A RESOLUTION REGARDING THE TOWN'S TECHNOLOGY PLAN
Resolution No. 109/2002-03

WHEREAS, the Carrboro Board of Aldermen adopted an Action Agenda in March 2002, and;

WHEREAS, one of the items on the adopted Action Agenda is to "prepare a technology report with plans for future improvements in communication and technology infrastructure and;

WHEREAS, staff has prepared a report on future technology improvements.

NOW, THEREFORE BE IT RESOLVED by the Carrboro Board of Aldermen that the Aldermen has conducted a work session to review and discuss the technology plan and;

BE IT FURTHER RESOLVED by the Carrboro Board of Aldermen that the Aldermen identifies the following priorities for the use and expansion of technology:

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This is the 25th day of February in the year 2003.

Technology Plan For The Town of Carrboro: Limited Scope

CONTENTS

I. Executive Summary

This technology plan is not intended to limit or stifle departmental creativity, but to provide a stable infrastructure and environment in which to solve common business problems faced by most departments and to allow departments to collaborate on significant efforts. The plan further facilitates a technological environment in which departments can communicate, interoperate and share data and resources while reducing the costs associated with training and support through the use of enterprise architecture and standards for Information Technology.

This technology plan begins by defining a preferred minimum set of computer skills that all employees are expected to possess. Current employees are expected to gain these skills with the support of the Town and newly hired employees will be recruited with a preference for candidates that have basic computer skills. Town support will be in the form of ongoing Town provided training, management expectation that employees will participate in training and management documenting and promoting computer skills through staff performance evaluations. As the computer skills of staff throughout the organization increase and become more uniform, a common ground of computer literacy will be established that will allow employees to interact, share data and solve problems more effectively. The end result will be an efficient work force that has the potential to deliver new services (made possible through technological innovation) and improved services to the Town's residents.

The technology plan then discusses the importance and necessity of maintaining and updating the installed technological infrastructure. Three criteria: business, technical and financial are identified and explained that will be used to determine if technological infrastructure is to be replaced, updated or retired. It is strongly suggested that end-user workstations are to be replaced on a four year cycle, servers to be replaced on a three year cycle and other network infrastructure and business applications to be replaced as dictated by the criteria listed above. Finally, it is noted that replacement of infrastructure with the latest technology, rather than applying major upgrades to existing infrastructure, is often the most cost effective path.

Lastly, the technology plan examines the role and application of technology in departmental business processes. Departments were surveyed for the top three technology priorities that would help improve work processes and services delivered to residents. It was discovered that the results could be neatly categorized under the following four technology themes: Internet and intranet initiatives, integrating GIS into ongoing business processes, departmental applications and records management. Internet initiatives would be in the form of ongoing refinement and revision of the current web site with the objective of becoming a high availability e-government portal to the Town's vast resources and services. The intranet, which serves internal staff, will continue to evolve toward a launch point for internal web based applications and serve as an information resource for staff. The use of GIS technologies, traditionally used solely by the Planning Department, is beginning to spread to other departments in an effort to further expedite the delivery of services or further refine the meaning of existing data. As examples, GIS is being considered as a tool for tracking and displaying crime and fire statistics as well as tracking and scheduling maintenance and repair of public facilities.

In summary, the primary focus of technology initiatives in the next few years shall focus on maintaining the core technological investment; introducing automated business processes to departments that currently do not have such tools; and improvement of online access and transactions in a convenient manner for town residents and patrons. It must be emphasized that funding only one IT position is no longer considered adequate given the current workload of managing a computerized phone system, 110 personal computers, active internet and intranet websites, and ongoing network maintenance. The technology plan reveals the depth of support currently required and envisioned from IT infrastructure and staff.

II. Training

The Town of Carrboro recognizes the benefit of helping Town staff achieve fundamental computer software literacy. To this end, the Town also recognizes that it must then provide the necessary computer software training, so that the staff may obtain the skills necessary to perform their jobs effectively. Computer software training will further enable staff members to realize an even greater potential through individual contributions and collective efforts as part of a computer literate team.

GOAL:
Implement an organization-wide training schedule with the expectation of reaching specified skill levels.

Benefits of training include:
- Reduces hidden costs of "baptism by fire". This often results in handling a task in a much less efficient manner (not using the correct or best-fit tools for the job). Training reduces reliance on other coworkers in the completion of tasks that can be and should be handled by a single properly trained staff member.
- Provides an opportunity to hone existing skills, while developing new ones. Training is good for everyone. All employees benefit from understanding possible uses of technology in all aspects of service delivery and work processes even if the software training does not directly apply to their job duties.
- Promotes consistent communication and increased interaction between all employees.
- Fosters a sense of loyalty to the organization.
- Enables IT function to direct work on projects envisioned in this report.

The training tasks, listed below, represent a core or fundamental skills set that all staff are expected to possess (given the help of Town resources and backing). The priority of training tasks is listed below (number one below being of the highest priority):

1) Knowledge of an email client – Microsoft Outlook™
   a. Intermediate Skill Level – Examples of competency:
      i. Send and receive email messages
      ii. Retrieve and add attachments from/to email messages
      iii. Calendaring – how to schedule appointments/meetings/room and vehicle reservations and invite others to those meetings. Expectation that all employees will use the calendaring feature (do not maintain a hard copy PIM – Personal Information Manager for town related business).
      iv. The use of public folders for collaboration and common access.
2) Knowledge of a productivity suite – Microsoft Office™
   a. Depends on Application – Examples of competency:
      i. Word Processing Skills: Microsoft Word™ - Intermediate Skill Level. Skills should include, but not be limited to, mail and document merge, envelope and labels creation (various methods), tables creation, modifying and handling formatting issues, as well as, MS Word "auto-format" issues, inserting graphics and basic linking to spreadsheets. Employee should learn how to edit documents and share those edits and document drafts with other employees.
      ii. Spreadsheet Skills: Microsoft Excel™ - Intermediate Skill Level. Skills should include all aspects of creating formulas, absolute v. relative cell reference, freezing row or column headers, basic linking to other spreadsheets. Need to understand printing options – sizing to fit on one page; formatting tools; creating graphs

        iii. Database Skills: Microsoft Access™ - No required Skill Level. A very basic understanding of databases would be desirable, but not realistic across the organization. This is software that is department-dependent in design and use.

        iv. Microsoft PowerPoint and Publisher™ - No required Skill Level. This is software that is department dependent. PowerPoint is very useful for presentations. This is software that is needed for staff members and management that do presentations to the Board of Aldermen or to the community. All management staff should have a Beginner Skill Level. It is a skill that is rapidly acquired if competent with Word and Excel.

3) Basic Microsoft Windows navigation

    a. Knowledge to create, copy, move and understand relationship of files, folders/directories, drives and local v. networked drives.

    b. Knowledge to navigate a directory/folder structure. How to search for files.

    c. Knowledge to create desktop shortcuts, as well as, take advantage of basic Windows usability features.

III. Information Technology Infrastructure

The pace of technological change and replacement is accelerating. The steady introduction of new operating system versions, software applications and higher performance hardware, at lower costs, quickly makes current network and computing infrastructure become outdated. Therefore, it is necessary for the Town of Carrboro to formulate a strategy on when Information Technology is considered obsolete and disposed. For the purposes of this document, network and computing infrastructure will include all networked devices from servers to desktop computers and printers.

GOAL:
To establish an Information Technology equipment life cycle schedule of four years for desktop workstations, three years for servers and as applicable for network infrastructure (switches, routers, cabling, infrastructure software, etc.) based upon the business, technical, and financial criteria listed below. Current workstation replacement schedule is seven years. Server replacement is not applicable at this point.

It is commonly accepted that the useful life of Information Technology equipment is near three years of service. However, many organizations extend the use of equipment beyond that time based on budget constraints or true need.

The Town of Carrboro defines the general business, technical, and financial criteria that will trigger the replacement of a piece of Information Technology equipment as follows:

Business Criteria: The software package or hardware becomes unreliable, unsupported, does not support newer common industry standards, is feature poor in comparison to currently available products and/or has become inefficient to use. Business productivity gains are being lost to inefficiencies in currently used technologies that could be alleviated by newer technologies.

In the past, most tasks were accomplished on paper with pencil or pen, with the introduction of computers it simply became good business practice to use a spreadsheet or word processor. Worker productivity could be greatly enhanced for minimal software costs of $200-$600 per worker.

Today, it is possible to find off-the-shelf software packages built for specific business processes that are highly engineered, well supported and professionally written. Computer applications, specifically written for this business process, exist which significantly reduce data entry time, mistakes and redundancy. As a side benefit, "data mining" may now occur on the collected information. Business criteria drive the decision process behind purchasing a software package that will replace an older less efficient package or process.

Business criteria justified the creation of an Internet web site. A newer technology allowing greatly increased accessibility to Town Hall.

Another potential example of business criteria justifying the use of technology exists in the Carrboro Recreation & Parks Department. Currently, the Recreation & Parks Department tracks program registration and facility reservation through a combination of spreadsheets and documents. The updating, maintaining, tracking additions and cancellations (of programs) consume many hours of staff time. Mistakes may even be introduced as numbers, dates and names are transferred between documents. The FY02-03 budget suggests that the Recreation & Parks Department purchase an off-the-shelf software package to support operations. A professional software package would provide the means to reduce the cost of providing information, while improving the quality and timeliness of services. Currently, staff maintains rosters on 3,200 registration receipts (that can contain payment for multiple programs) for 340 programs per year in athletics, general programs, and Century Center reservations. The benefit of a software package

supporting operations is increasing the number of people who can assist in the registration or reservation process while decreasing the time it takes to develop calendars, reports on program registration, Century Center usage and revenue generation.

Also recommended is the implementation of an online registration and payment capability for recreation programs via the Town's Internet site. The Department's ability to register residents in programs will be effectively extended to a "24 hour x 7-day" registration period.

Technical Criteria: While the current software and hardware environment is maintained, patched, upgraded and/or improved various hardware and software will become incompatible and thus obsolete. Technical functionality of existing equipment is not as robust as new technology.

For example, DOS (Disk Operating System) the primary operating system of the early 1980's has not been produced commercially in about nine years. The latest operating system used by the Town, a product of Microsoft, can still run many general DOS based programs. A DOS based application may do everything a department needs and they have no desire to upgrade (especially when software upgrade costs may be $10,000). These programs, however, begin to function unreliably or not as expected when moved to newer operating systems. For example, programs cannot print to networked printers, data cannot be stored on network drives and certain functionality simply stops working. The companies that produce operating systems, as time passes, become less and less interested in fully supporting legacy functionality (support costs prohibit such backward compatibility). The true costs of "making" these programs work with newer technology then shifts to the IT staff of the Town (very time consuming). At some point, these programs simply stop functioning with the newer technology and the solution of replacement is obvious (usually much later than it should have been due to budgetary constraints). Technical criteria then demand an upgrade/replacement.

Financial Criteria: Operating and/or maintenance expenses exceed the cost of replacement. Costs to acquire staff with specialized technical skill sets exceed the cost to replace existing equipment with newer mainstream technologies.

A classic example is the financial/manufacturing systems/packages running on now legacy Digital VMS systems. These machines/applications may actually still be doing the job. Once considered mainstream, state-of-the-art workhorses, they have become legacy devices holding businesses' data hostage. Due to the initial cost of these systems, as well as the costs of programming the application, many mid-size and smaller organizations have had great difficulty retiring these machines. Unfortunately, the technical expertise that once programmed and maintained these systems has since moved on to newer technology (following the demand). Finding and paying the people to maintain, re-program or even retrieve data from existing systems has become difficult and very expensive as the pool of qualified technical staff continues to shrink over time. Financial criteria, in this case, demand an upgrade/replacement.

Further, it is the Town's policy to replace desktop workstations with the latest technology rather than to apply major upgrades to existing workstations. Disadvantages to upgrades are:

- Upgrading is expensive because, more often than not, multiple system components must be upgraded in order to achieve the intended performance improvement.
- The purchase price of the various hardware components needed to accomplish an upgrade will exceed the purchase price of a new computer.
- The cost of labor to install an upgrade to existing hardware will far exceed the cost of labor to install a new workstation.
- Upgraded workstations have uncertain maintenance profiles and support costs.
- Upgraded workstations have added administrative complexity.
- There is no increase in residual value of upgraded workstations.

- Upgrading workstations tends to increase the overall complexity in the installed hardware base.

Managing replacement cycles, software upgrade strategies and downstream support costs are the keys to sustaining the Town's original Information Technology investment while minimizing the time needed to maintain old hardware and software. Maintaining a replacement cycle will allow the Town of Carrboro to continue to utilize the benefits of next-generation office environments, simplify technical support issues, and increase the Town's ability to deploy new solutions to business problems.

Finally, it is recommended that the replacement decision will be made in conjunction with the Town's budget planning cycle. This will allow for the appropriate budget to be set aside in order to sustain any current information technology projects. A recurring substantial information technology infrastructure cost break-out is included immediately below this section to further clarify and set expectations for expenditures toward maintaining the *existing* infrastructure, security, integrity and reliability. *Growth of infrastructure, as well as, new projects will change (increase) the dollar amounts listed below.* The dollar amounts listed below are for general guidance, are time sensitive and only substantial items are included.

Recurring Substantial Information Technology Infrastructure Cost Breakout

1. Network Infrastructure Hardware Maintenance
    a. Servers - $24,000/Year (3 year replacement cycle)
    b. Workstations - $66,300/Year (4 year replacement cycle)
    c. Networked Printers - $8,500/Year (5-6 year replacement cycle)
    d. Core Infrastructure (switches, routers, etc.) - $4,000/Year (4-7 year replacement cycle)
    e. Cabling:
        i. Copper – $0.00/Year
        ii. Fiber-Optic - $5,000/Year
2. Network Infrastructure Software Maintenance
    a. Servers (OS and application server software) - $8,000/Year (3-4 year replacement cycle)
    b. Workstations (OS, productivity suite and applicable network licenses) - $0.00/Year (**if** replacement cycle is maintained)
    c. Geographical Information System (GIS)
        i. Information Technology - $2,200/Year
        ii. Planning Department - $8,000/Year (includes mapping orthophotos)
3. Network Infrastructure Protection from Internal and External Malicious Forces
    a. Firewalling - $5,500/Year
    b. Content Filtering - $2,800/Year
    c. Virus Protection & Repair - $7,500/Year
        i. Servers, Email Server(s), Desktop and HTTP filtering
        ii. SPAM Blocking/Minimization
    d. Intrusion Detection/Security Scanning - $2,500/Year
4. Internet Connectivity - $15,000/Year
5. Miscellaneous Other - $25,000/Year

Grand Total: $185,000/Year (rounded up)

Note 1: Substantial dollar amounts that were not included in the above cost breakout include IT staff salaries and benefits, yearly telephone costs and a yearly lease payment for the phone system and fiber-optic system (that will end in 2005).

Note 2: When a range for replacement years is indicated, the bolded year number is the number used for calculations.

Note 3: Workstation Replacement

1. FY2002-2003: 100 Workstations. Any significant growth in the number of workstations would be due to the creation of new positions requiring a computer.
2. Cost to purchase a new workstation w/all applicable licenses is currently $2,650 per workstation. Applicable licenses include a license to use a productivity suite per desktop and all necessary licenses to access relevant networked resources. A minimum level of computer workstation is purchased based on the following key concepts:

    a. Manageability and Serviceability.
    b. Emphasis On Relevant Technology.
    c. Long Deployable Life-Cycles.
    d. Managed Product Transitions, Assists long-term technology planning.

    Together, these factors reduce the total cost of ownership by making it easy to plan, purchase, deploy, maintain, and refresh the installed base of workstations.

Note 4: Network infrastructure software maintenance costs can be difficult to predict over time. Software costs and licensing practices can (and do) change abruptly and significantly due to market pressures (or lack of).

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IV. Business Applications and Processes

Existing departmental business processes and applications must be reviewed on an ongoing basis. Information technology improvements must also be tracked and reviewed, and when appropriate and cost effective, applied to existing business processes to increase efficiency and quality of service to the residents of Carrboro.

New technologies may emerge, such as the Internet, allowing a municipality like Carrboro to potentially extend service hours to seven days a week and twenty-four hours a day through a web site acting as a portal to town services. Existing technology, such as GIS (in the past more commonly seen in larger cities, state, federal, and academia environments), has become more mainstream and cost-effective due to technical advancements in computer hardware and software. Specialized business applications are becoming more robust, professionally written and mainstream due to ongoing advancements in technology. These applications no longer require specialized computing hardware which in turn require specialized staff to maintain that software and hardware. Finally, technical advancements can make the storage of information much less costly, require almost no physical space for storage and remain useable (searchable, viewable and printable).

BROAD GOAL:
Continually review technological progress, as well as, existing technology for applicability to existing business processes with the end result of making those processes more effective and efficient.

The application of Internet/intranet, geographic information systems, departmental applications and electronic records management technologies throughout the organization, when appropriate and cost effective, should be considered and promoted for funding to improve efficiency of work processes and quality of services delivered to residents.

In March 2002, departments were asked for the top three technology priorities that will help improve work processes and services delivered to residents (two-year scope). The following four technology issues and priorities emerged:

1. **Internet and Intranet Improvements:**
   Common themes among departments surfaced, including: provision and payment of services online, posting important information and documents for citizens such as notices, events and board minutes.
2. **Integrate GIS into Ongoing Business Processes:**
   The development of GIS in local government significantly improves local government decision-making. A list of services, copied from the book, "Beyond Maps: GIS and Decision Making in Local Government," that is produced by the ICMA, shows the ways in which cities and counties use or are thinking about using GIS (page xx).
3. **Departmental Applications:**
   Departmental applications replace paper-driven processes; enable data exchange; improve tracking, monitoring, scheduling, and analysis of departmental information.
4. **Records Management:**
   Currently, town departments have varied methods of storing and preserving records and are quickly running out of storage space to house these records. Records are primarily stored in paper format that could be stored in some automated format, allowing the Town to discard the paper forms.

A detailed discussion of these priorities is described on the following pages.

A. Internet & Intranet: Greater Accessibility for the Information End User

To provide the highest possible level of access to the Town's vast resources and services, the Town must exploit the most widely available and used technology. The sum of standards and technologies that comprise the Internet will be the technology for the foreseeable future. The use of this technology in delivering services and information to residents and others is referred to as e-Government. The technology will be applied to the Town's Internet web site for users external to the organization and to the Town's intranet for users internal to the organization.

GOAL:
Internet - **The Town will strive to integrate its' Internet web presence into the daily activities of the Town. Specifically, the Internet web site will be used to inform, collect information, and offer services during and outside normal operating hours. The final outcome will be the production of a web portal, offering a broad array of resources and services, such as email based forums, site search capability, on-line program registrations, facility reservations, service payment and other web-enabled services.**
Intranet - **The Town will strive to integrate the intranet into the daily activities of the Town. Specifically, the intranet will be used to inform employees, be an intermediate archival area for commonly accessed documents/resources, be the gateway to a future electronic records management system and the "launch point" of all future internal web-based applications.**

In the private sector, increased revenue from improved customer service (in terms of availability and ease of access and/or process) is the normal result of expanding organizational operations to the Internet. In the public sector, the benefits of service enhancement through the implementation of e-Government are often less tangible. Generally, benefits are seen in the areas of customer interaction, the business process, and information technology.

Commonly seen customer interaction and business process benefits follow:
- Allows residents and others instantaneous information access from any location at any time. Residents do not have to visit Town Hall during office hours to obtain information or services.
- Self-service to information and services allow customers to perform simple transactions on their own, freeing staff time to focus on providing value-added service to customers.
- Reduces the cycle time to deliver services to customers by e-enabling key processes that may have previously created bottlenecks and have held up the process.
- Helps to redirect efforts away from manual tasks and paper processing toward more value focused activities such as customer service.
- Enhances positive public perception and awareness of town operations.
- Provides a "single view" of government that enables residents to interact with the town as a whole rather than a possibly confusing array of departments.
- Expands reach of organization beyond local community.
- Increased knowledge of residents' preferences. Tracking Internet web site usage enables the Town to better understand residents' needs and then tailor information and services accordingly.
- Possibility for financial benefits from convenience fees charged for providing enhanced services over the Internet.

Technology related benefits include the development of a common e-platform, standardization, scalability, data integration, software licensing and security.

Along with these benefits exist implications: (further discussion is beyond the scope of this document, these are only a few)
- Require technical standards in order to reduce the "Total Cost of Ownership".

- Requires presentation and publishing standards.
- Requires content management standards and policy for information refresh.
- Requires an understanding that information is a town resource.
- Requires a redesign of the back-office processes to fit with an e-Government environment.
- Requires participation and acceptance by all departments.

If these implications are not understood, the path toward e-Government will be rocky, uneven and unproductive. E-Government must be thoroughly integrated into the back-office business activities and processes of the town. There must be great care given to standards, scalability, robustness, usability and accessibility.

Specific Uses Identified by Town Staff
Internet (external use)
- Recreation & Parks - Program registration and facility reservation online, payable by credit card.
- Planning, Zoning & Inspections – Interactive Land Use Ordinance; various Inspections processes available online.
- Management Services – Provide ability to collect privilege license fees online ; improve citizen input into various town processes via surveys
- Town Clerk – Place past Agendas and meeting minutes online (prior to January 1999)

Intranet (internal staff use)
- Manager's Office – Implement a town-wide service request and complaints tracking system.
- Personnel – Place employee-related content on intranet.
- Manager's Office –Track Board's Action Agenda items and conduct follow-up reporting through intranet web access interface

B. Geographic Information System (GIS) – Maps and much more!

Many Town functions are associated with managing information about specific locations or geographic areas. A geographic information system is a computer system for the input, editing, storage, maintenance, management, retrieval, analysis, synthesis and output of geographically referenced information. A geographic information system supports applications such as land planning, transportation planning, monitoring crime and accidents, natural resource monitoring, public health and environmental analysis, economic and census analysis and site location.

A geographic information system can graphically display spatial relationships on a computer, providing information about geographically referenced features, such as roads, buildings, rivers and jurisdictional boundaries. These systems can provide better decision-making by creating "what if" scenarios to show potential impacts before implementation.

GOAL:
The Town of Carrboro has used GIS in the Planning, Zoning and Inspections Department for a number of years, until very recently, usage has not developed much beyond that department. The Town of Carrboro will seek more expansive use (where appropriate) of GIS in order to help introduce further efficiencies throughout the Town's various departments. The Town will leverage existing personnel and data resources, verify that existing data is in good shape and will also attempt to create proper data sharing agreements with other governmental bodies. An ongoing and longer-term goal will be the creation of a central GIS database that all users will be able to access and update. A subset of this GIS database would also be available to Internet users from the Town's Internet web site. Further, the creation of and migration toward a central GIS database would result in the standardization of the hodgepodge of databases scattered throughout the various departments.

The Town is under increasing pressure to streamline administration practices while adhering to complex political and/or regulatory requirements. To do so, the Town must digest huge amounts of information, most of which is tied to a very specific geographic location such as a street, an address, a park, or a piece of land. In terms of policy implementation (such as the Land Use Ordinance), the ability to analyze and to demonstrate graphically the results of the policy decisions themselves makes it an indispensable management tool. As a result, geographic information system technology has become indispensable.

The benefits of geographic information system technology are fully realized when Geographic Information System data becomes a shared resource and is integrated into the daily operations of an organization.

Specific Uses Identified by Town Staff
- Planning, Zoning & Inspections – maintain current GIS investment; advance the use and usability of GIS throughout the organization
- Police – Add crime statistics and tracking systems
- Fire – Develop and track fire statistics, street and fire hydrant mapping.
- Public Works – Develop cemetery database and mapping; develop and expedite maintenance and upgrade schedules for various programs, ie street lighting replacement and street resurfacing schedules.

C. Departmental Applications – Ongoing Effort Toward Automation and Improvement of Work Processes

Departmental applications can range in cost from hundreds of dollars to tens-of-thousands of dollars. These applications represent a significant investment by the town to achieve a more efficient and effective business process. Examples of departmental applications would be an activity registration and facility reservation software package for Recreation & Parks, a fleet maintenance application for Public Works or a comprehensive financial package that would serve multiple departments.

As discussed throughout this document, software applications targeting specific business processes are becoming less expensive, mainstream, standards based, robust, scalable and professionally engineered. Above all, they offer professional support for problem resolution. These "off-the-shelf", "canned" or "turn-key" software applications/solutions are highly desirable for containing and quantifying total cost of ownership and offloading support issues to a qualified support staff at a fixed cost.

GOAL:
Promote the purchase of appropriate off-the-shelf software applications to automate and improve business processes throughout the organization. To purchase only those applications that offer a verifiable support contract with fixed hours of support and a structured problem resolution escalation process.

Where applicable, to make a reasonable effort to find a product that relies on an SQL server database engine (preferred) or other scalable and robust database "back-end" engine. The product, when available, will have a modern "Windows" interface for consistency with existing applications.

Limit the creation of "in-house" applications through Microsoft Access databasing (or minimize the use to very specific, SMALL, short-lived and appropriate tasks).

Further:
- **No department will create an "application" for another department. All "programming" (languages, databasing, etc.) is to be done by the IT Department or a properly contracted outside source that provides a verifiable technical support contract for any product created. Ultimately, problem resolution is escalated to the point of involving the IT Department.**

Often, these "applications" require data restoration due to faulty programming. Data restoration is another function of the IT Department. The IT department does not do any programming due to limitations in staffing.

- **Exceptions** would be GIS programming. GIS programming should be done with the knowledge of the IT Department. Ultimately, problem resolution is escalated to the point of involving the IT Department. GIS may require data restoration. Data restoration is another function of the IT Department.

When an organization purchases an off-the-shelf application the following benefits will exist:

- Known/fixed total product cost.
- Known/fixed total support costs.
- Known/fixed hardware requirements.
- Ability to accurately predict and budget for future upgrades, enhancements and support.
- Dedicated and professional third-party support staff. If the organization is experiencing a technical problem with the application, it is likely it has been encountered and solved in the past with other organizations.
- Ability to discuss application functionality with other organizations, which are actually using the product, before the purchase.
- Ability to discuss application functionality, usage and unusual solutions with other organizations after the purchase.
- Recourse if the product fails to operate within expectations.
- All the knowledge a company has gained from delivering and supporting an application across multiple organizations is an intangible benefit that should be seen in the quality of the end product.

Purchasing an off-the-shelf application can still result in poor support, technical bugs in functionality and hidden costs. These situations do exist, in most cases this outcome can be avoided by doing sufficient research prior to purchase.

Specific Applications Identified by Town Staff

- Recreation & Parks - Program registration and facility reservation package.
- Public Works – Replace DOS-based Fuel Monitoring and Fleet Maintenance software program; investigate work-order software for use by the department; develop Solid Waste database for routing and costing purposes
- Police – Place computers in police cars to allow police reporting at accident or crime scene.
- Management Services - Continue implementation of financial system (MUNIS) for privilege licenses, accounts receivable (billing and collections); and fixed assets. Identify opportunities for decentralized departmental use and paperless processing.
- Personnel – Expand use of MUNIS financial software for personnel activities.
- Economic Development – Develop records and database management system for use by staff.
- Planning, Zoning & Inspections –Investigate a management system for the Inspections Division.

D. Electronic Records Management

Records management provides the procedural infrastructure that ensures information is available, preserved, and when appropriate, destroyed. Records management evaluates information in all media based on legal, regulatory, operational and historic factors. By recognizing that all information is not equal, records management assigns cradle-to-grave handling instructions that include who keeps what, for how long and in what form and format.

GOAL:
Begin the exploration into keeping the Town's records electronically. Eventually, architect and deploy an electronic records management system that will fit the records storage needs of all departments and deliver a consistent interface independent of type of stored record. All records must be viewable, searchable and printable across various technologies (operating system independent and Internet browser friendly would be a possible minimum bench mark). Store records using an accepted industry standard format consistent with other governmental bodies.

Electronic records management is the use of records management principles for records maintained electronically. The Town of Carrboro will be moving toward electronic records management and retention given the dense storage capabilities, the relative low storage cost and minimal physical storage space associated with electronic storage. Thus, items with long-term reference value will remain accessible, legible and highly searchable for the duration. Long term media accessibility and readability are strengths of the electronic format (if maintained properly).

While dense storage at declining costs seem to encourage keeping everything forever, prudent records management counsels that the organization keep only what is required, and assure that any system has mechanisms in place to purge the unneeded when it is appropriate.

In addition to technical questions surrounding media longevity, is the issue of technology obsolescence. Will technology ten to twenty years from now be able to read/display the records recorded with current technology? Further, records stored in electronic format can be lost, changed, or destroyed; and the electronic recording medium can be inadvertently erased or overwritten. Along with these hazards, there is the distinct possibility of unauthorized access to sensitive or confidential information in electronic files.

Specific Applications Identified by Town Staff
All departments – identified opportunities to automate records management and storage.
- Town Clerk - Past Agendas/Minutes/Contracts.
- Management Services – store financial information as required by law.
- Personnel – personnel records.
- Police – historical accident and crime files that, while not legally required to be kept, may be valuable for shedding light on important town history.

V. Glossary

client/server architecture - A network architecture in which each computer or process on the network is either a client or a server. Servers are powerful computers or processes dedicated to managing disk drives (file servers), printers (print servers), or network traffic (network servers). Clients are PCs or workstations on which users run applications. Clients rely on servers for resources, such as files, devices, and even processing power.

data mining - A class of database applications that look for hidden patterns in a group of data that can be used to predict future behavior. For example, data mining software can help retail companies find customers with common interests. The term is commonly misused to describe software that presents data in new ways. True data mining software doesn't just change the presentation, but actually discovers previously unknown relationships among the data.

Marketers, trying to distill useful consumer data from various databases, utilize data mining increasingly.

database - A collection of information organized in such a way that a computer program can quickly select desired pieces of data. You can think of a database as an electronic filing system.

Traditional databases are organized by fields, records, and files. A field is a single piece of information; a record is one complete set of fields; and a file is a collection of records. For example, a telephone book is analogous to a file. It contains a list of records, each of which consists of three fields: name, address, and telephone number.

database management system - A collection of programs that enables you to store, modify, and extract information from a database. There are many different types of DBMSs, ranging from small systems that run on personal computers to huge systems that run on mainframes.

The terms relational, network, flat, and hierarchical all refer to the way a DBMS organizes information internally. The internal organization can affect how quickly and flexibly you can extract information. Requests for information from a database are made in the form of a query, which is a stylized question. The set of rules for constructing queries is known as a query language. Different DBMSs support different query languages, although there is a semi-standardized query language called SQL (structured query language). Sophisticated languages for managing database systems are called fourth-generation languages, or 4GLs for short.

The information from a database can be presented in a variety of formats. Most DBMSs include a report writer program that enables you to output data in the form of a report. Many DBMSs also include a graphics component that enables you to output information in the form of graphs and charts.

GIS - Short for Geographic Information Systems, tools used to gather, transform, manipulate, analyze, and produce information related to the surface of the Earth. This data may exist as maps, 3D virtual models, tables, and/or lists.

GIS can be as complex as whole systems that use dedicated databases and workstations hooked up to a network, or as simple as "off-the-shelf" desktop software.

GIS plays an important role in many organizations. For instance, police and fire departments may use GIS to locate landmarks and hazards, plot destinations, and design emergency routes. Governments, research institutes or any other body that can't possibly handle the task of manually processing large amounts of geographical data may also use GIS.

front end - In client/server applications, the client part of the program is often called the front end and the server part is called the back end.

Internet - A global network connecting millions of computers. More than 100 countries are linked into exchanges of data, news and opinions.

intranet - A network belonging to an organization, accessible only by the organization's members, employees, or others with authorization (extranet). An intranet's Web sites look and act just like any other Web sites. 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.

open architecture - An architecture whose specifications are public. This includes officially approved standards as well as privately designed architectures whose specifications are made public by the designers. The opposite of open is closed or proprietary.

The great advantage of open architectures is that anyone can design add-on products for it. By making an architecture public, however, a manufacturer allows others to duplicate its product.

proprietary - Privately owned and controlled. In the computer industry, proprietary is the opposite of open. A proprietary design or technique is one that is owned by a company. It also implies that the company has not divulged specifications that would allow other companies to duplicate the product.

Increasingly, proprietary architectures are seen as a disadvantage. Consumers prefer open and standardized architectures, which allow them to mix and match products from different manufacturers.

robust - When used to describe software or computer systems, robust can describe one or more of several qualities: a system that does not break down easily or is not wholly affected by a single application failure; a system that comes with a wide range of capabilities; a system that either recovers quickly from or holds up well under exceptional circumstances; a system that is not wholly affected by a bug in one aspect of it.

The term robust is often used to market software and devices because it refers to the strength and durability of a product. Manufacturers stress the robustness of their products as a selling point.

scalable - A term that refers to how well a hardware or software system can adapt to increased demands. For example, a scalable network system would be one that can start with just a few nodes but can easily expand to thousands of nodes. Scalability can be a very important feature because it means that you can invest in a system with confidence you won't outgrow it.

SQL - Abbreviation of **structured query language**, and pronounced either see-kwell or as separate letters. SQL is a standardized query language for requesting information from a database. The original version called SEQUEL (structured English query language) was designed by an IBM research center in 1974 and 1975. Oracle Corporation first introduced SQL as a commercial database system in 1979.

Historically, SQL has been the favorite query language for database management systems running on minicomputers and mainframes. Increasingly, however, SQL is being supported by PC database.

Although there are different dialects of SQL, it is nevertheless the closest thing to a standard query language that currently exists. In 1986, ANSI approved a rudimentary version of SQL as the official standard, but most versions of SQL since then have included many extensions to the ANSI standard. In 1991, ANSI updated the standard. The new standard is known as SAG SQL.

standards - A definition or format that has been approved by a recognized standards organization or is accepted as a de facto standard by the industry. Standards exist for programming languages, operating systems, data formats, communications protocols, and electrical interfaces.

From a user's standpoint, standards are extremely important in the computer industry because they allow the combination of products from different manufacturers to create a customized system. Without standards, only hardware and software from the same company could be used together. In addition, standard user interfaces can make it much easier to learn how to use new applications.

turn-key - Refers to a system or software package that has been built, installed or supplied by the manufacturer complete and ready to operate. In the computer industry, the term is used to promote a system that can be easily set up and operated "right out of the box."