196	4	\$ 549	\$ 2,196	4	\$ 549	\$ 2,196	4	\$ 549	\$ 2,196
Lease Standard PCs (Replace 350Mhz - 650Mhz PCs)	✓				2	\$ 549	\$ 1,098	2	\$ 549	\$ 1,098	2	\$ 549	\$ 1,098
MS-Office Software Maintenance	✓	6	\$ 47	\$ 279	6	\$ 93	\$ 558	6	\$ 93	\$ 558	6	\$ 93	\$ 558
19. Selectman's Office													
Lease Standard PCs	✓	3	\$ 549	\$ 1,647	3	\$ 549	\$ 1,647	3	\$ 549	\$ 1,647	3	\$ 549	\$ 1,647
Lease Standard PCs (Replace 350Mhz - 650Mhz PCs)	✓				3	\$ 549	\$ 1,647	3	\$ 549	\$ 1,647	3	\$ 549	\$ 1,647
MS-Office Software Maintenance	✓	6	\$ 47	\$ 279	6	\$ 93	\$ 558	6	\$ 93	\$ 558	6	\$ 93	\$ 558
20. Social Services													
Lease Standard PCs	✓	25	\$ 549	\$ 13,725	25	\$ 549	\$ 13,725	25	\$ 549	\$ 13,725	25	\$ 549	\$ 13,725
Lease Standard PCs (Replace 350Mhz - 650Mhz PCs)	✓				8	\$ 549	\$ 4,392	8	\$ 549	\$ 4,392	8	\$ 549	\$ 4,392
MS-Office Software Maintenance	✓	33	\$ 47	\$ 1,535	33	\$ 93	\$ 3,069	33	\$ 93	\$ 3,069	33	\$ 93	\$ 3,069
21. Tax Collector													
Lease Standard PCs	✓	4	\$ 549	\$ 2,196	4	\$ 549	\$ 2,196	4	\$ 549	\$ 2,196	4	\$ 549	\$ 2,196
Lease Standard PCs (Replace 350Mhz - 650Mhz PCs)	✓				3	\$ 549	\$ 1,647	3	\$ 549	\$ 1,647	3	\$ 549	\$ 1,647
MS-Office Software Maintenance	✓	7	\$ 47	\$ 326	7	\$ 93	\$ 651	7	\$ 93	\$ 651	7	\$ 93	\$ 651
22. Town Clerk													
Lease Standard PCs	✓	1	\$ 549	\$ 549	1	\$ 549	\$ 549	1	\$ 549	\$ 549	1	\$ 549	\$ 549
MS-Office Software Maintenance	✓	1	\$ 47	\$ 47	1	\$ 93	\$ 93	1	\$ 93	\$ 93	1	\$ 93	\$ 93
Year Totals:			\$ 1,274,263		\$ 2,755,380		\$ 2,803,458		\$ 2,414,958				

Assumptions

- A 1. Our assumptions above assume costs on a full fiscal year
- A 2. Personal computer lease costs are based on a standard minimum configuration (see Appendix 7.F)
- A 3. PCs are leased and include MS-Office and Virus Protection Licenses
- A 4. Administrative Service Center PCs are included in the BET-MIS Line Items
- A 5. Departments identified as obtaining "latest processor" technology was implemented in Year 1
- A 6. Departments identified as obtaining "350-600Mhz Processor" technology was replaced in Year 1
- A 7. GIS Internal Support Resource Costs include benefits
- A 8. A single training class is limited to 10 people. Class duration is 4 hours
- A 9. Three levels of training classes will provide more flexibility in topics covered in class
- A 10. Once the initial training occurs, we assume an internal training program will be initiated, eliminating any external training company costs.
- A 11. Costs for current software maintenance agreements are not included in the figures above
- A 12. Outside support will be required to implement new and move old PCs
- A 13. Cabling for the WAN has been included in the original costs for WAN implementation
- A 14. Additional GIS software cost will be determined upon further review by Town.
- A 15. Internet/Intranet/Extranet development costs are estimates only. Actual costs will depend on sophistication of site design

VI. Conclusion

The objective of this plan is to provide the Town of Greenwich with a unified “roadmap” for implementing technology. The concepts and ideas presented in this plan are designed to address the needs and requirements of the Town’s personnel and improve the inefficient processes currently impacting business operations. Of all the findings and recommendations outlined in this report, there are three items of critical importance. They are:

1. Complete the Implementation of the Community-Wide Network – A critical element to the Town’s technology foundation is the completion of the Community-Wide Network. With the hardware components installed, the Town needs to review and organize it’s approach to sharing and integrating the various data resources that are now more widely available to Town users.
2. Define the Role of the IT Department – Because the services of the IT Department impact every department, the Town needs to ensure that IT Department resources are being used in the most effective manner. Achieving this goal includes not only on-going communication of activities and initiatives, but the introduction of methodologies that will help both the individual departments as well as IT achieve their budgetary and operational objectives.
3. Improve Project Management – The success of technology initiatives can be enhanced by assigning the “ownership” and accountability of systems to the departments that use them on a day-to-day basis. Empowering the departments to take a stronger role in the selection, implementation and management of the systems that impact their operations will help the IT Department provide better services and guidance to departments looking for technical support and direction.

Overall the plan addresses a myriad of issues in several ways. This includes:

- Developing a single, flexible technology foundation that incorporates the strategic directions of the Town, Greenwich Public Library and Public School systems. The end result is a unified plan that allows all groups to leverage the costs and advantages of technology to achieve their combined and individual goals.
- Implementing applications and procedures that make information easier to use and more accessible.
- Utilizing a phased implementation approach for technologies based on departmental needs and adopted departmental budgets. Requirements can be assessed and evaluated thoroughly, costs will be better managed, and users can become adequately trained.

- Implement appropriate policies and guidelines to ensure all users understand the intended use of new technologies and the consequences for misuse.
- Acquire the necessary knowledge resources to help direct and manage the implementation and use of key systems, such as GIS and the Town website
- Emphasize the concept of system “ownership” at the departmental level to ensure appropriate use of IT Department resources and the recognition of responsibility and accountability for the successful use of all technology investments.
- Provide continual, incremental training to ensure both users and IT support staff obtain and maintain the skill sets necessary to use the software tools effectively.

It will be critical for the Town to monitor the progress of this plan on a regular basis. The Technology Committee should constantly evaluate the plan to ensure stated projects are kept on track financially and kept to specific deadlines. This committee should also be given the task of revisiting the direction of the plan periodically to ensure it remains in line with the evolving expectations of the Town, constantly evaluating how technology tools can provide enhanced service and communications to residents.

VII.A Acknowledgments

This project relied heavily on information that could only be obtained from the employees of the Town of Greenwich. Our challenge was to accumulate key information and as many viewpoints in a compressed amount of time. A lot of information and Town viewpoints were identified through focus group sessions.

Focus Groups – Thirty-two focus groups, consisting of representatives from all Town departments, Public Library and Board of Education personnel were conducted over the course of three weeks. These two hour sessions gave employees from all aspects of the Town’s government the opportunity to share ideas and identify specific needs relevant to the use of technology in their departments. The groups were developed along operational lines, as opposed to departmental lines, in order to concentrate on common processes shared between and among departments. The focus groups are identified in section I.

Focus group members were asked to consider the following four questions:

1. What information is currently gathered, processed and/or produced within your department/functional area?
2. What are the business problems/obstacles currently experienced by your department/functional area?
3. How do these problems affect the flow of information through your department and your ability to deliver service?
4. What technological changes would you make to improve the flow and manipulation of data through your department?

The responses to these questions were evaluated for common themes and specific issues that show how data is processed within and between the Town’s departments.

Status Meetings - Ad-hoc meetings were held with the IT Department and BET representatives to periodically review the progress of the project and to discuss ideas, raise issues and address any concerns in a timely fashion. These meetings also helped to identify other potential opportunities and to confirm that the project was on track.

The following groups were directly involved in the oversight and development of the Greenwich Strategic Technology Plan. We wish to thank all who participated for their time, knowledge and efforts. The participants of the focus group sessions included:

First Selectmen	
<i>Name</i>	<i>Dept./Title</i>
Lolly Prince	First Selectman

First Selectman’s Office	
<i>Name</i>	<i>Dept./Title</i>
Peter Crumbine	First Selectman’s Office
Richard Bergstresser	First Selectman’s Office
Carol Shattuck	First Selectman’s Office

Admin Staff	
<i>Name</i>	<i>Dept./Title</i>
Laura Cirelli	Assessor’s Office
Alice Timmerman	Social Services
Diane Thierry	Social Services
William McCormick	Public Works
Melissa Evans	Public Works
Barbara DeVita	Parks and Rec
Jenny Colucci	Land Use
Catherine Rasile	Parks and Rec
Debra Dean	Social Services
Vivian Sandor	Land Use
Terry Pieczko	Public Works
Ann Augustine	Health
Maryann Deluca	Law
Maryann Hohl	Human Resources
Barbara Duffy	Social Services
Anne Giamarino	Finance
Ken Roper	Health

IT Department	
<i>Name</i>	<i>Dept./Title</i>
Boris Hutorin	Director
Maria Hulbert	Assistant Director
Francis St. Jean	Staff
Paul Hinlicky	Staff
Linda Strain	Staff
Jay Asphar	Staff
Janis Dautrick	Staff

Assessor	
<i>Name</i>	<i>Dept./Title</i>
Harriet Gotz	Assessor
Bob Shipman	Assistant Assessor

Finance	
<i>Name</i>	<i>Dept./Title</i>
Jim Latham	Purchasing
Joan Sullivan	Purchasing
Pat Fidelibus	Purchasing
Joyce Kosinski	Treasury
Roy Carey	Accounts Payable
Mary Walczykowski	Chief Accountant
Ed Gomeau	Finance Director

GIS	
<i>Name</i>	<i>Dept./Title</i>
Harriet Gotz	Assessor
Bob Shipman	Assistant Assessor
David Tompson	Engineering
Joseph Roberto	Highway
James Lavin	Administration
Steve Gospondinoff	Parks & Rec
Eric Omdahl	Parks & Rec
Hernando Chaves	Engineering
Scott Marucci	Engineering
Rafael Sotil	Transfer Station
Lou Panone	Police
Jud VanIngen	Police
Gret Hannigan	Police
Joe Benoit	Fire Marshal

Registrar of Voters	
<i>Name</i>	<i>Dept./Title</i>
Veronica Musca	Republican

Police/GEMS	
<i>Name</i>	<i>Dept./Title</i>
Peter Robbins	Police/GEMS
Lou Panone	Police/GEMS
Greg Hannigan	Police/GEMS

Fire	
<i>Name</i>	<i>Dept./Title</i>
Daniel S. Warzoha	Fire
Mike Puterbaugh	Fire

Tax Collector	
<i>Name</i>	<i>Dept./Title</i>
Lou Caravella	Tax Collector
Gail Downing	Tax Collector

Board of Estimation and Taxation	
<i>Name</i>	<i>Dept./Title</i>
Larry Simon	BET

Parks and Recreation	
<i>Name</i>	<i>Dept./Title</i>
Craig Witcomb	Parks and Rec
Bill burgess	Parks and Rec
Rich Ernye	Parks and Rec
Doanld Mohr	Parks and Rec
Lou Berlingo	Parks and Rec
Billie Schock	Parks and Rec

Nathaniel Witherell	
<i>Name</i>	<i>Dept./Title</i>
Peter Madden	Nathaniel Witherell
Tom Demchak	Nathaniel Witherell
John Harkins	Nathaniel Witherell

Human Resources	
<i>Name</i>	<i>Dept./Title</i>
Bernadette Welch	Human Resources
Sarah Brown	Human Resources

Public Works	
<i>Name</i>	<i>Dept./Title</i>
David Thompson	Engineering
Scott Marucci	Engineering
William Marr	Building Inspector
Margaret D’Autilio	Building Inspector
James Lavin	Administration
Hernando Chaves	Engineering
Joseph Roberto	Highway
Steve Demetri	Sewer
Richard Droll	Traffic
John McKee	Transfer Station
Rafael Sotil	Transfer Station

Social Services	
<i>Name</i>	<i>Dept./Title</i>
Carol Femia	Commissioner
Betty Steinberg	Dir, Adult & Family Services
Joan McGirr	Dir, Aging Services
Marlene Gray	Dir, Volunteer Services
Chicky Krois	Commission on Aging

Health	
<i>Name</i>	<i>Dept./Title</i>
Caroline Baisley	Dir, Health Department
Ann Augustine	Health Department
Tom Mahoney	Dir, Clinical Services
Michael Long	Dir, Environmental Health
Ann Harrington	Health Department
Victoria Quatrone	Health Planning & Promotion
Jennifer Johnson	Family Health
Virginia Gilbert	Adult, Maternal & Child Health

GIS	
<i>Name</i>	<i>Dept./Title</i>
Bill Brodie	GIS
Mark Goetz	GIS

Libraries	
<i>Name</i>	<i>Dept./Title</i>
Mario Gonzalez	Dir, Greenwich Library
Inga Boudreau	Assistant Director
Kevin McCarthy	Dir, Perrot Library
Toni Tynan	Staff
Debbie Orrico	Staff
Arlene Grant	Staff
John Yoke	Staff
Catherine Tynes	Staff
Marica Fosnot	Staff
Maureen Hattasch	Staff
Vera Skop	Staff
Mary Anne Moore	Staff
Wendy Silver	Staff

Fleet	
<i>Name</i>	<i>Dept./Title</i>
Betty Link	Dir, Fleet Operations

Town Clerk	
<i>Name</i>	<i>Dept./Title</i>
Carmella Budkins	Town Clerk
Dee Meilinggaard	Assistant Town Clerk
Carol Lovallo	Staff
Kimberley Jordan	Staff
Tom McGivney	ACS

Law	
<i>Name</i>	<i>Dept./Title</i>
John Wetmore	Town Attorney
Aamina Ahmad	Law Department
Valerie Maze	Law Department
Gail Sassos	Law Department
Eugene McLaughlin, Jr.	Law Department
Nickie Altomaro	Law Department
Maryann DeLuca	Law Department
Maria Enright	Law Department
Marianne Kane	Law Department
Jane Sulich	Law Department
Michele Sullo	Law Department

Board of Education	
<i>Name</i>	<i>Dept./Title</i>
Sue Wallerstein	Board of Education

Land Use & GIS	
<i>Name</i>	<i>Dept./Title</i>
Diane Fox	Town Planner
Denise Savageau	Dir, Conservation
Michael Aurelia	Dir, Wetlands
Mary Young	Land Use & GIS
Larry Bradley	Land Use & GIS
Vivian Sandor	Land Use & GIS
Katie Blankley	Land Use & GIS

VII.B Definition of Terms

100BaseT:	<p>One of several adaptations of the Ethernet (IEEE 802.3) standard for Local Area Networks (LANs). The 100Base-T standard (also called <i>Twisted Pair Ethernet</i>) uses a twisted-pair cable with maximum lengths of 100 meters.</p> <p>Cables in the 10Base-T system connect with RJ-45 connectors. A star topology is common with 12 or more computers connected directly to a hub or concentrator. The 100Base-T system operates at 100 megabits per second (Mbps) using baseband transmission methods.</p>
3GL Third-generation language:	<p>A language such as C, COBOL, FORTRAN or Pascal that provides developers with considerable flexibility at the cost of ease of use. Most 3GLs can handle such detailed tasks as detailed memory manipulation and physical disk access, which most 4GLs cannot handle. 3GLs, however, are complex and require more development time for applications.</p>
4GL Fourth generation language:	<p>A high-level language usually built using a 3GL. 4GLs, which are easier to use than 3GLs, are generally preferable for creating database applications and for use with popular development tools.</p>
ActiveX	<p>A technology from Microsoft that links desktop applications to the World Wide Web. Using ActiveX tools, software developers can create interactive Web content for their applications. For example, Word and Excel documents can be viewed directly in a browser if ActiveX is enabled.</p>
ADSL:	<p>ADSL (Asymmetric Digital Subscriber Line) is a technology for transmitting digital information at high bandwidths on existing phone lines to homes and businesses. ADSL is asymmetric in that it uses most of the channel to transmit downstream to the user and only a small part to receive information from the user. ADSL simultaneously accommodates analog (voice) information on the same line. ADSL is generally offered at downstream data rates from 512 Kbps to about 6 Mbps. ADSL was specifically designed to exploit the one-way nature of most multimedia communication in which large amounts of information flow toward the user and only a small amount of interactive control information is returned. ADSL and other forms of DSL are expected to become more widely available in 1999 and 2000. With ADSL (and other forms of DSL), telephone companies are competing with cable companies and their cable modem services.</p>
ATM:	<p>Short for <i>Asynchronous Transfer Mode</i>, a network technology based on transferring data in <i>cells</i> or <i>packets</i> of a fixed size. The cell used with ATM is relatively small compared to units used with older technologies. The small, constant cell size allows ATM equipment to transmit video, audio and computer data over the same network and assure that no single type of data hogs the line.</p>

Current implementations of ATM support data transfer rates of from 25 to 622 Mbps (megabits per second). This compares to a maximum of 100 Mbps for Ethernet, the current technology used for most LANs.

Bandwidth: The amount of data that can be sent through a network connection, measured in bits per second (bps). High bandwidth allows fast transmission or high-volume transmission.

Broadband: This term refers to high-speed data transmission in which a single cable can carry several channels of data at once. The most common type of broadband transmission is cable wiring (as in cable TV and cable modems). Because of its multiple channel capability, broadband has started to replace the baseband, or single-channel technology most computer networks were originally based on.

Internet Browser: A software program that facilitates easy, graphical browsing of the World Wide Web. Several browsers are currently available, the most popular being AOL/Netscape's Communicator and Microsoft's Internet Explorer. Browsers have fairly limited capabilities and rely on "plug-in" programs to perform most complex tasks. For this reason, browsers are easily suited as the common front-ends for Intranets.

Cable Modem Though a cable modem serves the same purpose as a typical analog modem, a cable modem is different in many ways. The biggest difference is that a cable modem is much faster. While a 56K modem can receive data at about 53 Kbps, a cable modem can haul it in at about 1.5 Mbps. That's about 30 times faster. Though the actual Internet bandwidth over a cable TV line is up to 27 Mbps for downstream to the subscriber and about 2.5 Mbps upstream, since the local provider may only have a T1 connection, which maxes out at 1.5 Mbps, that will be the maximum transfer rate for the subscriber. Also, a cable modem doesn't hook up to a phone line; it connects to a local cable TV line, hence the term "cable modem". This allows computers equipped with a cable modem to have a continuous connection to the Internet.

Cable modems, which have a much more complex design than telephone modems are usually external devices, but they can be integrated within a computer or set-top box. Finally, instead of connecting to a serial port, cable modems attach to a standard Ethernet card so that they can transfer data at the fastest speed possible.

The way the cable modem system works is pretty complex. All cable modems are attached to a coaxial cable line owned by some cable TV company where they connect to the company's Cable Modem Termination System (CMTS). Cable modems connected to the main line can receive from and send signals only to the CMTS, not to other cable modems on the line. In some cases, upstream signals are returned by telephone rather than the cable line, in which case the cable modem is known as a telco-return cable modem.

Computer Aided Design (CAD)	Also known by engineers and architects as the best invention of all time. Today, CAD software is used for pretty much all three-dimensional designing. It is much easier and quicker to turn an object into an electronic representation than to diagram one with a pencil and paper. Better yet, objects created with CAD are very accurate and can be changed instantly.
Client:	The client part of a <i>client-server architecture</i> . Typically, a client is an application that runs on a personal computer or workstation and relies on a server to perform some operations. For example, an <i>e-mail client</i> is an application that enables you to send and receive e-mail.
Clock speed:	Also called <i>clock rate</i> , the speed at which a microprocessor executes instructions. Every computer contains an internal clock that regulates the rate at which instructions are executed and synchronizes all the various computer components. The CPU requires a fixed number of clock ticks (or <i>clock cycles</i>) to execute each instruction. For example, an Intel 80286 microprocessor needs about 20 clock cycles to multiply two numbers together. The faster the clock, the more instructions the CPU can execute per second.
Concentrator:	<p>A type of multiplexor that combines multiple channels onto a single transmission medium in such a way that all individual channels can be simultaneously active. For example, Internet Service Providers use concentrators to combine their dial-up modem connections onto faster T-1 lines that connect to the Internet.</p> <p>Concentrators are also used in local-area networks (LANs) to combine transmissions from a cluster of nodes. In this case, the concentrator is often called a <i>hub</i>.</p>
Cookie	A cookie is data sent to your computer by a web server that records your actions on a certain web site. It's a lot like a preference file for a program on your computer. Whenever you visit the site after being sent the cookie, the site will load according to the information stored in the cookie. For example, some sites can remember information like your user name and password, so you don't have to re-enter it each time you visit the site. Cookies are what allow you to have personalized web sites like "My Excite" or "My Yahoo" in which you can customize what is displayed on the page.
Database server:	A system that receives requests from client applications over a network and responds by returning requested data (the answer set). Each database server is made up of a computer, an operating system and database server software.
Dynamic Link Library (DLL)	A .dll file contains a library of functions and other information that can be accessed by a Windows program. When the program is launched, a link to the .dll file is created. If a static link is created, the .dll file will be in use as long as the program is active. If a dynamic link is created, the .dll file will only be used when needed.

Because of this, .dll files allow programs to use resources, such as memory and hard drive space, more efficiently.

Domain Name

This is the name that identifies an web site. For example, "apple.com" is the domain name of Apple Computer's web site. A single web server may have more than one domain name, but a single domain name points to only one machine. To use Apple Computer as an example again, www.apple.com, support.apple.com, and store.apple.com could be served on one to three machines. It is also possible, and quite common, for a domain name to be registered, but not be connected to an actual machine. The reason for this is usually so that a company or group can have e-mail addresses at a certain domain without having to maintain a web site. In these cases, there still must be a machine to handle the mail of the listed domain name.

DoS (Denial of Service)

A form of attack on (usually) an internet service, which aims to prevent the service from operating properly, often by bombarding it with more information than it can process.

Downloading

This is the process in which data is sent to your computer. Whenever you get information off the Internet, you are downloading it to your computer. For example, you might have to download an upgrade for your computer's operating system in order to play a new game (especially if you're using Windows). The opposite of this process, sending information to another computer, is called uploading.

Driver

A driver is a small file that helps the computer communicates with a certain hardware device. It contains information needed to recognize and control the device which the computer does not already have. In Windows-based PCs, a driver is often packaged as a dynamic link library (DLL) file; in Macs, most hardware devices don't need drivers, but the ones that do usually come with a software driver in the form of a System Extension.

DSL:

DSL (Digital Subscriber Line) is a technology for bringing high-bandwidth information to homes and small businesses over ordinary copper telephone lines. Typical individual connections will provide from 1.544 Mbps to 512 Kbps downstream and about 128 Kbps upstream. A DSL line can carry both data and voice signals and the data part of the line is continuously connected. Within a few years, DSL is expected to replace ISDN in many areas and to compete with the cable modem in bringing multimedia and 3-D to homes and small businesses.

Digital Versatile Disk (DVD)

A DVD is a high-capacity optical disc that looks like a CD, but can store much more information. While a CD can store 650 MB of data, a single-layer, single-sided DVD can store 4.7GB of data. This allows for massive computer applications and full-length movies to be stored on a single DVD

E-Commerce

E-commerce refers to business over the Internet. Web sites such as Amazon.com, LandsEnd.com, and eBay are all e-commerce sites. The two major forms of e-commerce are Business-to-Consumer (B2C) and Business-to-Business (B2B). While companies like Amazon.com cater mostly to consumers, other companies provide goods and services exclusively to other businesses. The terms "e-business" and "e-tailing" are often used synonymously with e-commerce.

E-mail:

Short for *electronic mail*, the transmission of messages over communications networks. The messages can be notes entered from the keyboard or electronic files stored on disk. Most mainframes, minicomputers and computer networks have an e-mail system. Some electronic-mail systems are confined to a single computer system or network, but others have gateways to other computer systems, enabling users to send electronic mail anywhere in the world. Companies that are fully computerized make extensive use of e-mail because it is fast, flexible and reliable.

Sent messages are stored in electronic mailboxes until the recipient fetches them. To see if you have any mail, you may have to check your electronic mailbox periodically, although many systems alert you when mail is received. After reading your mail, you can store it in a text file, forward it to other users or delete it. Copies of memos can be printed out on a printer if you want a paper copy.

All on-line services and Internet Service Providers (ISPs) offer e-mail, and most also support gateways so that you can exchange mail with users of other systems. Usually, it takes only a few seconds or minutes for mail to arrive at its destination. This is a particularly effective way to communicate with a group because you can broadcast a message or document to everyone in the group at once.

Extranet:

An Intranet that is partially accessible to authorized outsiders. Whereas an Intranet resides behind a firewall and is accessible only to people who are members of the same company or organization, an Extranet provides various levels of accessibility to outsiders. Typically, an Extranet can be accessed only if you have a valid username and password, and your identity determines which parts of the Extranet you can view.

Fiber-Optic Cable

This is a cable made up of super-thin filaments of glass or other transparent materials that can carry beams of light. Using a laser transmitter that encodes frequency signals into pulses of light, data can be sent through through these cables at the speed of light. The receiving end of the transmission translates the light signals back into frequencies which can be read by a computer. Because fiber-optics are based entirely on beams of light, they are less susceptible to noise and interference than than other data-transfer mediums.

However, the cables are fragile and are usually placed underground, which makes them difficult and expensive to install. Some fiber-optic cables are installed above

ground, but if they break too many times, they need to be completely replaced, which is not cheap. The reason they need to be replaced is because breaks in the cables can only be fixed a few times, whereas copper wires can be spliced as many times as needed.

Firewall:

A system designed to prevent unauthorized access to or from a private network. Firewalls can be implemented in both hardware and software or a combination of both. Firewalls are frequently used to prevent unauthorized Internet users from accessing private networks connected to the Internet, especially *intranets*. All messages entering or leaving the intranet pass through the firewall, which examines each message and blocks those that do not meet the specified security criteria.

A firewall is considered a first line of defense in protecting private information. For greater security, data can be encrypted.

Flame:

A strong and inflammatory message delivered by E-mail or public posting on an electronic bulletin board.

Frame Relay:

A packet-switching protocol for connecting devices on a Wide Area Network (WAN). Frame Relay networks support data rates up to 1.544 Mbps (1.5 billion bits per second). Most telephone companies now provide Frame Relay service for customers who want connections at T1 speeds.

FTP (File Transfer Protocol):

The original and most popular way to transfer files over the Internet. Networks that allow “anonymous FTP” enable anyone to log on to a system and retrieve files, while other FTP systems require that the user enter a password.

Gigabyte

A gigabyte consists of roughly 1 billion bytes. To be exact, there are 1024 megabytes or 1,073,741,824 bytes in a gigabyte, but no one really cares. Because of the large size of today's hard disks, storage capacity is usually measured in gigabytes. Abbreviation: "GB".

GIGO

Stands for "Garbage In, Garbage Out," (not for Gigabyte, considering the word is Gigabyte). It basically means that if invalid data is entered in a computer program, the resulting output will also be invalid. So if a program asked for a character and you decided to be funny and enter "3.14159", there's a good chance the results you get back would be pretty messed up, or "garbage". Because people aren't always smart enough to enter valid data, programmers have to take excessive measures to protect their programs from GIGO-type errors.

Graphical User Interface (GUI):

A pictorial or icon based method intended to assist people in their use of personal computers. Prior to the advent of Microsoft's Windows, users typed in program commands at a simple system prompt (i.e., C:\>). This method, or interface, required users to remember a great many specific instructions that were often less than easy to

understand. The graphical user interface, introduced by the Apple Computer company, eliminates the need to remember commands by combining the use of icons and a “mouse” to start and run a computer program. This interface has gained wide acceptance through MS-Windows.

HTML

Stands for "Hyper-Text Markup Language." Today's software programs are created mostly in C/C++; today's web pages are created in HTML. Also known as hypertext documents, web pages must conform to the rules of the HTML language in order to be displayed correctly in a web browser. The HTML syntax is based on a list of tags that describe the format and what is displayed on web pages. Fortunately, the HTML language is quite easy to learn. Even more fortunately, (so much for good grammar), most web page development programs allow you to create web pages via a graphical interface without having to actually write the HTML code.

HTTP

Stands for "HyperText Transfer Protocol." It is the protocol used to transfer data over the World Wide Web. That's why all web site addresses begin with "http://". Whenever you type a URL into your browser and hit Enter, your computer sends an HTTP request to a Web server. The Web server then sends to you the requested HTML page.

Internet:

A global web connecting more than a million computers. Currently the Internet has more than 30 million users worldwide, and that number is growing rapidly. More than 100 countries are linked into exchanges of data, news and opinions.

Unlike on-line services, which are centrally controlled, the Internet is decentralized by design. Each Internet computer, called a host, is independent. Its operators can choose from Internet services to provide to its local users and which local services to make available to the global Internet community. Remarkably, this anarchy by design works exceedingly well.

There are a variety of ways to access the Internet. Most on-line services, such as CompuServe and America On-line, offer access to some Internet services. It is also possible to gain access through a commercial Internet Service Provider (ISP).

Internetworking:

The art and science of connecting individual local-area networks (LANs) to create wide-area networks (WANs), and connecting WANs to form even larger WANs. Internetworking can be extremely complex because it generally involves connecting networks that use different protocols. Internetworking is accomplished with routers, bridges and gateways.

Intranet:

A web site or group of Web sites belonging to an organization, usually a corporation, accessible only by the organization's members, employees or others with authorization. An Internet's Web sites look and act just like any other Web sites, but the *firewall* surrounding an intranet fends off unauthorized access.

Like the Internet itself, intranets are used to share information. Secure intranets are now the fastest-growing segment of the Internet because they are much less expensive to build and manage than private networks based on proprietary protocols.

IP address: A 32-bit number consisting of four octets (sets of eight binary digits) that specifies a network address and a host ID on a TCP/IP network.

KB/MB/GB: These acronyms are shorthand identifiers for Kilobyte (KB), Megabyte (MB), and Gigabyte (GB). They are used when describing the storage capacities of various computing equipment, such as hard drives and memory. Each term indicates the number of zeros following the stated number, for example 10KB equals 10,000, 10MB equals 10,000,000, etc.

Linux Pronounced "lihnuks", this is an operating system similar to Unix, created by Linus Torvalds. His reason for developing it was that he wasn't happy with any of the currently available options. He freely distributed his OS, helping it to gain popularity. Today, Linux is currently used by hundreds of thousands of people around the world. Computer hobbyists love it because it's very customizable and you can actually add your own code to OS itself. However, Linux has also become the choice for some corporations because it is an inexpensive substitute for Unix. The current supported hardware platforms are Intel, PowerPC, DEC Alpha, Sun Sparc, and Motorola.

Listserv A listserv, also known as a list server, is a small program that automatically sends messages to e-mail addresses on a mailing list. When someone subscribes to a mailing list, the listserv will automatically add the address and distribute future e-mail postings to that address along with all the others on the list. When someone unsubscribes, the listserv simply removes the address. A common listserv program is Majordomo, which instructs users to send an e-mail to majordomo@servername.com to subscribe or unsubscribe from a mailing list.

Mailbox: An area in memory or on a storage device where e-mail is placed. In e-mail systems, each user has a private mailbox. When the user receives e-mail, the mail system automatically puts it in the mailbox. The mail system allows you to scan mail that is in your mailbox, copy it to a file, delete it, print it or forward it to another user.

Modem: Acronym for *modulator-demodulator*. A modem is a device or program that enables a computer to transmit data over telephone lines. Computer information is stored digitally, whereas information transmitted over telephone lines is transmitted in the form of analog waves. A modem converts between these two forms. (Note that ISDN telephone lines send data digitally, so they do not require modems.)

Fortunately, there is one standard interface for connecting external modems to computers called RS-232. Consequently, any external modem can be attached to any computer that has an RS-232 port, which almost all personal computers have. There

are also modems that come as an expansion board that you can insert into a vacant expansion slot. These are sometimes called onboard or internal modems and are more machine specific.

Aside from the transmission protocols that they support, the following characteristics distinguish one modem from another:

- **bps:** How fast the modem can transmit and receive data. At slow rates, modems are measured in terms of baud rates. The slowest rate is 300 baud (about 25 cps). At higher speeds, modems are measured in terms of bits per second (bps). The fastest modems run at 56,000 bps, although they can achieve even higher data transfer rates by compressing the data. Obviously, the faster the transmission rate, the faster you can send and receive data. Note, however, that you cannot receive data any faster than it is being sent. If, for example, the device sending data to your computer is sending it at 2,400 bps, you must receive it at 2,400 bps. It does not always pay, therefore, to have a very fast modem. In addition, some telephone lines are unable to transmit data reliably at very high rates.
- **voice/data:** Many modems support a switch to change between voice and data modes. In data mode, the modem acts like a regular telephone. Modems that support a voice/data switch have a built-in loudspeaker and microphone for voice communication.
- **data compression:** Some modems perform data compression, which enables them to send data at faster rates. However, the modem at the receiving end must be able to decompress the data using the same compression technique.

Network Operating System (NOS):

An operating system that includes special functions for connecting computers and devices into a local-area network (LAN). Some operating systems, such as UNIX, Linux and the Mac OS, have networking functions built in. The term *network operating system*, however, is generally reserved for software and enhances a basic operating system by adding networking features. For example, some popular NOS's include Novell Netware and Microsoft.

Network:

A group of two or more computer systems linked together. There are many types of computer networks, including:

- **local-area networks (LANs):** The computers are geographically close together (that is, in the same building).
- **wide-area networks (WANs):** The computers are farther apart and are connected by telephone lines or radio waves.

In addition to these types, the following characteristics are also used to categorize different types of networks:

- topology: The geometric arrangement of a computer system. Common topologies include a bus, star and ring.
- protocol: A protocol defines a common set of rules that computers on a network use to communicate. One of the most popular protocols for LANs is called Ethernet. Another popular LAN protocol for PCs is the IBM token-ring network.
- architecture: Networks can be broadly classified as using either a peer-to-peer or client/server architecture.

Computers on a network are sometimes called nodes. Computers and devices that allocate resources for a network are called servers.

Object Linking and Embedding (OLE):

A standard method, defined by Microsoft, for exchanging information between Windows applications. Host applications (known as *containers*) are linked to OLE objects when they contain references to those objects. An embedded object, by contrast, contains an actual copy of the object.

Open Database Connectivity (ODBC):

A component of the Windows Open Services Architecture (WOSA) that provides multi-database access by adding its own set of programming standards on top of the native database layers, thus simplifying access. The developer need deal with only a single standard to access numerous database servers, because ODBC can translate standard ODBC function calls into many different native database dialects.

Operating System:

The most important program that runs on a computer. Every general-purpose computer must have an operating system to run other programs. Operating systems perform basic tasks, such as recognizing input from the keyboard, sending output to the display screen, keeping track of files and directories on the disk and controlling peripheral devices such as disk drives and printers.

For large systems, the operating system has even greater responsibilities and powers. It is like a traffic cop -- it makes sure that different programs and users running at the same time do not interfere with each other. The operating system is also responsible for security, ensuring that unauthorized users do not access the system.

Operating systems can be classified as follows:

- multi-user: Allows two or more users to run programs at the same time. Some operating systems permit hundreds or even thousands of concurrent users.
- multiprocessing: Supports running a program on more than one CPU.
- multitasking: Allows more than one program to run concurrently.

- multithreading: Allows different parts of a single program to run concurrently.

Operating systems provide a software platform on top of which other programs, called *application programs*, can run. The application programs must be written to run on top of a particular operating system. Your choice of operating system, therefore, determines to a great extent the applications you can run. For PCs, the most popular operating systems is Windows, but others are available, such as Unix.

Personal Digital Assistant (PDA):

A pocket-sized personal computer, PDAs usually can store phone numbers, appointments, and to-do lists. Some PDAs have a small keyboard, others have only a special pen that is used for input and output. A PDA can also have a wireless fax modem. Files can be created on a PDA which are later entered into a larger computer

Relational database management system (RDBMS):

A database application back end that stores information in two-dimensional tables linked by common properties. *SQL* is used to create, manipulate and extract data from relational databases.

RISC:

Pronounced *risk*, acronym for *reduced instruction set computer*, a type of microprocessor that recognizes a relatively limited number of instructions. Until the mid-1980s, the tendency among computer manufacturers was to build increasingly complex CPUs that had ever-larger sets of instructions. At that time, however, a number of computer manufacturers decided to reverse this trend by building CPUs capable of executing only a very limited set of instructions. One advantage of reduced instruction set computers is that they can execute their instructions very fast because the instructions are so simple. Another, perhaps more important advantage, is that RISC chips require fewer transistors, which makes them cheaper to design and produce.

Router:

A device that connects two LANs. Routers are similar to bridges, but provide additional functionality, such as the ability to filter messages and forward them to different places based on various criteria.

The Internet uses routers extensively to forward information packets from one host to another.

Search Engine:

Search Engines are web sites that maintain databases or indexes of the various web sites that can be found on the Internet. Search engines, such as Yahoo, Excite, Alta Vista, and InfoSeek, allow users to enter specific words, terms or phrases to research a wide variety of topics.

SSL Secure Sockets Layer

SSL is a transaction security standard developed by Netscape Communications to enable commercial transactions to take place over the Internet. It's one of a few competing security standards.

Server:

A computer or device on a network that manages network resources. For example, a *file server* is a computer and storage device dedicated to storing files. Any user on the network can store files on the server. A *print server* is a computer that manages one or more printers, and a *network server* is a computer that manages network traffic. A *database server* is a computer system that processes database queries.

Servers are often dedicated, meaning that they perform no other tasks besides their server tasks. On multiprocessing operating systems, however, a single computer can execute several programs at once. A server in this case could refer to the program that is managing resources rather than the entire computer.

Structured Query Language (SQL):

A relational data-access language created by IBM. Most relational databases use SQL as a standard way of accessing data from client applications.

T-1

This is a data transfer system that transfers digital signals at 1.544 megabits per second (a little faster than a 56K modem, which maxes out at around 0.056 mb/sec). The name "T1" was coined by AT&T. Most small to mid-sized colleges and business have T1 lines running out of their buildings. Because of the T1's large bandwidth, hundreds of people can be accessing the Internet from one T1 line with little slowdown. However, like all good things, too many people on one T1 line can still cause dramatic decreases in data transfer speeds. For this reason, multiple T1s are often used.

TCP/IP:

Acronym for *Transport Control Protocol/Internet Protocol*, the suite of communications protocols used to connect hosts on the Internet. TCP/IP uses several protocols, the two main ones being TCP and IP. TCP/IP is built into the UNIX operating system and is used by the Internet, making it the de facto standard for transmitting data over networks. Even network operating systems that have their own protocols, such as Netware, also support TCP/IP.

URL (Universal Resource Locator)

An address used to locate something on the internet, most often a web page. All web addresses are URLs.

USB (Universal Serial Bus)

A new type of serial port (or connector), faster and more versatile than its predecessors. Used to attach extra devices such as a scanner to a PC. Fitted on new PCs from about late 1998.

VPN (Virtual Private Network):	A virtual private network (VPN) is a private data network that makes use of the public telecommunication infrastructure, maintaining privacy through the use of a tunneling protocol and security procedures. A virtual private network can be contrasted with a system of owned or leased lines that can only be used by one company. The idea of the VPN is to give the company the same capabilities at much lower cost by using the shared public infrastructure rather than a private one. Phone companies have provided secure shared resources for voice messages. A virtual private network makes it possible to have the same secure sharing of public resources for data. Companies today are looking at using a private virtual network for both extranets and wide-area intranets.
Virtual Circuits:	Packets are routed through one or more Virtual Circuits known as Data Link Connection Identifiers (DCLIs). Each DLCI has a permanently configured switching path to a certain destination. Thus, by having a system with several DCLIs configured, you can communicate simultaneously with several different sites. Currently, only permanent virtual circuit connections are supported. This means that all DLCI connections are set up by the network provider at subscription time.
Webmaster	The webmaster is the person in charge of maintaining a web site. The jobs of a webmaster range from writing HTML for web pages to organizing the web site's structure to responding to e-mails about the web site.
Wide-Area Network (WAN):	A computer network that spans a relatively large geographical area. Computers connected to wide-area network are connected through telephone lines or radio waves.
Wireless Application Protocol (WAP)	A global standard for developing applications over wireless communication networks
Wireless Communications	In computer networking, this term refers to networks that are connected by radio rather than by wires. Wireless communications are enabled by packet radio, spread spectrum, cellular technology, satellites, and microwave towers, and can be used for voice, data, video, and images. Sometimes wireless networks can interconnect with regular computer networks.
Windows 2000:	<p>The most advanced version of the Windows operating system. Windows 2000 is the next generation of the Windows NT 32-bit operating system. The technical advantage of this platform is that its design supports preemptive multitasking.</p> <p>There are actually two versions of Windows 2000: Windows 2000 Server designed to provide network services in a local and wide area network environment and Windows 2000 for stand-alone or client workstations.</p>
World Wide Web (also known as WWW or	A system designed at the European Laboratory for Particle Physics in Geneva, Switzerland (CERN), that allows a user to search for related “pages” globally, from

W3):

simple text to multimedia graphics, just by pointing and clicking with a mouse. Built on the concept of linking different types of information, the WWW is the fastest-growing segment of the Internet and the most useful for commerce.

VII.C Information Technology Committee Review Checklist

In reviewing projects, the Technology Steering Committee will consider the following questions, along with other questions that relate to specific projects.

Hardware

- ___ Is the hardware compatible with current Town of Greenwich hardware standards?
If not, why not?
- ___ Will the hardware be connected to the Town Network?
If yes, explain how. If not, explain why not.
- ___ If equipment is not being purchased through the Town Purchasing Agent, explain what purchasing arrangements are planned and why.
- ___ How will the hardware be maintained?
What is the estimated annual cost?
What start-up costs are associated with the hardware, if any?
- ___ Are there special facility requirements (e.g. power, air conditioning, heating, etc.) for this hardware?
- ___ What is the total hardware costs for the system?
Provide a detailed breakdown of all costs associated with the purchase, customization, implementation and maintenance of the hardware.
- ___ What alternative funding sources are you pursuing (e.g. grants, gifts, shared purchase, etc) in addition to Town funding?

Software

- ___ How was the decision made to select this application or upgrade?
- ___ Is this “off the shelf” or customized software that is written specifically for this purpose?
If customized, why?
- ___ Does the software run on the standard hardware and operating systems used by the Town?
If not, why is it being considered at this time?
- ___ If the request is for upgrading an application, will the upgrade require new or additional hardware?
- ___ Does the software duplicate other existing applications that the Town is already using or in the process of implementing?
If yes, why is this application being considered instead of an existing Town application?

- _____ Will this software be useful to other Town departments and agencies?
Which departments? How will they use it?
Have these departments been involved in the selection process?

- _____ Are there security issues that must be considered in implementing this application?
Will these issues require special hardware, software, or communication arrangements?

- _____ If licensing is required, how many users will be licensed?
How many concurrent users?
What is the cost for additional users?

- _____ What is the total cost for this software system?
Provide a detailed breakdown of all costs associated with the purchase, customization, implementation and maintenance of the application.

Connectivity

- _____ If the hardware and/or software are to be connected to the Town Network, does it meet current standards for connectivity?
If not, explain why?

- _____ If the hardware and/or software are to be connected with agencies or organizations outside of Town government, does it meet the required connectivity standards?
What are they?
Identify any additional fees for connecting to these outside organizations

- _____ If the hardware and/or software are to be connected with agencies or organizations outside of Town government discuss how Town databases will be made secure.

VII.D Policy Issues

A. Sample User Policies, Procedures and Guidelines

Included in this section is a group of network and technology-related policies, procedures and guidelines from other organizations.

What Is Usually Included in a Network Security Policy

Drafting a high- or low-level network security policy will typically address the same basic issues. For example, both a high- and low-level policy should address physical security. However, a high-level policy would make a general statement about the organization's stance on physical security, whereas a low-level policy would describe in detail who is responsible for ensuring physical security and what security measures the organization requires.

Most network security policies--regardless of the organization's size, industry, or security requirements--address at least the 10 issues explained below. Naturally, each organization is different and may require other issues be included. For example, if an organization requires files be classified with security labels such as top secret, the procedures for assigning and using security labels should be explained as part of the overall policy.

OBJECTIVE

The Objective defines the organization's approach to network security. A typical objective explains that information is an important asset and that the organization will implement security measures to protect that asset.

SCOPE

The Scope defines the assets that will be protected by the organization's network security policy. For example, a scope might define whether the policy addresses only network security or includes other areas of organization security. The scope also defines who must follow the network security policy. Does the policy pertain only to the organization's employees? Or does the policy extend to the organization's contractors, customers, and vendors, who might be required to follow the policy if they connect their network to the organization's network, or use any of the organization's data processing systems or tools?

RESPONSIBILITIES

The Responsibilities section describes how users--including managers, security staff, and other employees--are responsible for safeguarding the organization's assets. This section usually outlines users' general security responsibilities. For example, it might state that users are responsible for protecting assets and for reporting any violations of the network security policy to their department manager.

The Responsibilities section might also state the general role of a particular department or manager. For example, it might state that the Information Technology (IT) Department must ensure that all security measures are properly implemented, or it might state that the manager of the Human Resources Department must ensure that all personnel information stored on the network is properly protected.

PHYSICAL SECURITY

The Physical Security section states how the organization will protect its facility and its hardware. For example, this section might define which employees should be granted access to restricted areas such as server rooms and wiring closets.

The Physical Security section might also define who is responsible for physical security. For example, it might state that the organization security manager is responsible for physical security and for ensuring that all of the organization's physical security measures are properly implemented.

NETWORK SECURITY

The Network Security section states how the organization will protect assets stored on the network. This section might include security measures regarding access control (login name and password requirements), network auditing, remote access, directory services, Internet services, and file system directory structures.

SOFTWARE SECURITY

The Software Security section explains how the organization will use commercial and noncommercial software on servers, workstations, and the network. This section might also identify who is allowed to purchase and install software, and the section might outline the organization's security measures for downloading software from the Internet.

DISASTER CONTINGENCY PLAN

The disaster contingency plan explains how the organization will recover from any type of natural disaster or attack, including attacks from hackers and employees. For example, it might include security measures for backing up servers, detailing how often backups must be performed and how backups must be stored off-site.

The disaster contingency plan might also list the members of an emergency response team that will handle a natural disaster or attack. In addition, the plan might include security measures for conducting drills to ensure that all users and the emergency response team know what to do when a disaster or attack occurs.

ACCEPTABLE USE POLICY

The Acceptable Use Policy section states how users will be allowed to use network resources. For example, it might describe the types of organization information that can be included in Internet e-mail messages and explain when e-mail messages must be encrypted. This section might also address issues such as whether or not users can play computer games or use organization resources, such as e-mail and Internet access, for personal use.

SECURITY AWARENESS

The Security Awareness section states how the organization will ensure that users understand and follow the network security policy. This section might include security measures for training new employees and conducting periodic user training. This section might also include information about how the policy should be distributed to users.

COMPLIANCE

The Compliance Section explains how the organization will enforce the network security policy. For example, this section might state the methods the organization will use to investigate breaches of the policy. This section might also outline the penalties the organization will impose on users who violate the policy. For example, the organization's management team might decide that users who do not follow the policy could lose their network privileges or even their job.

COMPUTER NETWORK USAGE POLICY

ACKNOWLEDGEMENT

I have received and reviewed the Organization’s policy regarding computer usage. I understand that violation of any part of the computer network policy including, but not limited to, unauthorized use of passwords, may result in discipline up to and including my termination. I understand that the Organization may refer all such violations to the appropriate law enforcement agencies. I further understand that the Organization reserves the right to modify, revoke, suspend, terminate or change this policy at any time.

User Name (Please Print)

User Signature

Date

GENERAL POLICIES

Any dispute over the administration of these policies will be referred to the IT Committee.

1. A user's ID and password are to be held confidential. User- IDs and passwords are not to be shared or transferred to other individuals in or outside of the Organization. User IDs will be the first initial followed by the first seven letters of the user's last name (i.e. jsmith for John Smith). The network will periodically (every 60 days) require the user to change their password. The IT Department will have the ability to change passwords, if necessary (i.e. user forgets their password or the user changes). There will be no PC passwords.
2. Passwords must be at least six characters in length and should be a combination of letters and numbers. Alternating of upper and lower case letters is encouraged to make the password more secure. The user must enter the correct password within three (3) attempts or the network will automatically lock them out of the system. If the user's network account is locked out, the user must contact the IT Department in order to unlock the account and reinstate the account.
3. Users should only login to one terminal at a time. If users need to login to other terminals, they must logout of the first terminal before logging into the second terminal. This can be accomplished by clicking Start → Shutdown →. Choose the option to "Close all programs and login as a different user". This will properly log the user off in order to login to another terminal on the network.
4. Authorized users can only access the computer network using their personal user-id and password and are not allowed to "login" for other users unless approved by the IT Department. Users can only login to one terminal at one time.
5. Each authorized user is responsible for testing all outside data (i.e. diskettes) used on his or her machine for viruses.
6. Organization employees must "logout" of the network at the end of each day, unless previous arrangements have been made. In addition, users must use a password-protected screensaver or logout of the network if they know that they will be away from their computer longer than half an hour. This includes meetings and lunch times.
7. Any authorized user accessing the Organization network from off-site shall make sure that the connection is not left unattended.

8. Remote access into the Organization computer network will not be authorized to anyone outside of the employment of the Organization other than authorized computer vendors for remote diagnostic, repair and updating purposes. Department Heads must supply the IT Department with a list identifying vendors that need access to the system, including contact names and telephone numbers.
9. All hardware and software used at the Organization are for business use and work related projects only. Other use of the Organization's technology is forbidden.
10. Any documents or templates created by any user are the sole property of the Organization and may not be distributed in any manner, including Email, to individuals/organizations outside the Organization without written permission from their respective Department Head.
11. Authorized users who are employees of the Organization are the only individuals allowed access to review their personal Email messages. All messages created/received by Email and/or Voice Mail are the properties of the receiver, sender and the Organization.
12. The distribution of programs, databases and other electronic information and/or software is controlled by the laws of copyright, licensing agreements and trade secret laws. These must be observed. Users are not allowed to download software without written authorization by the IT Department. Users are also not allowed to distribute information that can be considered 'confidential' without approval from their Department Head. Users should refer to the Organization's Freedom of Information (FOI) Act procedures for guidance in responding to FOI requests.

USER RESPONSIBILITY

The content and maintenance of a user's personal network drive and local PC hard drive are the user's responsibility.

1. Keep files to a minimum. Files should be deleted once they are deemed unnecessary.
2. All data files that are of a critical business nature are to be stored on the appropriate network drives as designated by the IT Department or by the user's Department supervisor. This ensures that all Organization data will be backed-up as part of the standard network backup process, and can be recovered from storage media in the event the original file is lost or damaged.
3. The network frequently scans your system for viruses, however, when receiving or downloading files from other systems you must run a scan on the files to prevent the spread of a virus. Each user will also be responsible for updating the virus files on their PC. Users will be notified and provided with instructions when this is deemed necessary. Occasionally, software patches or upgrades are necessary. When this occurs, users will be instructed on the appropriate steps to be taken.
4. User files may be accessed by persons with system privileges only with cause. As a general rule, users shall not maintain anything they expect to be private or confidential in the "C" drive of their computers.
5. The content and maintenance of a user's Email messages are the user's responsibility:
 - A. Check Email daily.
 - B. Messages should generally be deleted immediately after reading since they take up disk space.
 - C. Never assume that your Email can be read by no one except yourself; others may be able to read or access your mail. Never send or keep anything that you would not mind seeing on the evening news.

INTERNET EMAIL AND WORLD WIDE WEB ACCESS

As a user of the network, you may be allowed to access the Internet via the World Wide Web or through Email. Outlined below are a set of guidelines that must be followed when using the Organization's internet access.

Internet Email:

1. The content of anything exchanged via Internet Email must be appropriate and consistent with Organization policy, subject to the same restrictions as any other correspondence.
2. Users should be aware of any private or confidential information contained in an Email or attached data file(s). Under no circumstances should data be transported via the Internet that is a violation of state or federal law.
3. Any person receiving disk images or programs via the Internet must conduct a virus check on them before executing or distributing them.
4. Be aware of the potential audience. Avoid expressing opinions that could reflect negatively on the Organization and opinions that could result in unwanted actions or reactions from Internet participants that include many Organization residents.

World Wide Web Access:

5. Employees granted access to Internet Email and/or the World Wide Web must use that access in a way that is consistent with their job function, regardless of whether the access is on the employee's time.
6. Viewing, downloading, displaying or accessing inappropriate sites is prohibited. Examples of inappropriate sites include, but are not limited to, any access that violates state and/or federal laws, internet access that is unethical or immoral in nature, the distribution of unsolicited advertising, propagation of computer worms and/or viruses, distribution of chain letters and use for recreational games.
7. Users can only register for an Internet based service or product by obtaining written approval from their respective Department Head and the IT Department.

VII.E Remote Access

As identified within the technology report, remote access to the Town's network will enhance an employee's ability to obtain valuable information. Any person within the Town (assuming appropriate security rights) should be able to access the Town network through a standard telephone or internet connection. To facilitate and simplify remote access, the project team recommends implementing Citrix in conjunction with Windows 2000 Terminal Server.

The server edition of Windows 2000 integrates terminal services as part of the standard operating system rather than a separate add-on (i.e. like Windows NT). Citrix MetaFrame extends the value of Windows 2000 Terminal Services in three key ways:

A. Heterogeneous Computing Environments:

MetaFrame delivers Windows-based application access to virtually all types of client hardware, operating platforms, network connections and LAN protocols. As a result, organizations can keep their existing infrastructure, yet deploy the most advanced, 32-bit Windows-based applications across the enterprise.

B. Enterprise Scale Management:

Organizations building computing solutions around Terminal Server will benefit from the robust management tools of MetaFrame, including increased system scalability and simplified support of multiple applications for thousands of users enterprise-wide. These management tools include:

- Citrix Program Neighborhood allows administrators to quickly and easily "push" access to new or updated server-based applications directly to the user without concern for client configuration.
- Citrix Load Balancing Services allow multiple MetaFrame servers to be grouped into a unified "server farm" to meet the needs of a growing user base.
- Citrix Resource Management Services provides extensive audit trail, comprehensive system monitoring, and the ability to construct detailed billing reports.
- Citrix Installation Management Services automates the application installation process so applications may be quickly and easily replicated to Citrix servers across the enterprise.

C. Seamless Desktop Integration:

MetaFrame offers increased functionality and an enhanced user experience, including complete access to all local system resources such as full 16-bit stereo audio, local drives, COM ports and local printers. Although applications run remotely from the server, they look, feel and perform as though they are running locally. By providing this level of comfort for users, MetaFrame eliminates the need for training and increases user productivity.

In May of 1997, Citrix and Microsoft signed a five-year joint development and marketing agreement. As such, Citrix and Microsoft continue to work together to bring server-based computing solutions to the market. Outlined below is a brief overview of the capabilities and comparison of Windows 2000 Terminal Server and Citrix Metaframe.

MetaFrame Comparison For Microsoft NT4.0 Terminal Server and Windows 2000 Server

Available Clients	Terminal Server 4.0	Windows 2000 Terminal Services	MetaFrame
Windows NT	✓	✓	✓
Windows 95/98	✓	✓	✓
Windows 3.11 (Workgroups)	✓	✓	✓
Windows 3.1			✓
Windows CE		✓	✓
DOS			✓
Macintosh (Motorola, PowerPC)			✓
Browser - Internet Explorer			✓
Browser - Netscape			✓
UNIX - Solaris/Sparc			✓
UNIX - Solaris/x86			✓
UNIX - SunOS			✓
UNIX - DEC			✓
UNIX - HP/UX			✓
UNIX - IBM			✓
UNIX - SGI			✓
UNIX - SCO			✓
UNIX - Linux (Red Hat, Caldera, SuSE, Slackware)			✓
Java – JDK 1.1			✓
Java - JDK 1.0			✓
DirectICA/MVGA			✓
RISC OS			✓
PSOS			✓
NCI OS			✓
Net OS			✓
QNX OS			✓

Client Devices	Terminal Server 4.0	Windows 2000 Terminal Services	MetaFrame
PCs (Windows 3.11 or greater)	✓	✓	✓
PCs (Windows, DOS, UNIX, Linux)			✓
Macintosh (Motorola, PowerPC)			✓
Handheld PCs (HP Jornada, Compaq C Series, etc.)			✓
Network Computers (Sun JavaStation, IBM Network Station, etc.)			✓
Windows-based Terminals (CE-based)	✓	✓	✓
Windows Terminals (DOS, Linux, etc.)			✓
Network Terminals (Wyse Winterm 5000, etc.)			✓
Set Top Devices (BocaVision STB121, etc.)			✓
Mobile hand-held devices and network appliances			✓
Client Features	Terminal Server 4.0	Windows 2000 Terminal Services	MetaFrame
Manual drive redirection	✓ ¹	✓ ¹	✓ ¹
Bitmap caching	✓	✓	✓
Persistent bitmap caching		✓	✓
Auto printer creation		✓	✓
Clipboard redirection		✓	✓
Automatic drive redirection			✓
SpeedScreen			✓
Seamless Windows			✓
Business Recovery Client			✓
Program Neighborhood			✓
<i>1 PC clients running RDP can map local drives through the use of Windows networking (this is not a feature of RDP)</i>			
Client Multi-Media	Terminal Server 4.0	Windows 2000 Terminal Services	MetaFrame
System sounds (beep)	✓	✓	✓
16-bit stereo (WAV, MIDI, AVI)			✓
Video support			✓ ²
Multi-media bandwidth control			✓ ²
<i>2 MetaFrame 1.8 is video-ready on both the server and the 32 bit Windows client. On-demand video streaming is supported when used in conjunction with Citrix's upcoming video technology.</i>			

Transport Protocols	Terminal Server 4.0	Windows 2000 Terminal Services	MetaFrame
TCP/IP	✓	✓	✓
IPX			✓
SPX			✓
NetBEUI			✓
Connections	Terminal Server 4.0	Windows 2000 Terminal Services	MetaFrame
LAN	✓	✓	✓
WAN	✓	✓	✓
RAS Dial-up	✓	✓	✓
Direct Serial Connection (async.)			✓
Direct Dial-up			✓
Browse Available Servers			✓
Local Device Support	Terminal Server 4.0	Windows 2000 Terminal Services	MetaFrame
Local printer (parallel port)	✓	✓	✓
Local client print spooler		✓	✓
COM port redirection			✓
Server Features	Terminal Server 4.0	Windows 2000 Terminal Services	MetaFrame
One to one Shadowing		✓	✓
One to many Shadowing			✓
Many to one Shadowing			✓
Cross Server Shadowing			✓
Application Publishing			✓
Program Neighborhood			✓
Cross Domain management			✓
Cross Subnet management			✓
Automatic Client Update			✓
Shadow Task Bar			✓
Publish Applications to the Web (ALE)			✓
WinFrame/MetaFrame interpretability and management			✓
Administrator Toolbar			✓

Multi-Media	Terminal Server 4.0	Windows 2000 Terminal Services	MetaFrame
16-bit Stereo (WAV, MIDI, AVI)			✓
Video			✓ 2
Multi-media bandwidth control			✓
<i>2 MetaFrame 1.8 is video-ready on both the server and the 32 bit Windows client. On-demand video streaming is supported when used in conjunction with Citrix's upcoming video technology.</i>			
Management Services	Terminal Server 4.0	Windows 2000 Terminal Services	MetaFrame
Resource Management Services		✓	✓ 3
Encryption	✓	✓	✓
Security Management Services (RSA RC5 128 bit)			✓
Load Balancing		✓ 4	✓
Advanced Load Balancing (app publishing, mgmt services)			✓
Installation Management Services			✓
<i>3 Citrix Resource Management Services is available for Terminal Server 4.0. Additionally, Citrix will be releasing a version of Resource Management Services for Windows 2000</i>			
<i>4 Windows 2000 Terminal Services with NLB (Network Load Balancing) is limited to 32 servers.</i>			

Note - Some of the information in this document is based on public information provided by Microsoft Corporation at its web site, which may be subject to change without prior notice; see www.microsoft.com.

Town of Greenwich
 Strategic Technology Plan
 Office Automation Software License Information
 As of February 2002

<u>Item</u>	<u>Description</u>	<u>On-Hand Quantity</u>	<u>Upgrade Available</u>	<u>Upgrade Cost</u>	<u>Annual Maintenance</u>	<u>Other Cost</u>
<i>Current Software Licenses Within the Town</i>						
1.	MS-Office 97 Professional	2	Yes	\$ 235	\$ 95	
2.	MS-Office 2000 Professional	28	Yes	\$ 235	\$ 95	
3.	MS-Office XP Professional	10		N/A	\$ 95	
4.	MS-Office Standard	267	No	N/A	N/A	
5.	Upgrade Cost For MS-Office 97 Professional to XP	2				\$ 470
6.	Upgrade Cost For MS-Office 2000 Professional to XP	28				\$ 6,580
7.	Replacement Cost for MS-Office Standard	267				\$ 85,440
8.	Additional Licenses Required	146				\$ 46,720

Notes

- A. The Town standardizes on Microsoft Office XP software but temporarily installs Microsoft Office 2000 licenses

Town of Greenwich
 Strategic Technology Plan
 Proposed GIS Software Costs
 As of February 2002

Item	Capital Cost	Operating Costs	Comment
<i>GIS Software</i>			
1. Arc/INFO		\$ 3,000	
2. SDE for Windows NT/SQL Server 7.0		\$ 3,000	One connection
3. SDE for Windows Maintenance and Technical Support		\$ 1,150	Each seat
4. Arc CAD Software		\$ 225	Each seat
5. ArcView GIS		\$ 349	Each seat
6. MapObjects IMS Server		\$ 1,000	
<i>Training</i>			
7. ArcView GIS 3.1		\$ 800	Per Person
8. ArcCAD 14		\$ 800	Per Person
9. Advanced Arc/Info		\$ 1,800	Per Person
10. SDE (Prog/Admin)		\$ 2,000	Per Person
11. Introduction to MO IMS (Inter/Intranet)		\$ 500	Per Person
<i>Database Development</i>			
12. TIGER Database	\$ 6,000		Increase original amount by 20% due to inflation
13. Small Scale Database	\$ 78,000		Increase original amount by 20% due to inflation
14. 2' Contours	\$ 300,000		Increase original amount by 20% due to inflation
15. Digital Orthophotos	\$ 300,000		Increase original amount by 20% due to inflation
	Total Database Development	\$ 684,000	
	Annual Database Cost Over Three Years	\$ 228,000	

Town of Greenwich
 Strategic Technology Plan
Proposed Telecommunication Configurations and Costs
 As of February 2002

	Monthly Cost	Annual Cost	Year 1 Cost	Year 2 Cost	Year 3 Cost	Total Contract Cost
1. Wide Area Network and Internet Access		\$ 885,014	\$ 992,414	\$ 992,414	\$ 670,214	\$ 2,655,041
Fiber Based Private Network	\$ 41,100					
Nokia 440Ha with Checkpoint Firewall (Greenwich Library)	\$ 7,445					
Nokia 440Ha with Checkpoint Firewall (Greenwich Library)	\$ 7,445					
Greenwich Town Hall Dual Entrance Facility	\$ 411					
Greenwich Library Dual Entrance Facility	\$ 800					
Internet Access 15 Mbps-Greenwich Library	\$ 12,450					
Internet DS3 Router-Greenwich Library	\$ 1,300					
Internet Diverse DS3 Loop - Town Hall	\$ 1,500					
Internet DS3 Router - Town hall	\$ 1,300					
Total	\$ 73,751					
2 DSL Internet Connection (Failsafe -1.54 Mbs)	\$ 180	\$ 2,160				

Assumptions

1. Town of Greenwich will pay \$82,701.14 per month for the first 1 to 24 months
2. Town of Greenwich will pay \$55,851.14 per month for months 25-36
3. The current terms of the WAN and Internet service are for three years

Town of Greenwich
Strategic Technology Plan
Proposed Software Costs
As of February 2002

Item	Daily Cost	Capital Cost	Operating Costs	Comment
1. MUNIS Implementation Costs				
Financial Application Software			\$ 334,500	Per quarter figure is \$83,625
Tax & Sewer Collection Software			\$ 46,008	
Tax Assessment			\$ 61,500	
MUNIS Migration services(Data Conversion, Installation, Consulting)			(Included)	Total of 20 days included
MUNIS Training			(Included)	Total of 63 days included (not enough training has been identified)
Additional MUNIS Training	\$ 1,020			Factored in 30% for training (originally \$850/day)
Additional MUNIS Consulting	\$ 1,100			Does not include travel
Additional MUNIS Programming	\$ 1,000			Does not include travel
2. Cornerstone 2000 System				
Application Software		\$ 12,500	\$ 2,500	
IVR Hardware		\$ 9,500		
Migration services(Data Conversion, Installation, Consulting)		\$ 4,000		
Training			\$ 8,000	Proposed training will not be enough, added 2 days
3. Fire Management System (Esitmated)				
Application Software		\$ 70,000	\$ 12,600	Annual Maintenance is calculated using 18% of Software Purchase Price
Migration services(Data Conversion, Installation, Consulting)		\$ 14,000		
Application Training			\$ 7,000	
4. Fleet Management Software (Estimated)				
Application Software		\$ 50,000	\$ 9,000	Annual Maintenance is calculated using 18% of Software Purchase Price
Migration services(Data Conversion, Installation, Consulting)		\$ 10,000		
Application Training			\$ 5,000	
5. Nursing Home Management System (Estimated)				
Application Software		\$ 100,000	\$ 18,000	Annual Maintenance is calculated using 18% of Software Purchase Price
Migration services(Data Conversion, Installation, Consulting)		\$ 20,000		
Application Training			\$ 10,000	
6. Vermont Systems Internet Registration System (Estimated)				
Application Software-Photo ID (marina)		\$ 5,000	\$ 1,000	
Migration services(Data Conversion, Installation, Consulting)		\$ 1,000		
Application Training			\$ 1,000	
Application Software-Webtrac		\$ 13,800	\$ 2,500	
Migration services(Data Conversion, Installation, Consulting)		\$ 3,000		
Application Training			\$ 3,000	
Application Software-Credit Card Processing		\$ 1,000	\$ 300	
Migration services(Data Conversion, Installation, Consulting)		\$ 1,000		
Application Training			\$ 500	
7. Integrated Permitting Management System (Estimated)				
Application Software		\$ 80,000	\$ 16,000	Annual Maintenance is calculated using 20% of Software Purchase Price
Migration services(Data Conversion, Installation, Consulting)		\$ 55,300		
Application Training			\$ 12,000	
8. Integration software for ESRI and HTE (Estimated)				
Application Software		\$ 12,000	\$ 2,160	
Migration services(Data Conversion, Installation, Consulting)		\$ 2,400		
Application Training			\$ 1,200	

Town of Greenwich
 Strategic Technology Plan
Proposed Configurations and Costs
 As of February 2002

Item	Unit Cost	Unit(s)	Purchase Price	Annual Lease Price
1. Standard New Desktop Computer Pentium IV 1.8 GHz 20 GB hard drive 256 MB RAM 17" Monitor 10/100 Network Card CD-ROM Windows 2000	\$ 1,500		\$ 1,500	\$ 549
2. Power User Workstation Pentium IV 2.0 GHz 40 GB hard drive 512 MB RAM 19" Monitor Network Card CD-ROM/RW, DVD Windows 2000	\$ 3,000		\$ 3,000	\$ 1,098
4. Laptop/Notebook Computer Pentium III 1.0 GHz 20 GB hard drive 256 MB RAM CD-ROM/RW, DVD PCMCIA Modem Card PCMCIA Network Card Windows 2000	\$ 2,500		\$ 2,500	\$ 915
5. Citrix Software Citrix Metaframe - 20 user Software/Hardware Installation	\$ 3,900	1	\$ 8,900	
Annual Subscription	\$ 5,000	1		
	\$ 1,000	1		
6. Laser Printer (Business quality)-Moderate Speed Network card			\$ 1,550	
7. Laser Printer (Business quality)-High Speed Network card			\$ 2,950	
8. Desktop Scanner Ability to scan at the desktop (not a flat bed scanner)			\$ 300	
9. Microsoft Office Maintenance			\$ 320	
			\$ 93	
12. Virus Software			\$ 50	
13. Hand Held Windows CE Device with Phone			\$ 650	
14. Altiris Software Maintenance			\$ 27	
			\$ 8	
14. Hand Held Wireless Windows CE Device			\$ 250	

Assumptions

1. The workstations have been configured with an estimated configuration
2. Prices for additional MS-Office upgrades are based on discounts for government operations.
3. Lease payments are based on a 36 month lease

Town of Greenwich
Strategic Technology Plan
Proposed Server Configuration and Costs
As of February 2002

	Unit Cost	Unit(s)		Total Cost	Annual Lease Price
1. Low End Windows 2000 Server - Pentium III 1.2 GHz					
Server	\$ 5,533	1	\$	5,533	
18 GB HDD	\$ 320	6	\$	1,920	
128 MB RAM Kit	\$ 93	3	\$	279	
256 MB RAM Kit	\$ 185	3	\$	555	
Network Interface Card (10/100)	Included	1			
CD-ROM	Included				
600 Watt UPS	\$ 500	1	\$	500	
Virus Software	N/A	1			
Window 2000 Server with 5 license	\$ 2,500	1	\$	2,500	
Hardware Installation	\$ 480	1	\$	480	
3 Year, 7/24, 4 hour response	\$ 1,800	1	\$	1,800	
				\$ 13,567	\$ 5,604
2. Mid-Size Windows 2000 Server - Pentium III 1.2 GHz					
Server	\$ 1,844	1	\$	1,844	
18 GB HDD	\$ 400	6	\$	2,400	
256 Mb RAM Kit	\$ 185	4	\$	740	
Raid 5 controller	\$ 1,037	1	\$	1,037	
Redundant Power Supplies	\$ 463	1	\$	463	
Network Interface Card (10/100)	\$ 61	2	\$	122	
900 Watt UPS	\$ 600	1	\$	600	
Virus Software	\$ 1,000	1	\$	1,000	
Window 2000 Server with 5 license	\$ 2,500	1	\$	2,500	
Hardware Installation	\$ 640	1	\$	640	
3 Year, 7/24, 4 hour response	\$ 2,623	1	\$	2,623	
				\$ 13,969	\$ 5,808
3. Mid-Size Windows 2000 Server - Pentium III 1.2 GHz With Extra Disk Space					
Server	\$ 1,844	1	\$	1,844	
18 GB HDD	\$ 320	14	\$	4,480	
256 Mb RAM Kit	\$ 185	4	\$	740	
Raid 5 controller	\$ 1,037	1	\$	1,037	
Storage Works Enclosure	\$ 2,272	1	\$	2,272	
Redundant Power Supplies	\$ 463	1	\$	463	
Network Interface Card (10/100)	\$ 61	2	\$	122	
DLT Tape Drive	\$ 4,000	1	\$	4,000	
900 Watt UPS	\$ 600	1	\$	600	
Virus Software	\$ 1,000	1	\$	1,000	
Window 2000 Server with 5 license	\$ 2,500	1	\$	2,500	
Hardware Installation	\$ 640	1	\$	640	
3 Year, 7/24, 4 hour response	\$ 2,623	1	\$	2,623	
				\$ 22,321	\$ 9,084
4. High-End Windows 2000 Server - Pentium III 1.2 GHz, Dual Processor					
Server	\$ 1,844	1	\$	1,844	
Second Processor	\$ 3,300	1	\$	3,300	
18 GB HDD	\$ 320	10	\$	3,200	
256 Mb RAM Kit	\$ 185	4	\$	740	
Raid 5 controller	\$ 1,037	1	\$	1,037	
Storage Works Enclosure	\$ 2,272	1	\$	2,272	
Redundant Power Supplies	\$ 463	1	\$	463	
Network Interface Card (10/100)	\$ 61	2	\$	122	
DLT Tape Drive	\$ 4,000	1	\$	4,000	
900 Watt UPS	\$ 600	1	\$	600	
Virus Software	\$ 1,000	1	\$	1,000	
Window 2000 Server with 5 license	\$ 2,500	1	\$	2,500	
Hardware Installation	\$ 640	1	\$	640	
3 Year, 7/24, 4 hour response	\$ 2,623	1	\$	2,623	
				\$ 24,341	\$ 10,380

Assumptions

- The servers have been configured with an estimated configuration
- The mid and large servers have been configured with Raid 5 hard drive configurations
- The mid-server was modified to include 1 GB of RAM
- The monthly lease amounts of the servers are as follows:

-Low End Windows 2000 Server - Pentium III 1.2 GHz	\$ 467
-Mid-Size Windows 2000 Server - Pentium III 1.2 GHz	\$ 757
-High-End Windows 2000 Server - Pentium III 1.2 GHz, Dual Processor	\$ 865