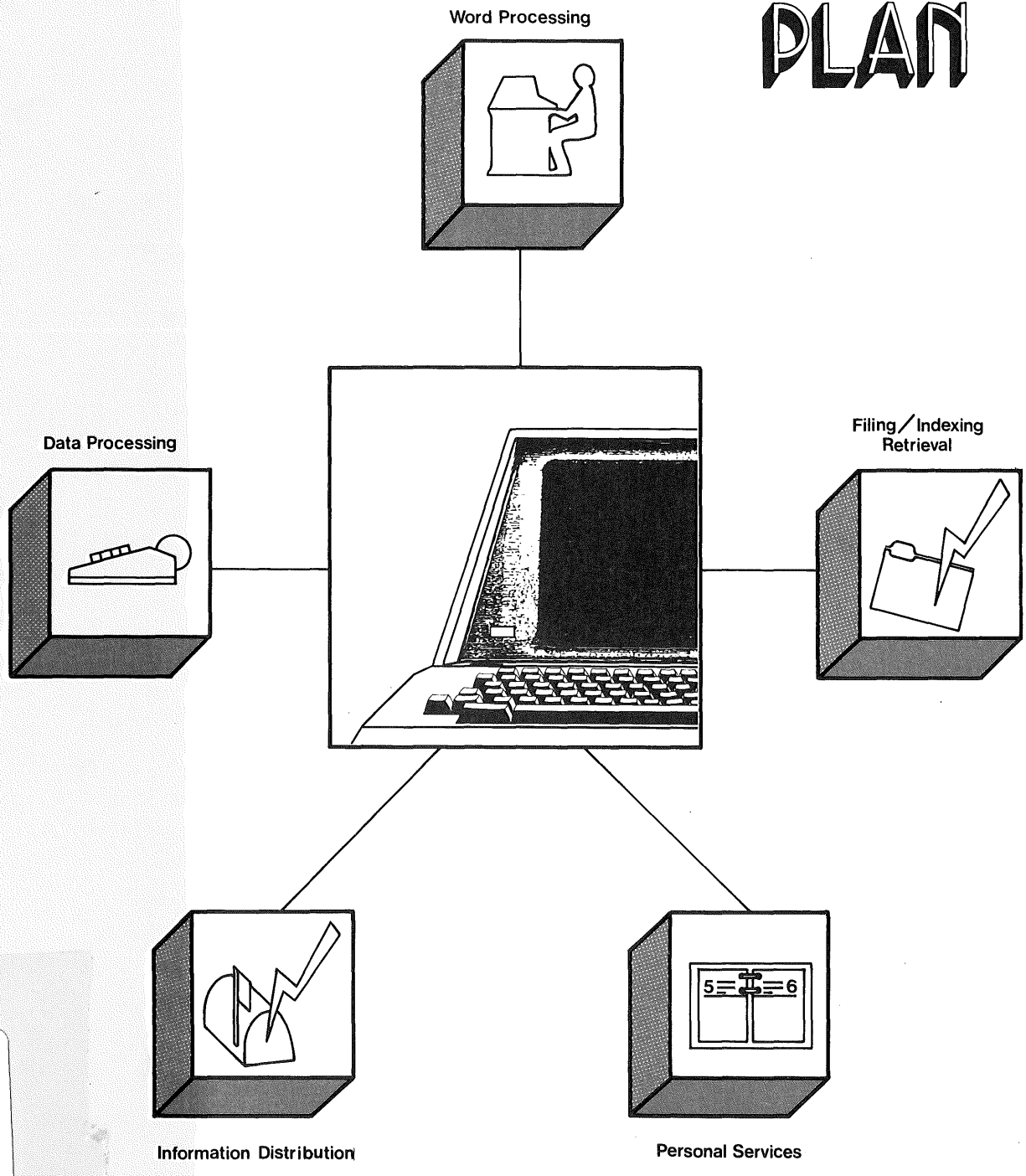
DNR

OFFICE AUTOMATION PLAN



Funding provided through the Legislative Commission on Minnesota Resources

DEPARTMENT OF NATURAL RESOURCES

OFFICE AUTOMATION PLAN

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CHAPTER 301, SECTION 31, SUBDIVISION 3

LAWS of MINNESOTA 1983

by the
MINNESOTA DEPARTMENT OF NATURAL RESOURCES

OFFICE AUTOMATION PLANNING TEAM

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Marilyn Hill	Secretary

Forestry is only division involved!

Role of ISB? Is this comparable to PRISM? No.

September 1983

DNR OFFICE AUTOMATION PLAN

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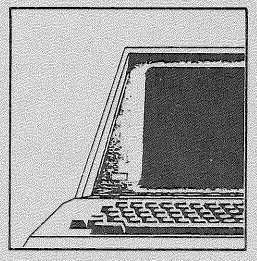
get these

The technical appendices for this plan are printed under separate cover. These are available from:

Bureau of Management Information Systems
Box 11
Centennial Office Building
St. Paul, Minnesota 55101



EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

The Department of Natural Resources must continue to meet the needs of industry and the general public while managing, protecting and preserving the state's resources in the face of increasing demands for services and limited budgets. In order to meet this challenge, the department must find better ways to communicate needed information on a timely basis, coordinate and share information resources among units, and increase productivity of departmental employees. New office technologies (such as word processing) have proven effective in addressing these needs. In addition to improving the productivity of staff, office automation has been shown to reduce the need for additional staff and improve administrative operations.

This Office Automation Plan by the Office Systems Planning Team (OSPT) is an outgrowth of the Department's Information Systems Strategic Plan dated January 3, 1983. This document identifies the common needs and problems of the department that can be addressed through office automation. The common needs and problem were identified through interviews with 85 department employees representing 19 units and one region. The plan recommends the implementation of a pilot system to be tested for effectiveness and productivity. The pilot can be used as a framework for making decisions on future office automation. This document does not include a detailed blueprint for an office information system but, instead, sets up guidelines for detailed studies aimed at equipment selection, training and implementation.

This plan identifies requirements for improving the department's administrative operations with special emphasis placed on improving the productivity of the nine bureau and five regional administrative support units. The goal established by the OSPT is to increase productivity and ultimately reduce cost through improved office technology. Implicit in this goal is the capability to expand office automation to the entire department as well as integrating the new system with the department's MIS and divisional data processing plans.

The office information system described in this plan will result in significant gains in productivity and will result in long-term cost savings for specific office functions. Productivity benefits will be realized

through reductions in the time required to complete typical office tasks such as writing, typing, filing and searching for information. In monetary terms, the opportunity value of the increased productivity is about $2.1 million. The term "opportunity value" is used to emphasize the fact that the gains in productivity may not necessarily result in reduced budgets but will more effectively utilize existing budgets to accomplish unmet needs in the department. The time saved will be reinvested allowing bureaus and regional administration to reduce work backlogs and improve service levels by providing more complete and up-to-date information for operations and decision making.

RECOMMENDATIONS:

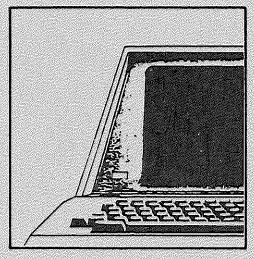
Realizing the current lack of funding to implement a complete office automation system, the Office Systems Planning Team recommends the following:

1. Establish a steering committee to provide the direction necessary to meet the goal and objectives identified in this plan.
2. Establish a pilot system for the Bureau of Personnel and the Bureau of Financial Management, and to provide as a minimum word processing capabilities for all bureaus and regions. The monthly cost of this pilot will be approximately $ 25,000. This pilot must allow immediate expansion and access to other units of the department as funds become available.
3. Establish a training program for the executives/administrators, professionals/supervisors, and clericals/technical staff of the department.

In summary, the team feels this study is a well documented, cost justified recommendation for implementing an office automation system tailored to fit DNR's requirements. The truly integrated office reduces the need for paper and places an emphasis on worker productivity.

"To take no action; even in a time of bewildering alternatives...is self-defeating and costly."

Forbes, Business Communications — ?



INTRODUCTION

CHAPTER I
INTRODUCTION

The Department of Natural Resources is a "paper intensive" organization which generates over 200,000 documents annually, including statistical reports, plans, permits, maps, memorandums and news releases. Given the large document volume it is not surprising that the prevailing question concerning office automation is not whether such technology is need; rather, when will the equipment be installed?

Despite the apparent widespread support for office automation the department can not simply purchase an office information system. Installing such a system requires rigorous planning.

Presented herein is a office information system development plan for Regional Administration and the 7 Bureaus of Personnel, Engineering, License, Management Information Systems, Financial Management, Lands, Field Services, Records and Office Services, and Information and Education. A key element of this plan is the ability to expand the system to meet the office automation needs of the divisions.

This report is an outgrowth of the department's Information System Plan for fiscal years 1984 - 1985. The plan was developed by the Office Systems Planning Team (OSPT) with the assistance of the Application Transfer Team of IBM. Funding for the planning effort has been provided by the Legislative Commission on Minnesota Resources.*

A. GOALS AND OBJECTIVES OF THE OFFICE SYSTEM PLAN

The overall goal which has guided the planning effort is to increase office productivity and ultimately reduce cost through the use of improved technology by determining the need for funding, equipment, personnel, and training.

*

The L.C.M.R. work program for the Management Information System project is presented in Appendix A.

With this goal in mind, the following objectives were established.

- Provide adequate word processing.
- Ensure that systems hardware and software are compatible.
- Keep people informed and involved in the changes that may come about and provide adequate training.
- Provide greater accessibility to information through storage, indexing, searching, tracking, archiving within and outside of agency.
- Ensure security of computerized information.
- Ensure that data created in one place is shareable by others to reduce duplication of effort.
- Reduce turnaround time to get required information.
- Provide recommendations for a policy that ensures the information stored on the computer will be used in an ethical manner.
- Provide adequate output capability (CRTs, printers, plotters) and storage capacity (hard-disk, diskettes).
- Improve communication with regional offices.
- Provide a means of communicating with all hosts used by the department.
- Provide back-up to data files.
- Ensure that documentation is provided on systems development.
- Provide adequate number of terminals for clerical/professional use.

B. WHAT IS AN OFFICE INFORMATION SYSTEM?

Since the term "office information system" is relatively new it may prove beneficial to briefly describe what the term collectively encompasses.

An office information system can be narrowly defined as a package consisting of both hardware and software for automating routine office functions. While office information systems are usually associated with word processing, the term incorporates a higher degree of automation. The functions which characterize office information systems include:

-word processing (text creation and revision)
-electronic document filing indexing, searching and retrieval
-document distribution (electronic mail)
-calendaring and scheduling
-limited data processing

It is important to note that an organization is not magically improved by the installation of an information system. An office information system is simply a tool which may be used to increase productivity and reduce office drudgery. The organization must train users and develop and adhere to standards and procedures for file naming, archiving, coding, and so on. Thus, an office information system package consists of people and procedures as well as hardware and software.

C. STUDY METHODOLOGY

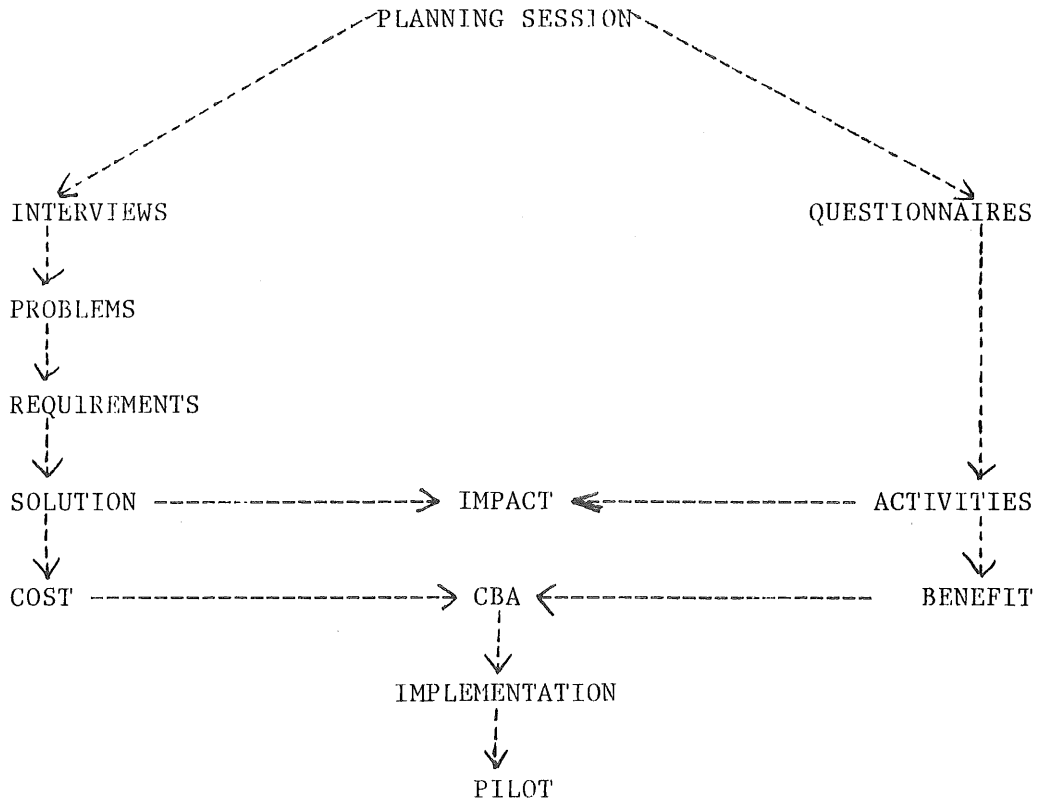
The planning methodology used for this study was provided by the IBM Corporation. IBM's assistance was requested in order to accelerate the planning process and because the methodology has been proven in over 1,600 studies.

The planning effort began with a joint meeting of representatives from the divisions, bureaus, regions and commissioner's office to outline the purpose of the study and obtain support of key management. Members of the Office System Planning Team (OSPT) and technical advisors from the IBM Applications Transfer Team then defined the goals and objectives of the project.

During July, 1983, representatives of all bureaus, divisions, and region II were interviewed by the planning team. The interviews were conducted to: 1) identify problems related to office automation, 2) identify information that is shared among units, and 3) clarify office automation needs. Nearly all representatives interviewed expressed the need for a department-wide office information system and none had difficulty identifying problems. The individuals and offices interviewed are listed in Appendix B. The 755 problems statements recorded during the interviews are documented in Appendix I.

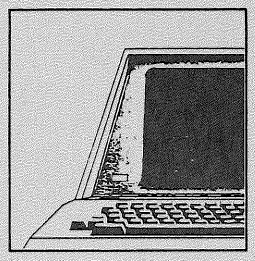
In addition to the interviews, two self-administered questionnaires were used to collect more detailed information. One questionnaire requested estimates of the average percent of time clericals and professionals spend on various office tasks, such as typing, proofing, and filing (Appendix D). The second questionnaire dealt with the kinds of information produced, the types of information required, and the flow of information between units (Appendix C).

Once all the necessary background information was collected, the planning team developed the office information system plan. The planning steps included: 1) defining the current environment, 2) analyzing the department's needs, 3) developing general specifications for the office system, 4) benefit analysis, and 5) developing an implementation strategy. These planning steps are graphically summarized below. Appendix E describes the study methodology in further detail.



D. DOCUMENT ORGANIZATION

The remaining text of this document is organized into five chapters. Chapter II describes the current office environment within the department. Included here is a summary of the problems related to office automation, along with their causes and effects. The technical function or requirements needed to solve the problems are listed in Chapter III. The non-quantifiable benefits (such as improving the ability to meet deadlines and quality of work) are also presented in this chapter. The general office information system needs are presented in Chapter IV. This chapter includes general specifications for software, hardware and data communications. Chapter V outlines an implementation plan, which includes the implementation and evaluation of a pilot system. Finally, the costs and benefits of the office automation system are compared in the Chapter VI.



CURRENT ENVIRONMENT

CHAPTER II

CURRENT ENVIRONMENT

A. OVERVIEW

The DNR is a large, complex state agency. Numerous documents are produced by the various units within the department, but these documents and those of other state agencies are not readily accessible to program managers. Few DNR offices are automated and existing equipment, for the most part, is not compatible. Departmental interviews have identified the need for substantial improvements in: (1) data processing (2) text data creation, capture and revision (3) data filing, indexing and retrieval (4) information distribution and (5) general and personal services.

B. PROBLEMS/ CAUSES/ EFFECTS

The DNR is a large, diverse public service agency which has existed as a state department for 52 years.

Organizationally, it consists of six divisions, nine bureaus and five regional offices, all administered by a commissioner (Appendix F).

The organizational structure in the units commonly consists of four structural levels. Numerous programs funded from a diverse mixture of general and dedicated funds make up an annual budget of about 85 million dollars. The budget includes a work force of 1572 complement employees and 1000 non-complement employees working at approximately 400 locations throughout the state.

Effective day-to-day management of any organization as large and diverse as DNR requires the availability of accurate and current information. This information must be readily accessible to all levels of management.

In order to effectively manage the complexity of DNR activities, it is necessary for both executive and line managers to have pertinent information readily accessible; for example, information concerning the department's finances, personnel, program performance, organizational structure, and grants and contracts. Such information, must be current and comprehensive to provide the basis for effective decision-making.

Individual DNR units produce numerous documents and computations which are needed by other units. This shared information, along with the units potential applications for automation, is included in Appendix G.

While DNR has some elements of an automated information system, there are problems with the equipment. DNR currently utilized a variety of office automation and data processing equipment including in excess of six different brands. Unfortunately, their design is such that most components are not compatible, and there is no automated approach for providing information quickly in an integrated format.

In order to ascertain the extent of office automation related problems within the department, representatives from all divisions, bureaus, and one regional office were interviewed. A total of 755 problem statements were submitted (Appendix I). These problems have been consolidated in terms of five functional areas of office automation which are: (1) Data Processing, (2) Text/Data Creation, Capture and Revision, (3) Document Filing, Indexing and Retrieval, (4) Information Distribution, and (5) General and Personal Services. The functional areas are briefly described below:

DATA PROCESSING - The systematic performance of operations on data such as numerical processing, sorting, and data base management. This document focuses on the end users' interface with data processing and includes such concerns as data availability, turn-around time and report formats.

TEXT/DATA CREATION, CAPTURE AND REVISION (WORD PROCESSING) - The keying and storing of text/data for subsequent revision, editing and printing.

DOCUMENT FILING, INDEXING, AND RETRIEVAL - The capability to store text files (documents) in a disk-based library, document indexing and retrieval of documents for viewing, printing and or editing.

INFORMATION DISTRIBUTION - The ability to electronically transmit a message or document to specified users' terminals for viewing.

GENERAL AND PERSONAL SERVICES - This catch-all area includes the development of standards and procedures, the ability to perform computing independent of the host CPU using a programmable terminal, electronic calendaring, and so on.

Based on the interview results, the most common problem area within the department involves the filing, indexing and retrieval of documents. Over one quarter (28 percent) of the 755 interview statements referenced this functional area. General and personal services is the second most common problem area. About 25 percent of the interview problem statements involved this broad functional area. Data processing is the third most common problem area encompassing 18 percent of the problems. Text/data creation, capture and revision (word processing) appears to be the next most troublesome area, with 16 percent of the problems. However, this area may actually be more problem-prone than the survey results indicate since significantly less clericals than professionals were interviewed. Finally, information distribution accounted for 13 percent of the problems related during the interview sessions.

Following is a summary of the 755 problems identified by departmental interviews. The summary consists of general and specific problem statements which are reflective of the department as a whole and are organized according to the above functional areas. Summary problems reflective of individual units are listed in Appendix H.

DATA PROCESSING

General Problem Statement:

Existing computer systems and associated procedures are not providing timely, accurate and readily accessible information to end users.

Specific Problems:

A 1. There is a lack of complete, automated and centralized files, particularly for personnel, fiscal and inventory records.

A 2. Much information is accessed and updated manually.

A 3. Some existing computer files are accessible only in batch mode, i.e., no on-line, real time access capability.

A 4. Data is sometimes available but a special program must be written to process it for special needs.

A 5. The department receives hard copy information that should be available from a computer terminal.

A 6. People do not have on-line query access to computer data. Most end users are provided with voluminous reports containing too much data.

A 7. Some computer equipment and programs are outdated and difficult to use.

A 8. There is limited capability to do spreadsheet analysis, specialized billing, graphics, complex calculations and list processing.

A 9. Data entry system is outdated.

A 10. The lack of department - wide data collection and coding standards inhibit the exchange and sharing of information.

The above summary problem statements were consolidated from 137 individual related problems during unit and regional interviews.

TEXT/DATA CREATION, CAPTURE AND REVISION

General Problem Statement:

The existing method of document creation is cumbersome, wastes employees' time and results in production backlogs. Professionals are often called upon to do clerical tasks.

Specific Problems:

B 1 There is limited capability to generate form letters automatically from existing files.

B 2. Most form letters are created manuals.

B 3. There is excessive proofing and retyping of letters, memos, lists, and reports.

B 4. Excessive time is consumed verifying text, spelling, punctuation and math on statistical and other reports.

B 5. Mailing (distribution) and subscription lists are not easily updated and are not readily accessible.

B 6. Budget documents are currently created and revised manually.

B 7. There is no efficient way to create and maintain large documents and manuals.

B 8. There is limited capability to share data maintained in one unit with other units.

B 9. There are peaks and valleys in requests for typing.

B 10. Sending documents to printers is time consuming.

The above summary problem statements were consolidated from 123 individual related problems during unit and regional interviews.

DOCUMENT FILING, INDEXING AND RETRIEVAL:

General Problem Statement:

The current method of managing and locating information is cumbersome and inhibits productivity and management control.

Specific Problems:

C 1. The lack of a centralized index to stored information result in inefficient manual searches and lost information.

C 2. Paper files and manual indexes inhibit the sharing of information among various units.

C 3. Unnecessary duplication occurs when information is kept in multiple locations and individuals maintain their own files.

C 4. The filing backlog makes needed information unavailable.

C 5. Manual retrieval of correspondence, training records, manuals, reports and case files is a cumbersome and slow process for locating information.

C 6. Maintaining card index files is time consuming and difficult.

C 7. Many groups develop and use non-standard filing methods, making filing and retrieval difficult. Retrieval is further complicated when documents are removed from the file area.

C 8. Large volumes of documents are processed by manual procedures.

The above summary problem statements were consolidated from 213 individual related problems during unit and regional interviews.

INFORMATION DISTRIBUTION

General Problem Statement:

The present method for distributing information generates large volumes of paper, delays management decisions, and encourages a labor intensive environment.

Specific Problems:

D 1. There is no rapid and efficient way to distribute most hard copies (including graphics) between units.

D 2. Distribution of documents required producing multiple copies to files and send to recipients, using various distribution lists. Information sometimes fails to get to the appropriate person.

D 3. Slow paper flow increases the time required to deliver information.

D 4. There is no timely method of tracking the activities of people in remote units.

D 5. Documents are handled in an inefficient manner with too much manual paper flow.

D 6. Requests for supplies, parts or information sometimes require many telephone calls to determine availability.

D 7. Interdepartmental mail, although usually reliable, is not always fast enough to meet same day or next day information needs. Document are sometimes lost.

The above summary problem statements were consolidated from 95 individual related problems during unit and regional interviews.

GENERAL AND PERSONAL SERVICES

General Problem Statement:

The equipment available to support professional and clerical functions within the department is both insufficient and inadequate. There is no easy way to schedule appointments and meetings. In addition, insufficient training is provided on the existing equipment.

Specific Problems:

E 1. People do not have ready access to the automated equipment necessary to improve their performance.

E 2. Presently, personnel cannot document teleconferences with hard copy text, data, and graphics.

E 3. There are limited backup procedures at the local level when the central system is down.

E 4. Fragmentation will get worse if something is not done soon to integrate all systems. For example, data already available in machine readable form is being rekeyed for different, incompatible machines.

E 5. There is limited equipment to automate some scientific reports, technical drawings, and special graphics, forcing professionals to do them by hand.

E 6. Many files must be maintained with security.

E 7. There are no uniform standards for document creation, storage, distribution or calendar maintenance.

E 8. There is not enough training for some existing equipment.

E 9. There is inadequate access to departmental and other public agency data bases.

E 10. Telephone tag is a problem.

E 11. Existing systems are not always user-friendly (easy to use).

E 12. Professionals are spending too much time on clerical tasks.

E 13. The equipment acquired for immediate needs, i.e., word processing, is not compatible with required additional functions, i.e., data processing.

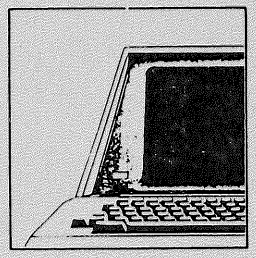
General and Personal Services

Specific Problems cont.

E 14. It is difficult and time consuming to schedule and locate meetings, equipment, facilities and personnel.

E 15. There is no effective way of tracking and monitoring documents that require a response with due dates when project control and tracking procedure are manual.

The above summary problem statements were consolidated from 185 individual related problems during unit and regional interviews.



PROBLEMS / REQUIREMENTS / BENEFITS

CHAPTER III
PROBLEMS/REQUIREMENTS/BENEFITS

INTRODUCTION

A myriad of office automation related problems have been identified in the preceding chapter. In this chapter, the requirements necessary to solve the problems are presented, along with the potential benefits which will be realized if the requirements are met. The problems, requirements, and benefits are organized in terms of the functional areas and are presented as follows:

Problem Statement
o REQUIREMENT
- Benefits

The problem statement describes an existing office automation problem. These problem statements are identical to those listed in Chapter II, and are typically reflective of the department as a whole. The requirement is simply a nontechnical statement as to what hardware, software or other provision is needed to solve the problem. Following the requirement is a qualitative statement of the benefits which can be expected.

At the end of each functional area are two matrices. The first matrix lists the requirements along the horizontal axis and the units interviewed (by the study team) on the vertical axis. This matrix shows which problems/requirements are common among units. The second matrix presents the requirements along the horizontal axis and technical functions (i.e. hard/software capabilities) along the vertical axis. The intent of this matrix is to indicate which technical functions are needed to meet the various user requirements.

A. DATA PROCESSING

A 1. There is a lack of complete, automated and centralized files, particularly for personnel, fiscal and inventory records.

- ← o DEVELOP A CENTRALIZED DEPARTMENTAL DATA BASE.
  - Would provide real time access to current information from a single source, reduce the need to duplicate files within units, save time and telephone calls, and provide management with more complete information for decision making.

A 2. Much information is accessed and updated manually.

- o AUTOMATE APPROPRIATE DATA SO THAT THE INFORMATION MAY BE ACCESSED AND UPDATED ON-LINE BY AUTHORIZED USERS.
  - Automating files will reduce the large amount of time individuals now spend on maintaining files and provide rapid access to current information.

A 3. Some existing computer files are only accessible in batch mode, i.e., no on-line access capability.

- o NEED TO EXPAND DISK STORAGE AND PURCHASE MORE TERMINALS SO THAT APPROPRIATE FILES MAY BE ACCESSED ON-LINE.
  - Will reduce bulky computer listings and reports and allow end users to access data on their own terms.

A 4. Data is sometimes available but a special program must be written to process it for special needs.

- o DEVELOP A DEPARTMENTAL INFORMATION SYSTEM WITH "CANNED" RETRIEVAL PROGRAMS AND REPORT GENERATING CAPABILITIES.
  - Eliminates need for most special application programs and reduces end user frustration.

A 5. The department receives hard copy information that should be available from a computer terminal.

- o ESTABLISH END USER ACCESS TO NEEDED COMPUTERIZED INFORMATION.
  - Makes information available more rapidly and can be correlated with data stored in related systems.

A 6. People do not have on-line query access to computerized data.

- o PROVIDE ON-LINE QUERY ACCESS TO COMPUTERIZED DATA.
  - End users will be able to carry on a dialogue with the system and extract needed data.

A 7. Some computer equipment and programs are outdated and difficult to use.

- o REVIEW EXISTING COMPUTER SYSTEMS FOR OBSOLESCENCES AND COST-EFFECTIVENESS
  - Outdated systems will be identified and scheduled for upgrading.

A 8. There is limited capability to do spread sheet analysis, specialized billing, graphics, complex calculations and list processing.

- o PROVIDE USERS WITH THE CAPABILITY TO DO THESE FUNCTIONS IN THEIR WORK AREA.
  - Will significantly reduce the time required to do these functions and improved accuracy of work.

A 9. Data entry system is outdated.

- o NEED TO OBTAIN KEY-TO-DISK MACHINE FOR DATA ENTRY.
  - Will significantly reduce the time required for keypunching and improve accuracy.

A 10. The is a lack of department-wide data collection and coding standards inhibit sharing of information.

- o DEVELOP AND ADOPT DEPARTMENT-WIDE CODING STANDARDS.
  - Will reduce the need to write programs to convert data codes and encourage the sharing of information.

USER REQUIREMENTS	USER DEPARTMENTS	Personnel	Office Services	Forestry	License Center	Information & Education	Planning	Waters	Commissioner's Office	Enforcement	Parks	Finance	Engineering	Fisheries/Ecological Services	Trails & Waterways	Lands	Minerals	Data Systems	Wildlife	Region II	Field Services
A1 Centralized departmental data bases		X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X
A2 Develop automated systems		X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X
A3 On-line file storage		X		X	X		X	X		X	X	X	X	X	X	X	X	X	X	X	X
A4 User report writing capabilities		X		X		X	X	X		X	X	X	X	X	X	X	X	X	X	X	X
A5 Establish end user access		X		X	X		X	X		X	X	X	X	X	X	X	X	X	X	X	X
A6 On-line query access		X		X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
A7 Update aging systems		X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
A8 Provide spread sheet capabilities				X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
A9 Key-to-disk data entry				X	X		X	X		X	X	X		X	X	X	X	X	X	X	X
A10 Department-wide coding standard		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

USER REQUIREMENTS / TECHNICAL FUNCTIONS	Dedicated Office Inf. CPU[1]	On-line Access to Req. Data[2]	Storage & Computing Expansion[3]	Communications Capability[4]	Data Base Management System	Spreadsheet Analysis	Business Graphics	Personal Computing for Data Entry/Program Development	Security	Distributed Processing[5]	Dial-up access to Host[6]	High Level Languages	User Friendly Systems	Text Editor	Host Pass Through[7]
A1 Centralized departmental data bases	X	X	X	X	X				X	X	X		X		X
A2 Develop automated systems	X	X	X	X	X				X	X	X		X		X
A3 On-line file storage	X	X	X	X	X				X				X		
A4 User report writing capabilities	X	X		X	X	X	X	X				X	X	X	
A5 Establish end user access	X	X		X	X					X	X		X		X
A6 On-line query access	X	X		X	X				X	X	X		X		X
A7 Update aging systems	X		X										X		
A8 Provide spread sheet capabilities	X	X				X	X	X					X		
A9 Key-to-disk data entry			X										X		
A10 Department-wide coding standard	X	X			X						X				

1- A computer that supports an office information system as well as limited data processing functions such as data management and high level languages.

2- This requirement includes user access to files currently maintained at U.C.C., L.M.I.C., and I.S.B. computer centers.

3- Capability to expand memory and disk capacity as required.

4- Ability to move data between the proposed processor and existing computers.

5- Some or all of the processing, storage and control functions are situated in different places and connected by transmission facilities.

6- Capability for existing terminals to communicate with the proposed local processor.

7- Capability for a terminal to pass through its host system and access other interconnected processors.

B. TEXT/DATA CREATION, CAPTURE AND REVISION

B 1. There is only limited capability to generate form letters automatically from existing files.

- o MUST AUTOMATE MANUAL RECORDS AND INTERFACE WORD PROCESSORS WITH THE MAIN FRAME IN ORDER TO GENERATE FORM LETTERS (AND CORRESPONDENCE).
- \- Will decrease the chance for error, save typing time, reduce turnaround time.

B 2. Most form letters are created manually.

- o MUST HAVE WORD PROCESSORS THAT ALLOW THE CAPABILITY TO STORE STANDARD FORMATS AND EASILY CREATE FORMATS UNIQUE TO THE USER.
- \- Will eliminate most setup and typing time required to prepare form documents.

B 3. There is excessive proofing and retyping of letters, memos, lists, and reports.

- o PROVIDE AN EFFICIENT MEANS FOR THE PREPARATION, REVISION AND PROOFING OF ALL KINDS OF DOCUMENTS.
- \- Will help eliminate mistakes, reduce time required, and improve accuracy.

B 4. Excessive time is consumed verifying text spelling, punctuation and math on statistical and other reports.

- o THE WORD PROCESSING EQUIPMENT MUST PROVIDE FUNCTIONS THAT ALLOW THE CHECKING OF SPELLING, MATRIX AND COLUMN MANIPULATION, AND HAVE MATHEMATICS CAPABILITY.
- \- Will assist users in spelling, creating statistical tables, and insure a greater degree of accuracy.

B 5. Mailing (distribution) and subscription lists are not easily updated and are not readily accessible.

- o PROVIDE AN AUTOMATED MEANS TO CREATE AND MAINTAIN DISTRIBUTION LISTS.
- \- Eliminates duplication, insures that documents are distributed to people in a timely fashion, and saves time required to identify and locate recipients.

B 6. Budget documents are currently created and revised manually.

- o DEVELOP AN AUTOMATED METHOD OF CREATING AND UPDATING BUDGET DOCUMENTS WITH COMPUTATIONAL CAPABILITY.
  - Allows use of previous budget documents to save time, providing faster preparation and more accurate computations.

B 7. There is no efficient way to create and maintain large documents and manuals.

- o DEVELOP AN EFFICIENT WAY TO CREATE AND MAINTAIN LARGE MANUALS AND DOCUMENTS.
  - Would allow a more timely method to update and distribute documents and large manuals.

B 8. There is limited capability to share data maintained in one unit with other units.

- o PROVIDE A MEANS TO CREATE AND EASILY UPDATE CATALOG LISTINGS OF AVAILABLE PROGRAMS, SERVICES, EQUIPMENT, PERSONNEL, ETC.
  - Provide all units with current information on what is available

B 9. There are peaks and valleys in requests for typing.

- o DEVELOP A SYSTEM WHERE A UNIT'S TYPING WORKLOAD COULD BE SHARED BY OTHER UNITS.
  - This would help units meet reporting deadlines and keep all personnel fully utilized.

B 10. Sending documents to printers is time consuming.

- o DEVELOP A SYSTEM WHERE THE QUALITY OF TYPING AND CHOICE OF TYPESTYLES WOULD LESSEN THE NEED FOR HAVING DOCUMENTS PREPARED BY A PRINTER.
  - Would save time and money in the publishing of documents.

USER REQUIREMENTS / USER DEPARTMENTS	Personnel	Office Services	Forestry	License Center	Information & Education	Planning	Waters	Commissioner's Office	Enforcement	Parks	Finance	Engineering	Fisheries/Ecological Services	Trails & Waterways	Lands	Minerals	Data Systems	Wildlife	Region II	Field Services
B1 Automatic form letter generation	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
B2 Create standard formats	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
B3 Retyping, proofing, editing	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
B4 Spell checking and math functions	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
B5 Create and maintain documents	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
B6 Create and update budgets	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
B7 Create and update large documents	X		X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
B8 Create and update department information listings	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
B9 Sharing of typing workload	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
B10 Document printing	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

USER REQUIREMENTS / TECHNICAL FUNCTIONS	Spelling Assist	Auto Hyphenation	Document Assembly	Pagination	Arithmetic Processing	Decimal Alignment	Variable Inserts	Footnotes/Headings	Multiple Columns	Document Index	Sorting	User Programmable	Document Security	User Friendly	Document Sharing	Fixed Disk Storage	Archiving to Diskettes	Letter Quality Printing
B1 Automatic form letter generation		X	X	X			X	X				X		X				X
B2 Create standard formats			X				X	X						X	X	X		
B3 Retyping, proofing, editing	X	X	X	X				X		X				X				
B4 Spell checking and math functions	X				X	X			X		X			X				
B5 Create and maintain documents	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
B6 Create and update budgets			X	X	X	X		X	X	X	X	X	X	X		X	X	X
B7 Create and update large documents	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
B8 Create and update department information listings								X	X	X	X			X	X	X	X	X
B9 Sharing of typing workload			X							X				X	X	X	X	
B10 Document printing										X				X				X

C. DOCUMENT FILING, INDEXING AND RETRIEVAL

C 1. The lack of a centralized index to stored information results in inefficient manual searches and lost information.

- o MAINTAIN A CENTRALIZED INDEX TO FILE.
  - If people knew what material was already available, it would reduce time required to obtain this information, duplication of manual lists, and save money.

C 2. Paper files and manual indexes inhibit sharing of information among various units.

- o INSURE THAT INFORMATION CREATED BY ONE UNIT CAN BE MADE AVAILABLE TO ANY OTHER AUTHORIZED UNIT.
  - Avoids duplication of effort and information, the cost of gathering data, and enhances the ability to make better decisions.

C 3. Unnecessary duplication occurs when information is kept in multiple locations and individuals maintain their own files.

- o DESIGN A SYSTEM THAT ELIMINATES THE NEED TO RETAIN MULTIPLE COPIES OF DOCUMENTS IN MORE THAN ONE FILE.
  - Creates one accurate, official copy in a central file accessible to all authorized users, thus reducing personnel, printing, and office space requirements.

C 4. The filing backlog makes needed information unavailable.

- o ESTABLISH A SYSTEM TO MAINTAIN CURRENT FILING.
  - Provides accurate information needed for actions--saving work, processing and response time.

C 5. Manual retrieval of correspondence, training records, manuals, reports, and case files is a cumbersome and slow process for locating information.

- o SET UP A CONVENIENT, COST-EFFECTIVE FILING AND RETRIEVAL SYSTEM FOR MOST OFFICE FILES, INCLUDING A PROVISION FOR REFERENCING DOCUMENTS THAT ARE NOT ENTERED IN THE SYSTEM BUT RETAINED IN PAPER FORM.
  - Reduces space; also, with proper standardization, access should be easier, time will be saved and more complete and current information provided.

C 6. Maintaining card index files is time consuming and difficult.

- o DESIGN A SYSTEM THAT REPLACES MANUAL CARD INDEXES WITH ELECTRONIC INDEXES.
  - Saves time and space and improves accuracy of indexes, reduces likelihood of losing information and provides for cross indexing.

C 7. Many groups develop and use non-standard filing methods, making filing and retrieval difficult. Retrieval is further complicated when documents are removed from the file area.

- o PROVIDE A SYSTEM THAT ENFORCES STANDARDIZATION OF FILING METHODOLOGY AND THAT HANDLES "OUT OF FILE" SITUATIONS.
  - Improves turnaround, minimizes disruption of work flow, reduces risk of information being lost and increases productivity.

C 8. Large volumes of documents are processed by manual procedures.

- o PROVIDE A SYSTEM FOR AUTOMATED PROCESSING OF DOCUMENTS.
  - Timelines and efficiency of processing documents would be improved. Costs would be reduced.

USER REQUIREMENTS / USER DEPARTMENTS	Personnel	Office Services	Forestry	License Center	Information & Education	Planning	Waters	Commissioner's Office	Enforcement	Parks	Finance	Engineering	Fisheries/Ecological Services	Trails & Waterways	Lands	Minerals	Data Systems	Wildlife	Region II	Field Services
C1 Central index to files	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
C2 Information sharing	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
C3 Eliminate multiple copies	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
C4 Maintain current filing	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
C5 Effective filing and retrieval	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
C6 Replace manual card indexes	X	X	X	X	X		X		X	X	X	X	X	X	X	X		X	X	X
C7 Standardization of filing	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
C8 Automated processing of documents	X		X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X

USER REQUIREMENTS / TECHNICAL FUNCTIONS	Document Index	Parametric Search	Contextual Search	Automatic Archiving[1]	Transfer to Host for on-line Storage	Conditional	Retrieve by Search Terms	Local Workstation Archiving	Document Security	Document Back-up
C1 Central index to files	X	X	X	X	X	X	X		X	X
C2 Information sharing	X	X	X		X	X	X		X	
C3 Eliminate multiple copies				X					X	X
C4 Maintain current filing	X									
C5 Effective filing and retrieval	X	X	X	X	X	X	X	X	X	X
C6 Replace manual card indexes	X	X	X	X	X	X	X	X	X	X
C7 Standardization of filing	X							X		
C8 Automated processing of documents				X	X					X

1- Archiving of obsolete or neglected documents to tape or diskettes.

D. INFORMATION DISTRIBUTION

D 1. There is no rapid and efficient way to distribute most hard copies (including graphics) between units.

- o CREATE A FASTER, DEPENDABLE AND ACCURATE INTERDEPARTMENTAL INFORMATION EXCHANGE SYSTEM AND REDUCE TELEPHONE AND POSTAGE COSTS.
- Decision making would be facilitated by improved availability of information with shorter response and turnaround time. Routing mistakes would be fewer and there would be less dependence on U.S. mail and messengers. It would save postage and telephone costs and encourage more exchange of information.

D 2. Distribution of documents requires producing multiple copies to file and send to recipients, using various distribution lists. Information sometimes fails to get to the appropriate person.

- o DESIGN A SYSTEM TO ELECTRONICALLY TRANSFER DOCUMENTS, ALLOWING SUBSEQUENT ROUTING TO SUBORDINATES, BUT INSURING THE INTEGRITY OF THE CHAIN-OF-COMMAND.
- All involved personnel would be assured of getting accurate and consistent information in a timely manner.

D 3. Slow paper flow increases the time required to deliver information.

- o ESTABLISH EFFECTIVE METHODS OF TIMELY DISTRIBUTION OF INFORMATION FOR REVIEW AND RESPONSE, TRACKING ITS LOCATION, AND RECORDING ACTIONS TAKEN.
- Expedites staff performance by allowing for more timely input into pending matters.

D 4. There is no timely method of tracking the activities of people in remote units.

- o DEVISE A METHOD OF TRACKING ACTIVITIES OF PERSONNEL AT THE LOCAL LEVEL WHICH CAN BE ACCESSED BY MANAGEMENT.
- Will improve operational methods, identify problems in workload imbalances, and can be used to support a combined payroll and cost accounting system.

D 5. Documents are handled in an inefficient manner with too much manual paper flow.

- o REDUCE PAPER TRANSACTIONS.
  - This will help reduce costs of postage, paper, preparation, storage and processing. It will also lessen the time spent in completing transactions.

D 6. Requests for supplies, parts or information sometimes require many telephone calls to determine availability.

- o DEVISE A SYSTEM TO FACILITATE THE EXCHANGE OF INFORMATION REGARDING AVAILABILITY AND LOCATION OF EQUIPMENT, SUPPLIES AND REFERENCE MATERIAL.
  - Will reduce telephone calls needed to locate information, saving time, money, and reducing duplication of inquiries and effort.

D 7. Interdepartmental mail, although usually reliable, is not always fast enough to meet same day or next day information needs. Documents are sometimes lost.

- o DEVELOP A SYSTEM OF ELECTRONICALLY TRANSMITTING INFORMATION.
  - Information would be available quicker at reduced costs, and there would be less likelihood of information being lost.

USER REQUIREMENTS	USER DEPARTMENTS	Personnel	Office Services	Forestry	License Center	Information & Education	Planning	Waters	Commissioner's Office	Enforcement	Parks	Finance	Engineering	Fisheries	Trails & Waterways	Lands	Minerals	Data Systems	Wildlife	Region II	Field Services
D1 Interdepartmental information exchange		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
D2 Electronic routing		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
D3 Review and response		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
D4 Tracking activity		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
D5 Reduce paper transactions		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
D6 Reduce telephone calls		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
D7 Electronic mailing		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

USER REQUIREMENTS \ TECHNICAL FUNCTIONS	Electronic Message	Distribution List	Acknowledgement	Confirm with Reply	Electronic In-Basket	Mail Log by User	Name Routing Codes
D1 Interdepartmental information exchange	X	X	X	X	X	X	X
D2 Electronic routing		X	X	X	X	X	X
D3 Review and response	X		X	X	X	X	
D4 Tracking activity	X		X	X	X		
D5 Reduce paper transactions	X	X			X	X	
D6 Reduce telephone calls	X	X	X	X	X		X
D7 Electronic mailing	X	X	X	X	X	X	X

E. GENERAL AND PERSONAL SERVICES

E 1. People do not have ready access to automated equipment necessary to improve their performance.

Terminals

Personal Computers

Access to information center

- o PROVIDE ALL REMOTE UNITS WITH THE NECESSARY EQUIPMENT AND SOFTWARE TO MEET LOCAL NEEDS, ACCESS THE CENTRAL SYSTEM AND COMMUNICATE WITH OTHER UNITS.
  - Will assist people in performing their work by giving them access to needed information and communication.

E 2. Presently, personnel cannot document teleconferences with hard copy text, data and graphics.

- o PROVIDE A METHOD OF SUPPORTING TELECONFERENCING WITH HARD COPY TEXT, DATA AND GRAPHICS.
  - Will reduce the number of meetings required, saving time and money, and simplifying the scheduling of people and facilities.

E 3. There are limited backup procedures at the local level when the central computer system is down.

- o TRANSFER SOME OF THE FUNCTIONS NOW REQUIRING THE CENTRAL COMPUTER TO THE LOCAL USER, I.E., COLLECTING WATER LEVELS, TRAIL CONDITION DATA, ETC.
  - This would provide some backup capability in the event of computer or line outage.

E 4. Fragmentation will get worse if something is not done soon to integrate all systems. For example, data already available in machine readable form is being rekeyed for different incompatible machines.

- o ENSURE THAT ALL FUTURE EQUIPMENT IS COMPATIBLE AND ABLE TO SHARE COMMUNICATION NETWORKS AND DATA BETWEEN OFFICE AUTOMATION AND DATA SYSTEMS.
  - Assures compatibility that is essential for minimizing the costs of communication, storage and processing equipment, for training people, and for achieving many of the other requirements listed.

E 5. There is limited equipment to automate some scientific reports, technical drawings and special graphics, forcing professionals to do them by hand.

- o PROVIDE AUTOMATED CAPABILITIES TO PRODUCE TECHNICAL DRAWINGS, GRAPHICAL DIAGRAMS AND SCIENTIFIC REPORTS CONTAINING SPECIAL CHARACTERS.
- Will get more professional results and provides information in a more understandable manner without requiring costly time of professionals.

E 6. Many files must be maintained with security.

- o THE SYSTEM MUST PROVIDE FOR THE SECURITY OF CONFIDENTIAL DATA, ALLOWING ACCESS ONLY TO AUTHORIZED USERS.
- The integrity of files will be maintained.

E 7. There are no uniform standards for document creation, storage and distribution, or calendar maintenance.

- o PROVIDE A SYSTEM THAT FACILITATES STANDARDIZATION OF DOCUMENT CREATION, FILING AND DISTRIBUTION.
- Results in uniformity of data collection and aids in analysis and interpretation.

E 8. There is not enough training for some existing equipment.

- o PROVIDE AN ONGOING TRAINING PROGRAM FOR OFFICE TECHNOLOGY.
- Ensure maximum utilization of equipment, enable offices to share staff to even out peaks and valleys, reduce employees frustration, and assist in upward mobility for support staff.

E 9. There is inadequate access to departmental and other public agency data bases.

- o SOME TERMINALS IN THE SYSTEM SHOULD HAVE THE CAPABILITY TO ACCESS DATA BASES OUTSIDE THE DEPARTMENT.
- Provides information not otherwise available.

E 10. Telephone tag is a problem.

- o DEVELOP A SYSTEM THAT REPLACES THE TELEPHONE TAG PROBLEM.
- Will save time and the cost of calls due to multiple callbacks.

E 11. Existing systems are not always user friendly (i.e., easy to use).

- o ENSURE THAT ANY OFFICE AUTOMATION BEING CONSIDERED IS NOT TOO COMPLICATED TO USE, I.E., THE SYSTEM MUST BE USER FRIENDLY.
- Reduces employee resistance to change, reduces training time, provide for multiple users, and increases user productivity.

E 12. Professionals are spending too much time on clerical tasks.

- o PROVIDE OFFICE AUTOMATION TO ASSIST WITH REPETITIVE CLERICAL FUNCTIONS.
  - Free personnel from mundane clerical tasks, allowing them to utilize their time more productively.

E 13. The equipment acquired for immediate needs i.e., word processing, is not compatible with required additional functions, i.e., data processing.

- o ESTABLISH PROCEDURES THAT WILL ASSURE THAT EQUIPMENT ACQUIRED WILL MEET BOTH IMMEDIATE AND LONG RANGE NEEDS.
  - Makes better use of limited funds to purchase equipment and allows sharing of trained staff.

E 14. It is difficult and time consuming to schedule and locate meetings, equipment, facilities and personnel.

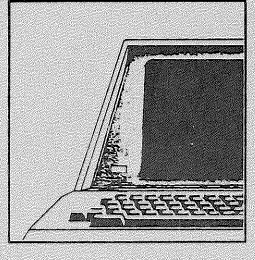
- o SET UP AN EFFICIENT, FLEXIBLE, AND EASY TO USE SYSTEM FOR SCHEDULING MEETINGS.
  - Enables timely and effective scheduling of meetings. Enhances workflow by reducing conflicts and delays.

E 15. There is no effective way of tracking and monitoring documents that require a response with due dates when project control and tracking procedures are manual.

- o DEVELOP A SYSTEM FOR PROMPTING MESSAGES TO INFORM PEOPLE WHEN ITEMS IN SUSPENSE ARE DUE FOR ACTION.
  - Helps people to avoid missing due dates on correspondence and other actions. Reduces the time a person new takes to do this manually.

USER REQUIREMENTS / USER DEPARTMENTS	Personnel	Office Services	Forestry	License Center	Information & Education	Planning	Waters	Commissioner's Office	Enforcement	Parks	Finance	Engineering	Fisheries/Ecological Services	Trails & Waterways	Lands	Minerals	Data Systems	Wildlife	Region II	Field Services
E1 Adequate equipment	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
E2 Support teleconferencing	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
E3 Distribute functions to local user	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
E4 Compatibility of equipment	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
E5 Graphics equipment		X	X		X	X	X	X		X	X	X	X	X	X	X	X	X	X	X
E6 File security	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
E7 Uniform standards	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
E8 Training	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
E9 Access to data bases	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
E10 Improve telephone communications	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
E11 User friendly system	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
E12 Automate repetitive clerical tasks	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
E13 Equipment meet long range needs	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
E14 Scheduling meetings	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
E15 Tracking documents/due dates	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

USER REQUIREMENTS / TECHNICAL FUNCTIONS	Host Printing	Photo Composition	Laser Printer Support	Security	Ease of Learning/Use	Personal Computing	Calendaring	Tickler File	Records Processing	Access to Host	Information Center Access	Distributed Processing
E1 Adequate equipment												
E2 Support teleconferencing												X
E3 Distribute functions to local user						X						
E4 Compatibility of equipment												
E5 Graphics equipment				X								
E6 File security												
E7 Uniform standards					X							
E8 Training										X		
E9 Access to data bases												
E10 Improve telephone communications												
E11 User friendly system					X							
E12 Automate repetitive clerical tasks	X						X	X	X			
E13 Equipment meet long range needs												
E14 Scheduling meetings							X					
E15 Tracking documents/due dates								X				



GENERAL SYSTEM NEEDS

CHAPTER IV
GENERAL SYSTEM NEEDS

The preceding chapters have detailed the department's problems and requirements as related to office automation. This chapter is intended to outline the general system needs and is organized into five sections. The first section provides specifications for the office information system software. This section includes requirements for word processing, electronic document distribution, and document filing, indexing and retrieval. The second section briefly describes the general purpose software needs. Included here is a list of requirements for an operating system and general purpose software tools. The third part describes the department's hardware needs. The forth section outlines the data communication needs. Finally, the last section of this chapter details the documentation and training needs.

Perhaps it is worth mentioning that, for reason which will be described in Chapter V, the office system implementation will be phased and only the core components (or pilot) will be initially installed. Thus, the following requirements were developed in order to help ensure that the phased components meet the over all system requirements. It should also be noted that this chapter presents only enough detail to allow the next step of planning - the development of detailed bid specifications - to be performed.

A. OFFICE INFORMATION SYSTEM

The office information system must be responsive to clerical, professional and management needs. These needs include word processing, document distribution, and document indexing, filing and retrieval. The office information system needs are organized accordingly.

1. Word Processing (text creation, capture and revision)

The word processing system must:

- Be user friendly, menu-driven and easy to use.
- Be available to all work stations.
- Provide all basic word processing functions including: pagination, searching, inserting, centering, underscoring text merge/move, text copying, and global replace/delete.
- Be user programmable for repetitive typing/editing tasks.
- Be capable of sending/storing documents to/on host.
- Be capable of retrieving documents from host.
- Provide document security.
- Enable standard formats to be created, stored and executed.
- Merge (assemble) documents.
- Copy (duplicate) documents.
- Provide spelling check functions with system and user defined dictionaries.
- Provide the ability to do math (e.g., column add, row add) in documents.
- Enable users to easily find documents when number/name is unknown by searching for author's name, creation/revision date, subject and document number/name.
- Enable lists to be sorted on one or more fields.

2. Document Distribution

The electronic document distribution system should:

- Be available to all stations.
- Provide auto call/auto answer.
- Store distribution lists
- Provide electronic routing.
- Confirm delivery of documents.
- Provide electronic messages capability.

3. Document Indexing, Filing and Retrieval

The office information system must provide:

- A convenient and efficient method for on-line (fixed disk) storage and retrieval of frequently requested information and documents.
- A convenient cost-effective archiving system.
- An easy to use cross reference indexing system for archived electronic documents, microfilm files, and manual files which permits searching by author, title, date, and subject (topic).
- An easy to use author, title, and subject searching indexing system for retrieving documents filed (stored) on-line.
- A archiving/purging utility for obsolete and neglected documents.

B. GENERAL PURPOSE SOFTWARE

The following general purpose software tools are required:

- Interactive operating system.
- Batch and real time processing.
- High level programming languages including FORTRAN, COBOL and PASCAL.
- A user friendly data base management software package capable of efficiently storing, updating and retrieving files of up to 400,000 records.
- Security utilities.
- Operating system level programming language.
- Text editor.
- System utilities to monitor CPU usage, peripheral resources, users, disk (storage) space, etc.

C. HARDWARE

The following hardware specifications are organized in terms of the department's central processor, work station, and output device needs.

1. Central Processor

A mini computer that supports an office information system as well as limited data processing functions such as data base management and high level language programming is required. The host processor must:

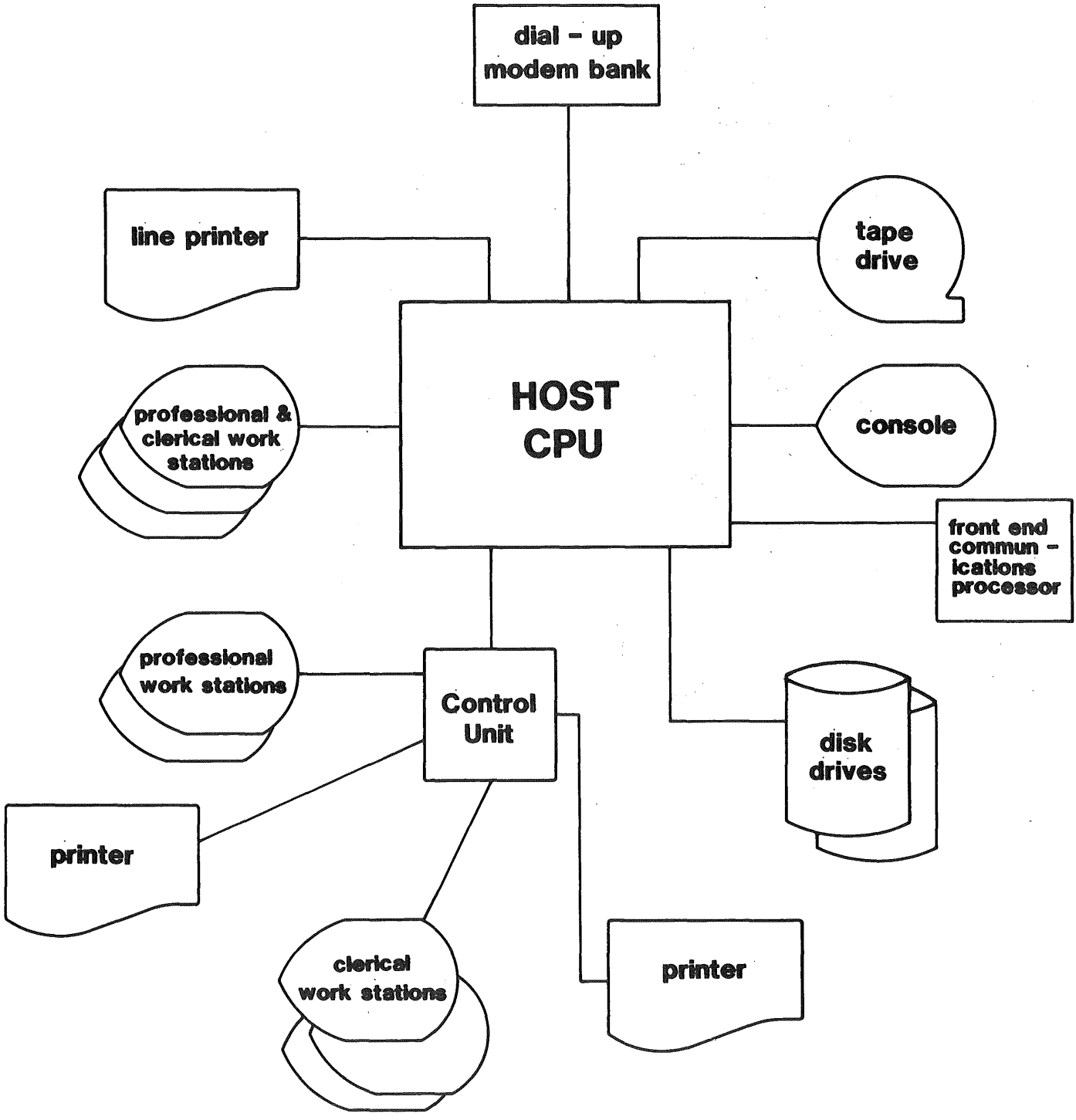
- Support no fewer than 16 interactive terminals simultaneously.
- Be capable of communicating with other processors, including Cyber, IBM, Nixdorf, Prime and Texas Instruments computers.
- Be capable of future expansion.
- Be capable of supporting a variety of peripheral devices including tape drives, fixed disk drives, printers (including line and laser) and communication controllers (e.g. concentrators, multiplexers).
- Provide a minimum of 60 megabyte disk storage capacity with the capability of expanding.
- Be capable of supporting the department's revenue accounting system and land records file (400,000 records, 70 bytes in length).

2. Work Stations

Both professional and clerical work stations are required. Clerical work stations must be tailored to heavy text entry and editing tasks and must have single stroke key functions for such tasks as deleting, underscoring, moving and merging text. Professional work stations must be suited for limited text entry/editing and also for use as a computer terminal. Selected work stations should be capable of medium resolution graphic display capabilities. In addition the work stations must:

- Be easy to use.
- Have self-explanatory key boards.
- Have a minimum display of 22 lines and 80 columns.
- Be equipped with user programmable function keys.

Figure 4.1 System Configuration



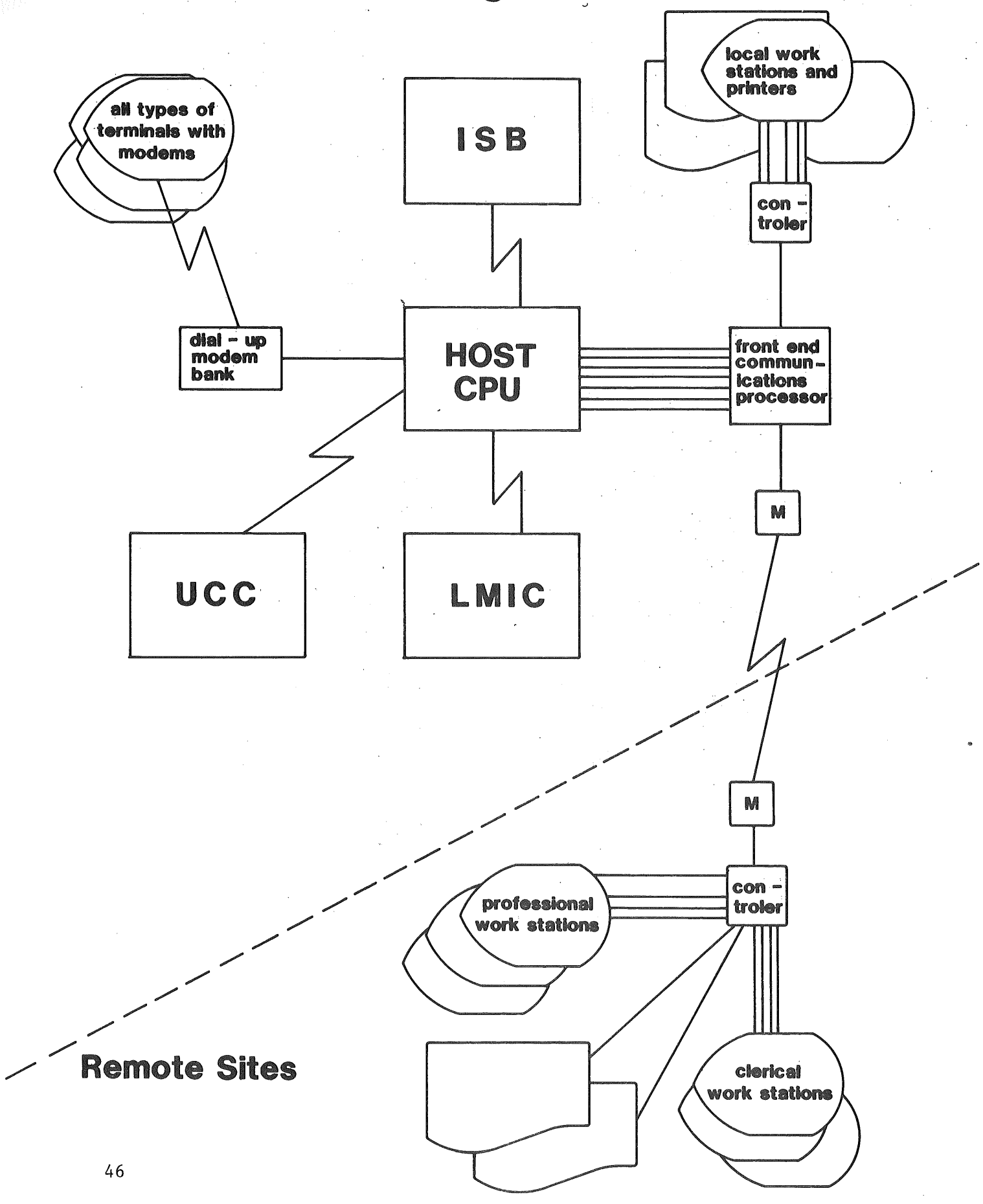
D. COMMUNICATIONS AND INTERMACHINE DATA TRANSFER

The office information system must support communications so that work stations may access the host and independent processing sites such as LMIC, UCC, and ISB. The proposed communications configuration is depicted in Figure 4.2. The following list highlights the communication and network architecture needs.

- Remote dial-up access to the host using existing equipment which includes Teleray and Digital terminals and GDC and Multi-Tech modems.
- On-line access to independent computers housed at the Information Service Bureau, University Computer Center and the Land Management Information Center through selected professional work stations.
- The capability to merge data and text files created/stored on all computers (including Prime, Cyber, Texas Instruments, Nixdorf and IBM) currently used by the department.
- The ability to transfer data at high speeds between the host and the above mentioned mini and main-frame computers.
- The capability to read "stranger" tapes and, if necessary, translate data codes so that data can be shared among computers not integrated into the communications network.

Although the communication needs are not listed in a priority order, remote dial-up access to the host is probably the most important. The other communication needs are also very important, but they are clearly more complicated. If it is determined that the cost of establishing the intermachine communication network will be too high for the available funds, then the need to communicate and transfer data between the host and each independent processing sites will have to be re-evaluated and prioritized.

Figure 4.2 Communications Network Configuration



E. DOCUMENTATION AND TRAINING

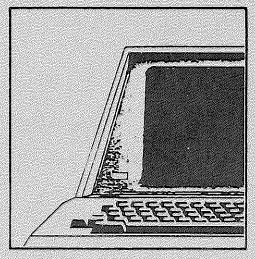
1. Documentation

The hardware/software systems must be thoroughly and clearly documented. Documentation will include:

- Training manuals.
- Users' manuals for all functions (e.g., word processing, electronic mail, etc.).
- Programmers' manuals.
- Procedure manuals.
- Hardware manuals.
- Detailed systems documentation.

2. Training

Professional training is needed for all levels of end users, including clerical, professional and management. Adequate training is also required for system programmers/administrators. The training must be consistent with the department's vendor training specifications.



IMPLEMENTATION PLAN

CHAPTER V

IMPLEMENTATION PLAN

A. SUMMARY

To determine whether the conceptual plan for DNR office automation as developed by the study team is feasible, a pilot program approach should be adopted. In addition to testing the concepts, this approach will allow for operating within the budget restrictions, reduce organization disruption, provide necessary training, and provide justification for wider implementation. Therefore, this section will concentrate on the implementation of the pilot program.

B. PILOT OBJECTIVES

There are a number of objectives that a pilot project can be expected to accomplish. The attainment of these objectives would greatly assist in the implementation of the remaining phases of the system. These objectives are to:

1. Review and modify, as necessary, the general system plan and strategy.
2. Establish and test procedures, responsibilities, and standards.
3. Develop and test training procedures.
4. Test reliability and maintainability of the equipment.
5. Determine the host computer impact.
6. Identify specific functions the host should provide.
7. Start building a document data base.
8. Determine the user acceptance level.
9. Determine the implementation guidelines for subsequent applications.

C. DNR OFFICE SYSTEMS STEERING COMMITTEE

Implementation of an automated office system which provides such services as electronic mail and centralized filing and retrieval will require strong executive commitment to be successful. There must be a commitment to user satisfaction and quality service. It is imperative that a responsive and committed staff provide services, training, and user support.

Implementation of this system will involve change in the way work is done and in the structure of the organization itself. Many people may be skeptical of the ability of automation to meet their requirements and may be apprehensive about relying on data processing services to help perform their jobs. For many, this will be their first hands-on experience with a computer.

To assist in this conversion and to guide the execution of this pilot program, the study team recommends the formation of a DNR Office Steering Committee. The study team suggests that the membership of this committee be selected from the DNR MIS Technical Committee whose members are already part of the study team. Other members could also be, or represent, end users and implementation personnel.

The responsibility of the steering committee will be to review the overall office systems plans and activities and to ensure that no important area is overlooked. Some areas of concern for the committee may include the following:

1. Maintenance of the Office System Plan
   - Periodic review of the implementation strategy.
   - Modification of the plan to respond to unanticipated needs.
2. Management and Control of the Overall Implementation Process
   - Periodic review of the progress of implementation.
   - Measurement of expected benefits.
3. Personnel Considerations

Review of
- position design and job classifications.
- changes in reporting structure.
- education and retraining requirements.
- work environments.
- attitudes and perception of end users toward the system.

4. Education

Review of
- development and education of personnel who have ongoing responsibility for office systems training and education.
- training of personnel who will work on implementation.
- new employee training.
- training for end users as new capabilities of the systems are implemented.

D. INITIAL TASKS FOR PILOT IMPLEMENTATION

The following is a preliminary list of tasks which must be accomplished to implement the system. This plan needs to be expanded as the additional phases get underway.

1. Create the office systems steering committee.
2. Assign a Project Supervisor and an Installation Team. The supervisor should be familiar with the functions of the department and how work flows through the organization. Ideally, this person would have an information systems background.
3. It would be the installation teams responsibility to:
   a. Identify equipment quantities and locations for the affected employees, (The study team has made equipment recommendations).
   b. Identify data processing services and assign project personnel. Involvement will be required of a Programmer/Analyst from the MIS Bureau for this project to coordinate the installation of hardware and software, and perform systems analysis for detailed application design.
   c. Develop hardware and software design specifications, bidding, and requests for proposal.
   d. Guide site preparation.
   e. Guide systems planning. Plans, personnel assignments, and training are required for implementation of the selected software.
   f. Oversee personnel planning and define duties and establish positions as needed.
   g. Develop a detailed training plan for managers and employees.
   h. Install the system in accordance with the DNR Office Automation System Pilot Plan.
   i. Evaluate the pilot project.
   j. Expand the system to include all DNR units within the scope of this study.

E. IMPLEMENTATION PLAN FOR THE PILOT

A phased approach to implementation of this plan is recommended since it offers a number of benefits:

- It is faster and less costly to phase in an automated office system.
- Management has an opportunity to periodically review the long-term goal and the implementation, and to make changes.
- Management will have better control because checkpoints are established and benefits measured.
- Successful implementation of each step strengthens user support.

The study team recommends that the equipment be distributed among the DNR units in accordance with the following phasing plan:

PHASE I:

1. Install system in the Bureau of Personnel.

Purpose:
- Evaluate hardware/software capabilities.
- Provide data systems with systems access for application and development.
- Adjust plans to smooth succeeding installation.
- Build installation expertise in implementation team.
- Establish access to files by DNR divisions, bureaus and regions.

Equipment:

1 - Central Processor/ Console
Line Printer/ Tape Drive/Disk Units
5 - Terminals
3 - Terminal Printer
1 - Local Control Unit

2. Install stand-alone word processors and printers in the following units.

Purpose: To establish training and experience in the use of the equipment for the preparation of memo, letters, forms, etc.

1 - Personnel
1 - Engineering
1 - Commissioner's Office
1 - License Center
1 - Data Systems
1 - Field Services
1 - Finance
1 - Lands
1 - Information and Education
1 - Office Services
5 - Regional Administrative Offices

3. Transfer Revenue and Land files to Central Processor.

Purpose: To create access for files by DNR Bureaus/ Divisions/ Regions.

PHASE II:

Install system in Bureau of Financial Management.

Purpose: Preparation of budgets

- Limited data entry and revision
- Spreadsheet analysis
- Establish access to files by DNR bureaus, divisions and regions
- Revenue accounting

Equipment:

2 - Terminals
1 - Terminal Printer
1 - Terminal with P.C.

PHASE III:

Install equipment where necessary in all DNR bureaus, divisions, and regions.

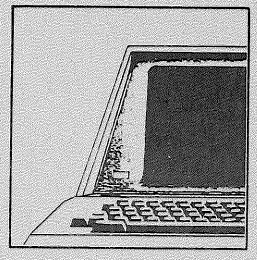
Purpose: For access to Personnel, Finance, Revenue and Land files.

PHASE IV:

The first three phases should be completed and the results successfully measured in the initial pilot installation. Then the automated office system should be expanded in accordance with a plan to be developed by the Steering Committee.

Other areas to be considered at this time should be to:

1. Add communications capabilities (electronic document distribution) to connect the DNR units to the Data Processing Center and to each other.
   - This allows documents created through word processing to be distributed among the participating DNR units.
2. Add document storage and retrieval capabilities (electronic file cabinet).
   - DNR units will be able to store and electronically index documents for subsequent retrieval.
   - A library of documents, such as procedures manuals and research manuals can be established and accessed, as required.
3. Provide for the integration of text and data processing.
   - This will allow access to existing applications via office system terminals and access to office system documents from existing data processing terminals.
   - Most importantly, this will allow information stored or created on the data processing computer to be merged into office system documents, e.g., mailing lists with personalized letters.
4. Provide the assistance of other facilities on the office system to support DNR professionals.
   - This provides for personal and group calendars, facilities scheduling, etc.



BENEFIT ANALYSIS

CHAPTER VI

BENEFIT ANALYSIS

A. MANAGEMENT/PROFESSIONAL AND CLERICAL ACTIVITIES

The Administrative Management Services Program (Bureaus of Personnel, Engineering, License Center, Management Information Systems, Financial Management, Lands, Records and Office Services, and Information and Education), the Regional Administration Program (five administrative support units) and the Field Services Program (three administrative support units) were selected as the organizational targets for the Office Automation Study.

One of the first steps of the study involved determining the average percent of time that management/professional and clerical personnel in these programs typically spend performing the following work activities:

-- CREATING DOCUMENTS
-- COMMUNICATING
-- ANALYZING
-- ADMINISTERING
-- OTHER ACTIVITIES

Each bureau and regional administrative unit completed a representative questionnaire (Appendix D) for their respective management/professional and clerical personnel. The questionnaire covered a total of 177 management/professional and 125 clerical employees. The results of the employee questionnaire are summarized on attachment "Summary of Documented Time (Percentages) Spent on Activities."

SUMMARY OF DOCUMENTED TIME (PERCENTAGES) SPENT ON ACTIVITIES

BUREAU/REGION	MANAGEMENT/PROFESSIONAL				CLERICAL				
	Creating	Communicating	Analyzing	Administering	Creating	Communicating	Analyzing	Administering	Other
Personnel	26.0	48.0	13.0	13.0	35.0	23.0	11.0	31.0	-0-
Engineering	25.0	26.0	27.0	22.0	30.0	10.0	14.0	46.0	-0-
License Center	20.0	45.0	30.0	5.0	10.0	30.0	10.0	50.0	-0-
Data Systems	27.0	31.0	24.0	18.0	20.0	13.0	41.0	26.0	-0-
Finance	18.0	38.0	30.0	14.0	40.0	17.0	23.0	20.0	-0-
Lands	23.0	39.0	14.0	24.0	39.0	21.0	18.0	22.0	-0-
Field Services	17.8	33.5	13.7	35.0	32.0	14.0	7.5	23.0	23.5
Office Services	55.0	15.0	15.0	15.0	5.0	62.0	2.0	31.0	-0-
Info. & Educ.	33.0	20.0	13.0	34.0	45.0	20.0	6.0	29.0	-0-
BUREAU AVERAGE	27.2	32.8	20.0	20.0	28.5	23.3	14.7	30.9	2.6
Region #1	21.3	37.9	11.9	28.9	38.8	16.6	13.1	31.5	-0-
Region #2	21.0	28.0	20.0	31.0	31.0	26.0	13.0	30.0	-0-
Region #3	7.0	45.0	41.0	7.0	50.0	21.0	12.0	17.0	-0-
Region #4	20.2	33.8	13.0	33.0	37.0	16.0	26.0	21.0	-0-
Region #5	23.0	52.0	7.0	18.0	50.0	21.0	4.0	25.0	-0-
REGIONAL AVERAGE	18.5	39.3	18.6	23.6	41.4	20.1	13.6	24.9	-0-
DEPT. AVERAGE	24.1	35.1	19.5	21.3	33.0	22.2	14.3	28.8	1.7

B. ESTIMATED IMPROVEMENT FACTOR

The next step in the process involved completing a "Potential Time Savings Worksheet" (Appendix J) by employee category for each organizational unit. The work activities and documented "percent of time spent" from Section A of the "Benefit Analysis Section" are repeated and multiplied by an "improvement factor" to arrive at the "percent of total time saved."

NOTE: The "improvement factors" used on the "Potential Time Savings Worksheet" resulted from studies conducted by Booz, Allen, Hamilton (independent sources) and IBM. The potential time savings calculated in this study are summarized on attachment "Summary of Potential Time Savings (Activity by Employee Category within Bureau/Region)."

SUMMARY OF POTENTIAL TIME SAVINGS

(ACTIVITY BY EMPLOYEE CATEGORY WITHIN BUREAU/REGION)

BUREAU/REGION	MANAGEMENT/PROFESSIONAL						CLERICAL					
	Creating Documents	Communicating	Analyzing	Administration	Total %	Number of Staff	Creating Documents	Communicating	Analyzing	Administration	Total %	Number of Staff
Personnel	5.2	10.7	1.2	4.7	21.8	8.0	8.6	4.9	.2	16.2	29.9	5.5
Engineering	5.0	5.4	3.6	9.9	23.9	38.0	10.8	2.3	.6	19.1	32.8	4.0
License Center	4.2	11.5	3.0	2.7	21.4	5.0	3.0	6.5	1.0	25.0	35.5	27.0
Data Systems	5.4	5.3	3.6	8.8	23.1	2.0	7.0	2.9	.2	13.0	23.1	6.0
Finance	3.6	8.8	1.0	7.5	20.9	10.0	12.0	3.5	.4	9.8	25.7	6.0
Lands	4.6	7.6	1.2	9.9	23.3	15.0	9.8	4.8	.4	11.4	26.4	15.0
Field Services	3.7	6.6	1.3	14.3	25.9	11.0	14.8	3.1	.6	10.9	34.1	9.0
Office Services	16.0	3.7	2.0	8.1	29.8	4.0	1.4	11.1	.2	15.8	28.5	3.0
Info. & Educ.	8.6	3.7	2.0	13.9	28.2	16.0	14.0	4.6	.6	14.2	33.4	5.0
Region #1	4.2	8.5	1.0	10.3	24.0	13.0	12.3	4.3	.8	15.4	32.8	8.0
Region #2	4.4	5.4	.8	9.9	20.5	13.0	9.8	5.6	1.4	13.5	30.3	9.0
Region #3	1.4	4.5	.6	2.7	9.2	12.0	13.0	3.9	.2	8.9	26.0	7.0
Region #4	4.1	7.6	1.0	7.1	19.8	11.0	12.6	3.6	.6	10.6	27.4	7.0
Region #5	4.8	13.2	.8	5.1	23.9	19.0	15.4	4.9	.4	12.6	33.3	13.0

C. GENERAL PRODUCTIVITY BENEFIT

The final step in the process of working with the "potential time savings" information is to arrive at an estimated dollar value associated with the productivity improvements provided through an office automation system. In this study, the following method was used to calculate the gross value of estimated productivity improvements by organizational unit: The total potential time savings (percentage) multiplied by the number of staff, equals the number of full-time equivalent positions (FTE's) saved; multiplied by the average salary, equals the gross value of estimated productivity improvements. The gross value of estimated productivity improvements addressed by this study is approximately $2,100,000 annually ($1,400,000 for management/professional and $700,000 for clerical). These estimated values are the optimum results for ideal applications of office automation.

However, of more importance to the department, is determining the net value of the estimated productivity improvements to be realized from implementing an office automation system. The cost of the equipment configuration for the proposed office automation system recommended by the study team is as follows:

ALTERNATIVE #1 - Monthly Lease/Purchase Option

Under this alternative, the Department would enter into a two-year lease agreement with monthly payments of approximately $55,000 (including monthly maintenance). The annual payments during the two-year lease period would amount to $660,000.

ALTERNATIVE #2 - Purchase and Monthly Maintenance

The list price to purchase the equipment configuration recommended by the study team is approximately $1,100,000. In addition, the annual cost of monthly maintenance would amount to approximately $100,000.

NOTE: The figures contained in Alternatives #1 and #2 do not include costs associated with site preparation, employee training, communications, etc. These costs must be addressed in detail by the installation team in the next phase of the Office Automation Study.

Based on the value of the estimated annual productivity improvements and the list price of the equipment configuration, there is a substantial net gain to be realized by the Department in implementing the proposed office automation system.

In addition, the study team has also recommended a "pilot" office automation system with the following equipment configuration:

ALTERNATIVE #1P - Monthly Lease/Purchase Option

This basically carries the same lease provisions as in Alternative #1, except for the downsizing of the equipment configuration. This monthly lease/purchase payment for the "pilot" office automation system is approximately $25,000 per month or $300,000 for an entire year.

ALTERNATIVE #2P - Purchase and Monthly Maintenance

This list price to purchase the equipment configuration for the "pilot" system amounts to approximately $500,000. The annual monthly maintenance costs are $5,000 per month or $60,000 for an entire year.

what is basis for these costs? whose hardware?

FINANCIAL IMPACT OF POTENTIAL TIME SAVINGS ATTRIBUTABLE TO PROPOSED OFFICE AUTOMATION SYSTEM

Bureau/Region	MANAGEMENT/PROFESSIONAL		CLERICAL		TOTAL
	Total Potential Time Savings	Estimated Value of Productivity Improvements	Total Potential Time Savings	Estimated Value of Productivity Improvements	Estimated Value of Productivity Improvements
Personnel	21.8%	$ 60,360	29.9%	$ 30,922	$ 91,282
Engineering	23.9%	298,162	32.8%	23,777	321,939
License Center	21.4%	28,223	35.5%	173,683	201,906
Data Systems	23.1%	23,778	23.1%	25,551	49,329
Finance	20.9%	65,894	25.7%	29,232	95,126
Lands	23.3%	116,347	26.4%	83,496	199,843
Field Services	25.9%	98,562	34.1%	56,600	155,162
Office Services	29.8%	28,535	28.5%	16,575	45,110
Info. & Educ.	28.2%	136,719	33.4%	32,047	168,766
Subtotal	--	856,580	--	471,883	1,328,463
Region #1	24.0%	115,301	32.8%	47,819	163,120
Region #2	20.5%	108,165	30.3%	50,601	158,766
Region #3	9.2%	43,062	26.0%	31,682	74,744
Region #4	19.8%	86,189	27.4%	34,365	120,554
Region #5	23.9%	153,275	33.3%	82,306	235,581
Subtotal	--	505,992	--	246,773	752,765
TOTAL	--	$ 1,362,572	--	$ 718,656	$ 2,081,228

EQUIPMENT CONFIGURATION FOR PROPOSED OFFICE AUTOMATION SYSTEM

(Administrative Bureaus and Regional Administration)

Item	ALTERNATIVE #1	ALTERNATIVE #2	
	Monthly Lease/ Purchase Option	Purchase	Monthly Maintenance
EQUIPMENT			
1 - Central Processor	$ 8,559	$ 125,130	$ 447
1 - Console	265	3,550	24
1 - Disk Unit	1,463	35,480	126
1 - Disk Unit	1,096	26,600	95
1 - Tape Unit	392	11,960	83
1 - Line Printer	595	15,226	180
24 - Word Processors	8,892	208,920	2,632
18 - Word Processor Printers		87,200	1,224
1 - Local Control Unit	946	18,230	58
9 - Remote Control Units	8,464	74,718	288
60 - Terminals	12,240	329,520	1,500
19 - Printers (120 cps) 18 - Modems (4800 bpi)	6,118	115,444	912
1 - Communications Control	2,115	46,600	229
SOFTWARE	3,789	N/A	685
Includes VM Operating System Professional Office System Information Center Software APL software products for report writing, spreadsheets			
TOTAL	$ 54,934	$ 1,098,578	$ 8,482

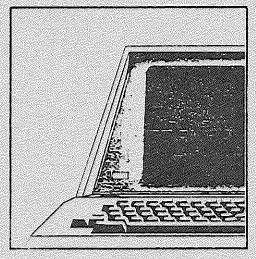
61 NOTE: Schedule reflects list prices.
Monthly Lease/Purchase Option - 50% of lease payments accrue and apply to purchase price if option is exercised.

EQUIPMENT CONFIGURATION FOR PROPOSED

PILOT OFFICE AUTOMATION SYSTEM

Item	ALTERNATIVE #1P	ALTERNATIVE #2P	
	Monthly Lease/ Purchase Option	Purchase	Monthly Maintenance
EQUIPMENT			
1 - Central Processor	$ 8,559	$ 125,130	$ 447
1 - Console	265	3,550	24
1 - Line Printer	595	15,226	180
2 - Disk Units	2,559	62,080	221
1 - Tape Unit	392	11,960	83
1 - Local Control Unit	946	18,230	58
15 - Word Processors 15 - Word Processor Printers	5,558	185,070	2,415
8 - Terminals	1,632	43,936	200
4 - Terminal Printers no modems?	1,288	24,304	192
SOFTWARE	3,789	N/A	685
Includes VM Operating System Professional Office System Information Center Software APL software products for report writing, spreadsheets			
TOTAL	$ 25,583	$ 489,486	$ 4,504

NOTE: Schedule reflects list prices.
Monthly Lease/Purchase Option - 50% of lease payments accrue and apply to purchase price if option is exercised.



GLOSSARY

GLOSSARY OF TERMINOLOGY

WORDS	DEFINITIONS
Application:	The use to which a data processing system is put; for example, a payroll application, a permit tracking application, accounts receivable application.
Archiving:	The storage of a file on an off-line storage device such as magnetic tape or diskette.
Arithmetic processing:	The capability to perform row and columnar arithmetic functions including addition, subtraction, multiplication and division.
Auto-answer:	Answering in which the called data equipment automatically responds to the calling signal. Synonymous with automatic answering.
Auto-call:	A machine feature that allows a transmission control unit or a station to initiate a call automatically. Synonymous with automatic calling.
Automation:	The investigation, design, development, and application of methods of rendering processes more automatic, self-moving or self-controlling.
Background processing:	The execution of an operators request such as printing a document while the operator is performing other tasks.
Back-up:	A system, device, file, or facility that can be used in the event of a malfunction or loss of data.
Batch environment:	An environment to which data processing jobs in command lists are submitted. The environment schedules their execution, independent of their submitter.
Baud:	A unit of signaling speed equal to the number of discrete signal events per second.
Calendaring:	An application which allows secretaries and professionals to maintain a calendar of meetings and other commitments.
Centering (automatic):	The positioning of text string so that its midpoint is aligned with a given reference point position.
CPU:	The computer control logic used to execute the programs. Synonymous with Central Processing Units.

WORDS	DEFINITIONS
Coding standards:	A set of unambiguous rules specifying the manner in which data may be represented.
Communication control unit:	A communication device that controls the transmission of data overlines in a network.
Computer network:	A complex consisting of two or more interconnected computing units.
Concentrator:	In data transmission, a unit that permits a common transmission medium to serve more data sources than there are channels currently available within the transmission medium.
Configuration:	The arrangement of a computer system or network as defined by the nature, number, the chief characteristics of its functional units.
CRT:	Cathode Ray Tube
Data:	A representation of information in a formalized manner suitable for communication, interpretation, or processing by human or automatic means.
Data base:	A collection of interrelated or independent data items stored together without unnecessary redundancy, to serve one or more applications.
Data base management system:	A software system facilitating the creation and maintenance of a data base and the execution of computer programs using the data base.
Data communication:	The transmission, reception and validation of data according to appropriate protocol.
Data file:	A collection of related data records organized in a specific manner.
Data processing:	The systematic performance of operations upon data; for example, handling, sorting, merging, computing.
Dial-up:	The use of a telephone to initiate a connection between two stations that allow them to communicate. Contrast with hardwired connection.
Disk drive:	A mechanism for moving a disk pack or magnetic disk and controlling its movements.
Diskette (floppy disc):	A thin, flexible magnetic disk and a semi-rigid protective jacket, in which data is permanently enclosed. Contrast with fixed, or hard disk.

WORDS	DEFINITIONS
Distribution list:	A collection of one or more name-location pairs that is used to send message to all entries in the list.
Document:	A collection of one or more lines of text that can be named and stored as a separate entity.
Dot matrix printer:	A printer which prints character images using a two-dimensional pattern of dots.
Emulation:	The act of imitating or performing as if a device or program were something else.
Edit:	To enter, modify or delete text.
End user:	The ultimate source or destination of information flowing through a system.
Front-end processor:	A processor that can relieve a host computer of certain processing tasks such as message handling, code conversion, and line control.
Function key:	A key on a terminal that causes the system to perform some predefined function for the operator.
Gobal:	An operation, such as delete, search, or replace, which is performed for the entire document.
Hard copy:	A printed copy of machine output.
Hardware:	Physical equipment used in data processing and office automation, as opposed to programs and procedures contrast with software.
Hardwired:	Pertaining to a physical connection. Contrast with dial-up connection.
Host processor:	A processor that controls all or part of a user applications network.
Index:	A list of the contents of a file or of a document, together with keys or references for locating the contents.
Inquiry:	A request for information from storage.
Intelligent terminal:	Programmable terminal.
Interactive:	Pertaining to an application in which each user entry calls forth a prompt from a system.
Mass storage:	Storage having very large capacity.

WORDS	DEFINITIONS
Menu:	A display of a list of available functions for selection by the terminal operator.
Merge:	To combine two or more documents.
MIS:	Management Information System.
Modem:	A device for transmitting data over telecommunication facilities.
Multiplexer:	A functional unit that permits two or more data sources to share a common transmission medium such that each source has its own channel.
Off-line storage:	Storage that is not under control of the processing unit.
On-line system:	A system in which the input data enters the computer directly from the point of origin or in which output data is transmitted directly to where it is used.
Pagination:	The automatic arrangement of text according to a preset number of page layout parameters.
Personal Computing:	Computing is performed on a desk top micro computer, independent of the main (host) computer.
Privacy:	The right of individuals and organizations to control the collection and use of their data or data about themselves.
Protocol:	The set of rules governing the format and control of inputs and outputs between two communicating functional units. Includes hand shaking and line discipline.
Record:	A collection of related data items treated as a unit.
Remote access:	Pertaining to communication with a data processing facility through a data link such as a telephone dial-up link.
Security:	An application which permits users to access only the documents, data files, mail, etc., that they are authorized to see.
Shared logic Word processing equipment:	Word processing equipment in which the resources of a processing unit and storage devices are shared between two or more work stations.

WORDS	DEFINITIONS
Software:	Programs, procedures, rules and any associated documentation pertaining to the operation of an office information system contrast to hardware.
Stand-alone Word processing equipment:	Word processing equipment for use by one operator at a time that does not depend on the resources of other equipment for its normal operation.
System:	A collection of men, machines and methods organized to accomplish a set of specific functions.
Telecommunications:	Communication over distance by telephone.
Text:	Information for human comprehension that is intended for presentation in a two-dimensional form, for example, printed on paper or displayed on a screen.
Transmission:	The sending of data from one place for reception elsewhere.
User friendly:	A system which provides users with meaningful prompts, error messages and recovery capability. "Help" screens can be requested to explain prompts or error messages in detail when additional information is required.
Word processing:	A means for improving the efficiency and effectiveness of document communication. Word processing is characterized by the ability to efficiently enter text, store text, and edit text in groups of characters such as words, lines, paragraphs and pages.
Work station:	A station at which an individual can send information to or receive information from a processing unit, such as a word processor or computer.