North Dakota Legislative Council

Statewide Telecommunications Plan
Financial Analysis & Fiscal Note

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I. Executive Summary

In the 1990s, communications have expanded in ways few dreamed of just years ago. These advances have brought about major changes in North Dakota as we look ahead for ways to strengthen our economy and build for our future.

The state's Information Services Division (ISD) has established a solid telecommunications network in conjunction with the university system and the counties. The steps taken by these organizations positions the state to capitalize on advanced improvements in the future. By including key entities such as the K-12 schools, additional libraries, cities and not-for-profit healthcare facilities on this network, the state is in a strong position to leverage its buying power and influence the deployment of advanced technologies throughout the state.

The purpose of this report is to present a fiscal note and supporting information for Senate Bill 2043. The bill has two major objectives:

- Establish the Information Technology Department (ITD)
- Establish a statewide telecommunications network

Financial Analysis Summary

In 1998, the state of North Dakota spent approximately $19.3 million on telecommunications services for state agencies, universities, public schools, counties and municipalities. The breakdown of spending is as follows:
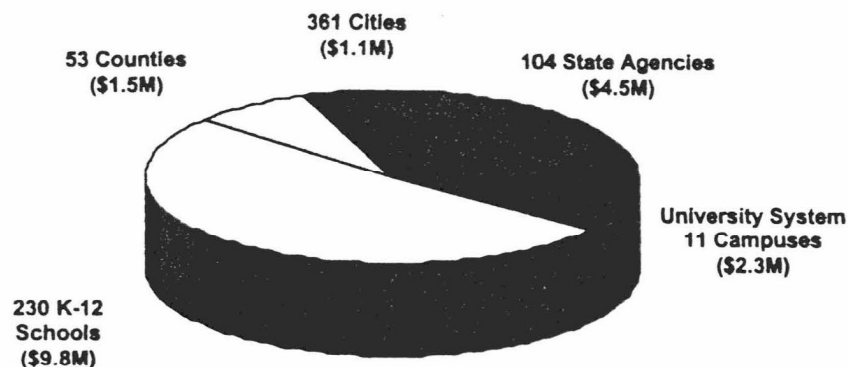
Based on industry data, this spending is expected to increase 20% a year, resulting in telecommunications spending of $57.6 million annually by fiscal year 2005.

Conservatively, the expected financial benefit of implementing an enhanced Information Services Department and establishing statewide telecommunications services is a 3% reduction in spending growth. This translates into savings of $6.7 million over the next six years.

Recommendations

1. Establish **ITD as an enhanced ISD** with a cabinet level Chief Information Officer (CIO) reporting directly to the governor. Additional staff will enable ITD to offer expanded services to its customers.

2. Establish a **statewide telecommunications network** for state agencies, higher education, schools, cities, counties and other not-for-profit organizations.

The network presented in this plan is based on the following:

1. **Expansion of current customer base (schools, cities, healthcare, etc.)**

2. **Increased bandwidth capability to meet continually increasing demand**

3. **Implementation of advanced technologies**

North Dakota can realize tremendous benefits by following a unified network strategy, expanding the customer base and enhancing the network. These benefits include:

1. **New technologies** - The joint purchasing power of the entire group is sufficient to drive the market. This will enable both public and private sector entities to obtain new technologies that would not be available on a timely basis with a disparate approach.

2. **Economic Development** - Economic development capabilities throughout the state will be enhanced. North Dakota's improved telecommunications infrastructure will augment business retention, expansion and growth.

3. **Financial savings** - The financial benefits are substantial (See Section VIII).

4. **Rural areas** - Rural areas will benefit tremendously by joining forces with the more populated regions. Rural areas are currently at a significant disadvantage financially and technically in their pursuit of affordable technologies.

5. **Joint planning** - The networking options facing public entities will continue to become more and more complex. By following a single, statewide plan, public entities within the state can advance together and ensure appropriate communications capabilities are deployed and utilized.

6. **Improved government services** - Government data and services can be made more accessible to the citizens of North Dakota as the network expands and new applications are developed.

Other state governments are making significant investments in their telecommunications capabilities. Economic development and educational opportunities commonly drive this investment.

The state of North Dakota has its own purposes. This study indicates the overriding reason for the state to aggregate buying power is to reduce future telecommunications spending and influence the deployment of advanced telecommunications technology throughout the state. North Dakota must make these advances in the coming years to meet user needs and stay competitive. The most efficient and cost-effective way for the state to proceed is as a united group.

This document provides the legislature with the information required to act on this important initiative.

II. Project Objectives and Project Team

The Legislative Council and the Information Technology Committee (IT Committee) defined the objectives to be accomplished by the project team. The two primary objectives of this project were:

- Create a Fiscal Note (99-01 biennium) for the impending legislation which will establish an Information Technology Department to plan and administer the statewide communications network.

- Perform a financial analysis for the implementation of a statewide network that will include state government, higher education, cities, counties, schools and other not-for-profit organizations.
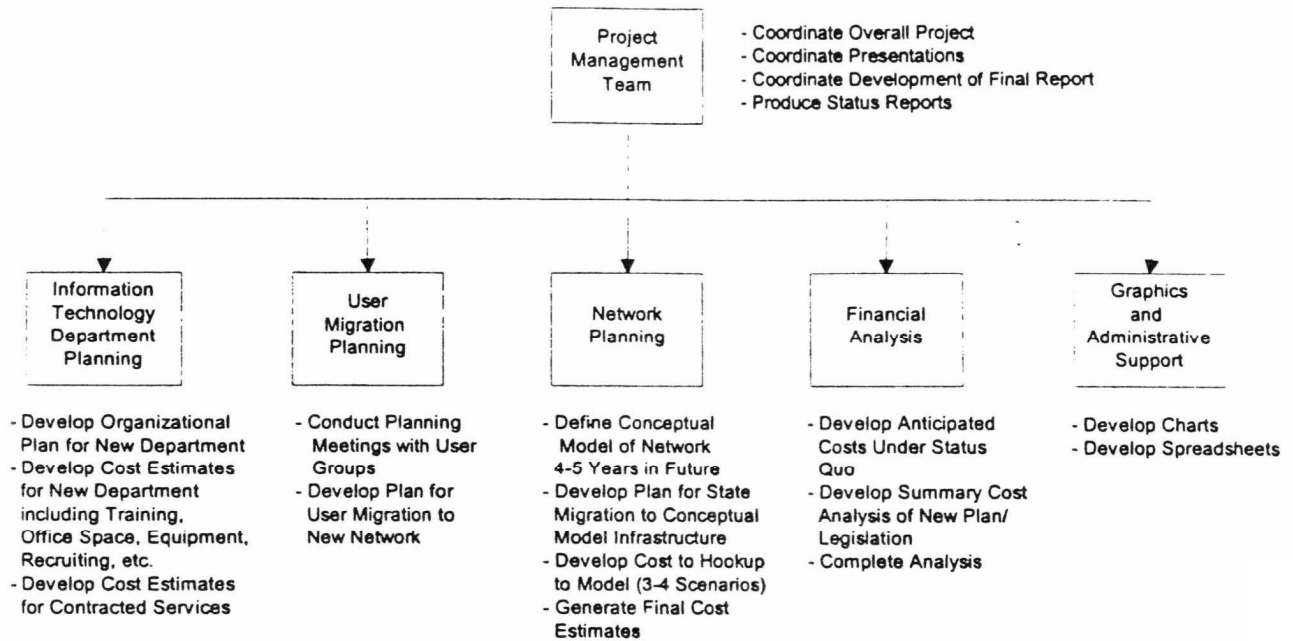
Project Tasks

To satisfy the project objectives, the following tasks were accomplished:

- Organized the project and created a Project Team

- Defined the network community

- Defined a conceptual model of the new network as it might exist in the future

- Developed a migration strategy to the new model

- Established costs for migrating to the new network environment over the next six years

- Estimated the cost for each location of converting from the current environment to the new environment

- Defined budget requirements for the new Information Technology (IT) Department and contracted services which might be necessary to deploy the new network

- Summarized the data and developed a summary cost document for the future network

- Developed anticipated costs of telecommunications under status quo

- Developed final conclusions and cost comparisons
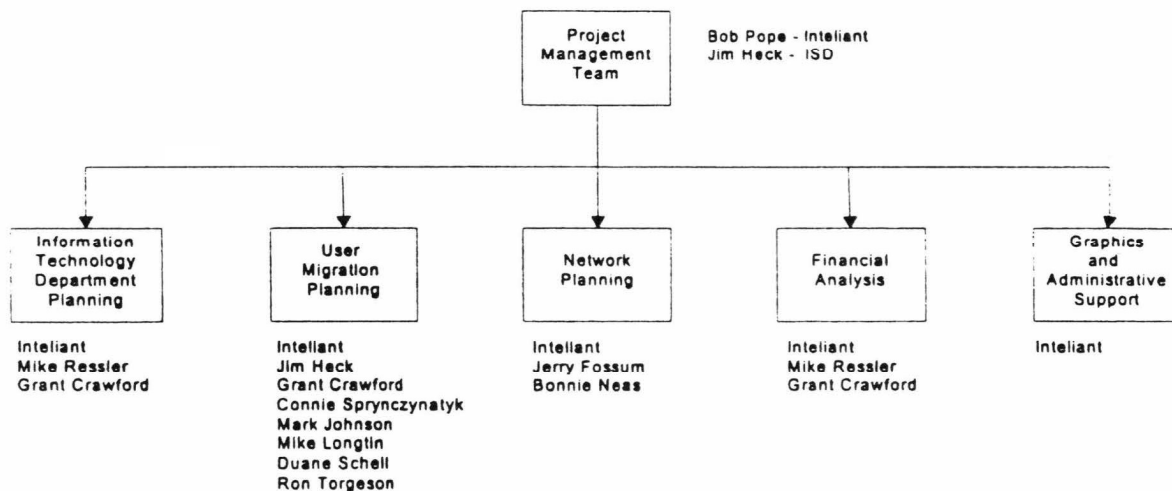
- Presented conclusions

Project Team

Because of the large number of tasks to be accomplished and the various skills needed, a diverse project team was established. The two charts on the following page identify the parts of the team, the primary team members and the functional responsibilities of each part of the team.

Functional Responsibilities

Project Management Team
- Coordinate Overall Project
- Coordinate Presentations
- Coordinate Development of Final Report
- Produce Status Reports

Information Technology Department Planning
- Develop Organizational Plan for New Department
- Develop Cost Estimates for New Department including Training, Office Space, Equipment, Recruiting, etc.
- Develop Cost Estimates for Contracted Services

User Migration Planning
- Conduct Planning Meetings with User Groups
- Develop Plan for User Migration to New Network

Network Planning
- Define Conceptual Model of Network 4-5 Years in Future
- Develop Plan for State Migration to Conceptual Model Infrastructure
- Develop Cost to Hookup to Model (3-4 Scenarios)
- Generate Final Cost Estimates

Financial Analysis
- Develop Anticipated Costs Under Status Quo
- Develop Summary Cost Analysis of New Plan/ Legislation
- Complete Analysis

Graphics and Administrative Support
- Develop Charts
- Develop Spreadsheets

Fiscal Note Project Team

Project Management Team
Bob Pope - Inteliant
Jim Heck - ISD

Information Technology Department Planning
Inteliant
Mike Ressler
Grant Crawford

User Migration Planning
Inteliant
Jim Heck
Grant Crawford
Connie Sprynczynatyk
Mark Johnson
Mike Longtin
Duane Schell
Ron Torgeson

Network Planning
Inteliant
Jerry Fossum
Bonnie Neas

Financial Analysis
Inteliant
Mike Ressler
Grant Crawford

Graphics and Administrative Support
Inteliant

Other Meetings

The project team also met with representatives from the following groups to gather input and comments regarding the proposed recommendations:

- E.T.C. – Education Technology Council
- North Dakota SchoolNet / SENDIT
- ND Council of Education Leaders – Technology Committee
- US West
- Dakota Carrier Network
- Sprint
- AT&T
- Teledesic (Admiral Bill Owens)
- Office of Management & Budget
- Prairie Public Television
- North Dakota Healthcare Association
- St. Alexius Telecare
- Valley City Economic Development

III. Background

From the first state network in 1982, where the Department of Transportation established direct communications with each district office, until recently when North Dakota began using a high-speed ATM/SONET network between Bismarck and Fargo, changes and improvements in telecommunications technology have been constant.

Today, North Dakota is at a new juncture, where advances in technology and new ways of thinking are prompting a hard look at the way the state interacts with its citizens and manages its telecommunications. Telecommunications technology has the potential of fundamentally changing the way we live, work and play.

Recently, the Information Technology Committee of the Legislative Council contracted with Inteliant to develop a Strategic Telecommunications Plan. The committee recognized new processes and a new organization are needed to stay current and effectively deploy technology in North Dakota government.

As part of that effort, Inteliant visited five states that are leaders in the deployment of statewide communications networks: North Carolina, Oklahoma, Arizona, Washington and Kansas. The project team developed recommendations based on the best practices of those leading states.

Reasons For A Change

The decision to explore a new approach for statewide telecommunications services was made for the following reasons:

- The need to encourage economic development in North Dakota through the use of a high-speed statewide communications network.

- The increased demand by citizens and companies for improved government services at decreased costs.

- The need for advanced telecommunications services in rural areas of the state.

- The rapid changes in the technologies and mediums used to provide high-speed communications and the convergence of technologies to provide all services over a single medium.

- The increased demand for high-speed data, voice and video communications.

The rapid emergence of digital technologies in the private sector has created both challenges and opportunities for government, and for state governments in particular. Businesses increasingly demand the ability to interact electronically with state governments, just as they do with other customers and suppliers. Moreover, many observers attribute citizen dissatisfaction with government, at least in part, to their sense governments are running behind in achieving the efficiencies and providing the convenient services digital technologies permit.

At the same time, digital technologies are providing state governments with opportunities to integrate programs, involve citizens and manage information in ways never before possible. Increasingly, states are taking advantage of these opportunities. Via the Internet and other digital technologies, citizens around the country are finding their way to government agencies and services without ever having to leave their homes, offices or cars. States are now providing on-line permit applications, electronic tax filing and personal assistance through e-mail correspondence.

Technology enables changes in work processes that lowers cost and improves service. More importantly, technology drives radical changes in governmental operations and it can serve as an economic engine for the state.

Anticipated Benefits

Through the proposed changes in the network and the organization used to plan, deploy and manage the network, the state anticipates realizing the following benefits:

- Improves communications services for the public sector.
- Allows the private sector to receive these enhancements without state involvement.
- Reduces costs by leveraging the state's buying power.
- Creates greater efficiency due to a planned, synchronous deployment of communications.
- Enhances economic development capabilities in rural areas.
- Creates opportunities to equalize education opportunities between rural and urban areas.
- Streamlines procedures that reduce government costs.
- Improves access to government data and services for the citizens of North Dakota.

Value of a Statewide Network to the Education of Its Children and Citizens

In March 1996, the Washington State Legislature passed Senate Bill 6705 to create a K-20 educational telecommunications network. The purpose of the network was to provide Internet, videoconferencing, and video program services to schools, colleges and universities statewide. It did so for the following reasons:

- Given the demand on limited resources, legislators recognized that distance learning using a high-speed network would be the most cost-effective way to provide quality educational services to students who might miss them otherwise.
- Legislators recognized that students need access to information technology, including advanced networking applications, if they are to obtain the skills needed for jobs in a competitive, high-technology marketplace.
- Legislators wanted to ensure the state's educational institutions would work together to develop access to information technology and avoid duplicating facilities at taxpayer's expense.

The state of Wyoming is currently in the process of implementing the Wyoming Equality Network. This is a statewide, high-speed data and video network that will connect all Wyoming public schools while giving communities the capabilities for economic development, telemedicine, and community outreach applications as well as access to the Internet. This network will impact all Wyoming public schools and every community in Wyoming.

Iowa, North Carolina, Utah, Kansas, Alaska, Oklahoma, and Rhode Island, to name a few, are in the process of implementing similar statewide networks for education.

Other Advantages of Networks to Schools

There are many advantages to students in an online world. With just a district network, students can share their work with others in the same class, in the same building or even in a different building. Networks support a teaching model that provides students the opportunity to learn by solving problems. This aids the teacher in becoming an education facilitator to the students in their search for knowledge and solutions.

Once the district and building connect to the Internet, the opportunities grow even larger. Students can share their work with others around the world, providing them access to diverse cultures and perspectives they would not encounter in everyday experiences. Information is available on the

World Wide Web that can provide students access to materials such as scientific journals and up-to-date research data which takes years for textbooks to offer. The Web can also provide access to mentors and experts that would not normally be accessible to children. Videoconferencing equipment allows a district to offer additional classes or supplements to current classes.

As they use the Internet, students become more familiar and comfortable with technology, facilitating their current education while preparing them for the future job market.

Expanding the Job Market

Policy makers, educators and private companies agree the K-20 educational telecommunications network will enable Washington's schools, colleges and universities to expand current distance learning projects and develop new and innovative uses for educational technology. The network enables educational institutions to operate more efficiently and provide citizens the skills they need to land quality jobs in a competitive global economy.

Barry Murphy of Microsoft Corporation says the network "has great potential for continued economic development in this state." He said that along with technology skills, Microsoft looks for other abilities students can gain from the network, such as thinking on their feet, searching effectively for information and collaborating. "You have to have teamwork. This technology will allow students in K-12 and higher education to work in teams. Not just teams within their own classroom but teams in other classrooms – teams in other schools."

By breaking the barriers of time and distance, telecommunications gives adults the option to pursue education throughout their lives without leaving their communities. These new learning opportunities give workers the choice to retrain for new jobs and better earning opportunities.

Businesses and industries can also take advantage of the network's training capabilities. They can work with the educational system and the network to update their employees' knowledge via videoconference at convenient times and places. There is little doubt that states who offer the right training will attract the jobs and employers that use those skills.

'The network is *critically important* to the high-technology companies in Washington which rely on highly skilled workers", said Mike Brice, Washington chairman of the American Electronics Association. "This is an innovative approach to delivering education, and will enhance the productivity of the state's education system."

Other Reasons to Invest in Rural Telecommunications

According to the *Applied Rural Telecommunications Investment Guide,* there are at least ten good reasons for North Dakota to invest in upgrading telecommunications services to its rural communities. These ten reasons are outlined as follows:

- Telecommunications resources can help diversify rural economies, open regional and global markets, and create economic opportunities.

- Telecommunications can make rural companies or organizations more efficient and more competitive.

- Telecommunications resources can help reduce the impact of vanishing or seasonal jobs.

- Telecommunications-based industries are typically cleaner and safer for their workers, the community and the environment.

- Telecommunications resources can leverage a rural area's best features into competitive advantages in the challenge to attract new businesses.

- Telecommunications resources protect the future. The Internet and other telecom-based resources expand the social, educational and intellectual options for young people, making migration to urban/suburban areas less compelling. By bringing the world to your town or region, you make it less necessary for them to travel or relocate.

- Telecommunications resources help build a more informed citizenry and more efficient and responsive local governments.

- Investment in rural telecommunications assets has a significant ripple effect. Improvements to information infrastructure not only support the business and commercial sectors; they also make possible improvements to other rural assets. Once the "data plumbing" is in place, all manner of uses become possible, including some that haven't been invented yet.

- The network needs the influence and perspective of rural participants.

- Telecommunications can improve the quality of rural life. By providing educational resources, cultural access and opportunities for social interaction, the various forms of telecommunications can reduce the isolation of the wide-open spaces.

Recommendations

The North Dakota Legislative Council published a *Strategic Telecommunications Plan* in October 1998. The report included several recommendations related to the deployment of telecommunications technology. The following list highlights these recommendations:

- Establish an Information Technology Department (ITD) for all telecommunications planning, selection, implementation and management for all state agencies, higher education, schools, cities and counties. Rural hospitals and other not-for-profit organizations should be included as well, if cost justified and desired by the state legislature.

- Establish the director of ITD as the Chief Information Officer (CIO) for the state of North Dakota. Establish the CIO as a cabinet-level position reporting directly to the governor.

- Establish an Information Technology Department Board (ITDB). ITDB should include representatives from the major branches of state government, outside companies and state agencies. ITDB shall have overall responsibility to approve standards and policies related to network technologies in North Dakota.

- Mandate that ITD develop a business plan defining rate plans, missions, roles, policies, transition plans, business objectives, measurements and general procedures.

- Establish a group within ITD for improving personnel productivity and workflow processes for ITD customers.

- Establish a technology development fund to establish the statewide network and to evaluate emerging technologies and implement common, shared components for users of the statewide network.

- Require each entity that will use the statewide network or is a user of ITD services to file a strategic information technology plan.

- Establish a project quality assurance process to provide an independent assessment of the status of major projects.

- Create a department within ITD called Citizen Service Delivery (CSD) to plan and administer access to state information primarily through the Internet.

IV. Guiding Principles for Recommendations

The bill draft is based on the following guiding principles. These principles were originally outlined in the October 1998 Strategic Telecommunications Plan prepared by Inteliant.

- **State information systems and communications networks should accomplish the following**:
  - Move government services to direct delivery
  - Improve collaboration and cooperation among government entities
  - Direct investments in technology from a strategic perspective
  - Invest in common components that may be used by multiple organizations
  - Improve the yield on information and technical resources by managing these as strategic assets from a business perspective
  - Lower employee costs and improve service by reengineering business processes
  - Improve customer service by using leading technology

- **State agencies, grades K-12 and post-secondary institutions should focus on their key competencies.** The agency that has network planning, implementation and support as its key competency and function should do network planning, implementation and support for the entire state.

- Citizen expectations for easy access to information and more responsive services are increasing rapidly. This demand for **hassle-free, convenient interactions with state government** is dictating that information be accessible anytime and anywhere.

- The state must plan, govern and fund the implementation and management of a common technical infrastructure that **facilitates the sharing and exchange of data**.

- **The statewide network should be a state resource** accessible by agencies, universities, K-12 education, cities, counties and nonprofit entities.

- **Eliminate duplication** of administration, deployment and management of the statewide communications network.

- **Clearly define position accountabilities and job roles.** As much as possible, establish the roles and accountabilities of the state CIO and the Information Technology Department Board within law.

- **Establish business partnerships** to meet the needs of government, citizens and industry on an ongoing basis. Input from business and telecommunications professionals from outside state government is healthy for both the state and private industry.

- **Establish an entity that will provide input from all government branches regarding telecommunications issues.** The statewide network is so important to the future economic viability of the state that intense cooperation of the legislative and executive branches of state government will be required on an ongoing basis.

- **Offer convenient access for all individuals regardless of their geographic location.** The state's connectivity infrastructure must be affordable, enabling all citizens and businesses in the state to be consumers and producers of the state's information resources.

V. The State Network of the Future

The main purpose of North Dakota's Network of the Future is to provide North Dakota's public entities with a broadband network that supports voice, data and video communications. The network will give the state the advantages of broadband technology and ways to reorganize government operations to improve service, implement new services and reduce overall costs.

The users of the network would include:
- North Dakota state government agencies
- North Dakota universities
- North Dakota school districts
- North Dakota counties
- North Dakota cities
- Other North Dakota not-for-profit organizations

Conceptual Design

To forecast future networking costs, the team developed a conceptual view of the future network for the state of North Dakota.

A conceptual model of the network was developed to avoid the problem of technical obsolescence. A conceptual model is defined in terms of requirements and services as opposed to hardware, software, wires and fiber. The conceptual model of North Dakota's Network of the Future has the following characteristics:

- Bandwidth or network capacity is the single most important characteristic of the network. The analysis of other states revealed that most networks were overloaded because demand grew faster than the capacity of the network to supply service. As state agencies, schools, counties and cities all connect to the same network and begin using the network, demand will increase significantly.

- The plan does **not** propose the development of a private, state-owned network for telecommunications services. Instead, the plan suggests the network consist primarily of services procured from private telecommunications service providers. The state would install its own infrastructure only when private providers fail to supply the required services.

- As the largest telecommunications consumer in North Dakota, the state serves the critical role as "anchor tenant." In this role, the state must consider community and economic development issues related to telecommunications and must work with private providers to provide oversight and leadership in the development of the state's future telecommunications infrastructure.

- The Information Technology Department's primary function in relation to the network would include the following major tasks:
  → Maintain a broad overview of the network requirements of the users of the statewide network. This means ITD should anticipate demand and plan for each future network upgrade before the need is present.
  → Contract with various telecommunications vendors to supply the bandwidth and functions needed by the customers of the network.
  → Manage the vendors to ensure compliance with the quality of service issues defined within the telecommunications contracts.
  → Monitor the network to assist in problem resolution (in conjunction with network service providers), particularly as it relates to customer premise equipment.

- The backbone, or the primary components, of the Network of the Future must be able to support voice, data and video over the same set of media and equipment. The system must also

eventually be able to monitor the volume of use of each user of the network to support fair and equitable allocation of cost when cost recovery is applied.

- The network must be developed on a flexible and scalable architecture with the ability to address a rapidly changing telecommunications environment. Vendor contracts must include the same flexibility and scalability.

The following diagram provides a visual depiction of the conceptual network:
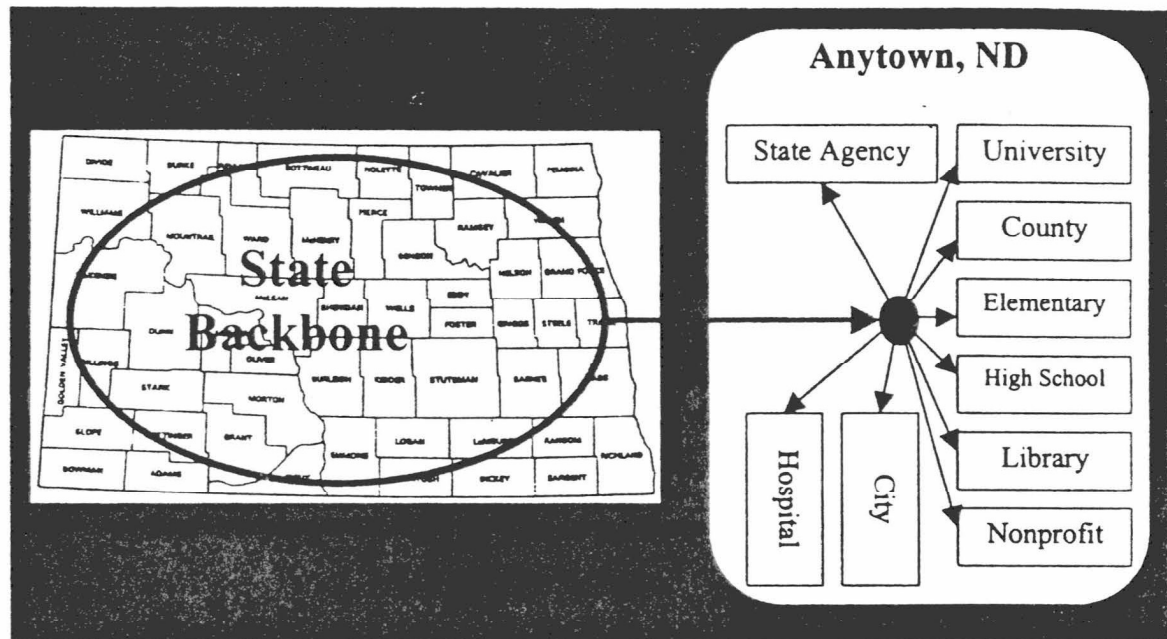
"The State Network of the Future"

Advanced telecommunications would be brought into the community to a network access point and distributed to each eligible entity. Because the state is purchasing this service, private individuals and businesses would be in a position to purchase similar services from the telecommunications provider.

Projected Technologies

The conceptual design intentionally avoids designating specific technologies and is based on desired services and outcomes. The principles for ultimately selecting the technologies for the Network of the Future will be based on a detailed technical design, service provider offerings and the cost effectiveness of the solution.

However, the project team outlined potential technologies that meet the requirements of the conceptual design. These technologies include an ATM-based backbone with local access technologies that include frame relay, Digital Subscriber Lines (xDSL) and wireless systems. Future access technologies may include low-earth orbit satellites (LEOs) to serve those areas that are ill-suited for traditional wireline approaches.

VI. Network Usage

This section of the report identifies the potential additional value of improved network capabilities made possible through the implementation of Senate Bill 2043 and the Strategic Telecommunications Plan of the Legislative Council. The expanded uses of the network are identified for state agencies, universities, schools, counties, cities and healthcare organizations.

It is important to note that, in and of itself, the network is simply a delivery mechanism for applications and services. To maximize the potential value of the network, additional investments will be required to purchase and/or develop new applications and hardware. These costs are not addressed in the proposed legislation or this report. Each of these initiatives should stand on its own merit. Executive and legislative leadership should encourage the exploration and implementation of innovative applications to improve services and reduce costs.

North Dakota State Government Agencies

Most state agencies are connected to a data Wide Area Network and a voice network. Some locations are connected to an interactive video network. After the ITD is created and the capabilities of the network increase, the following additional uses and benefits can be realized:

- Provide the technical environment which can reduce paperwork, increase efficiency and improve government effectiveness.

- Increase legislator access to agency information.

- Promote further cooperation and information sharing among state agencies.

- Give citizens increased access to public records, reducing costly, time-consuming work by state employees, resulting in improved customer service. This capability could include access to information on jobs, unemployment benefits, tax records and other items.

- Make video conferencing more widely available, saving on state employee travel costs.

- Create the opportunity for electronic town meetings between government leaders and constituents.

North Dakota Universities

Advanced technology and telecommunications systems are critical to the on-going mission of the North Dakota University System. Technology is an essential component for the university system to provide *a high quality, high access higher education system.*

The North Dakota University System already shares network services with state agencies. After the Information Technology Department (ITD) is created and the capabilities of the network increase, the following additional uses and benefits can be realized:

- Provide the infrastructure for expanded distance learning applications.

- Offer expanded remote learning opportunities.

- Provide some of the essential infrastructure for the "Virtual University" – education anytime, anywhere.

- Enable increased resource sharing across the university system.

- Strengthen collaboration opportunities in research and development of future applications.

- Enhance professional development and continuing education.

- Enable real-time manipulation of remote research instruments.

North Dakota School Districts

"The value of having access to advanced telecommunications and information services in America's public schools is clear: the work force of the 21st Century will need to be familiar with information technologies, adept at information gathering, and comfortable with the manipulation and interpretation of data. In order to help prepare and train much of tomorrow's labor force, educational institutions will need to be equipped with information technologies and communications networks that are integral to these processes. Students who do not learn to use computers and information technology in schools will not be competitive in the job market."

Emilio Gonzalez, United States Department of Commerce

Section III of the report addresses many of the future benefits of enhanced communication capabilities for the North Dakota's public schools. Accounting for one-half of the state's telecommunications spending, public schools stand to gain the most from the network envisioned within this legislation.

Currently, over 90% of K-12 schools in North Dakota are connected to the Internet via the ND School Net Cooperative, their local telephone company or a local Internet provider. SENDIT and the Center for Innovation and Instruction provide LAN and WAN consulting services to schools to assist them in planning and development. Already, these schools are seeing many of the benefits.

Connecting classrooms to a common network can transform ordinary computers into powerful learning tools. The network will allow education materials and resources to be shared across the state. Access to the network will also introduce students and teachers to people, places and ideas from around the world.

Network-based, interactive video environments will continue to grow in the next few years, making possible the expanded discovery of information and the opportunity for improved schools, learning and student performance. By connecting all of North Dakota's classrooms to a statewide network, the state can ensure that North Dakota students are not left behind.

The network will be used in the following ways:

Student Use	Distance Learning
	Computer-based Instruction
	Technology Education
	Global Learning
	Research
Teacher Use	Continuing Education / Professional Development
	Research
	Curriculum Development
	Resource Sharing
	Parent / Teacher Collaboration
Administrative Use	Student Records (reporting / transferring)
	Fiscal Reporting
	District and State Collaboration
Community Use	Adult Education (Lifelong learning)
	Parent / Student / Teacher Collaboration
	School Information Access

Two critical issues must be addressed to maximize the effectiveness and value of the network for public schools: network support and applications leadership.

SchoolNet and NDSU currently provide support services to the 100+ schools that are part of the ND SchoolNet Cooperative. This arrangement is working well with a high-level of satisfaction by the

member schools. Under a statewide network, it is recommended this arrangement continue on a collaborative basis with the Telecommunications Services Division of ITD. During the 01-03 biennium, it may be necessary to add one support person to SchoolNet to account for additional support requirements.

Applications leadership is critical to realizing the full value of the network. Applications refers to items such as distance-learning courses, computer-based training and resource-sharing applications. Under a statewide network, it is recommended applications leadership be a collaborative arrangement between the new Information Technology Department, the university system, public school representatives, SENDIT, the Center for Innovation and Instruction and the Department of Public Instruction.

North Dakota Counties and Cities

Across America, local governments have struggled to keep up with the technological revolution. High costs and limited expertise have restrained progress in the use of information technology. While several local functions such as libraries, Registers of Deeds and Social Services offices have made significant strides, many other functions have been left behind. Some cities and towns have no connections to the state, other counties or other cities. Others have been able to make considerable strides with their technology. This leaves a huge gap between those with the expertise and those without.

Local governments have a significant need for effective technology and telecommunications capabilities. They are the closest level of government to the people. As government evolves, local governments will be required to provide faster and more convenient services. These changes will require more strategic uses of technology, specifically communications. For this to happen, several things must occur:

- Cities and counties must desire to take advantage of the network and its capabilities.

- A network plan must be developed that serves the needs of cities and counties.

- A complete technical support structure must be implemented.

- Network services that provide maximum financial and operational benefits must be deployed.

Counties and cities will realize the following benefits after the Information Technology Department is created and the capabilities of the network increase:

- Take advantage of state leadership in the selection and deployment of network technology and telecommunications.

- Provide remote employment opportunities by retaining people in rural communities.

- Attract outside technology companies to locate in their communities due to of the presence of an advanced telecommunications infrastructure.

- Allow companies to train employees at colleges and universities through video connections without leaving the work location.

- Provide businesses better access to strategic information and market data.

- Provide a means for statewide library connectivity.

- Allow resource sharing and collaboration opportunities for North Dakota cities and counties.

North Dakota Healthcare

Many opportunities exist within the healthcare industry of North Dakota for use of a high-speed communications network. If desired by the legislature, nonprofit hospitals and clinics could participate in the network to accomplish the following:

- Remote diagnosis for doctors and consultation of patients using real time video and audio telepresence equipment (interactive television). These remote capabilities are used for urgent and routine care.

- Reduced travel time and costs for patients and doctors.

- Improved access to healthcare in rural areas of the state.

- Increased quality by improving physician follow-up care.

- Improved medical education for physicians and other health care professionals.

- Improved access to specialists.

- Improved processing of medical and insurance records.

Although some hospitals and organizations are already using high-speed communications functions (i.e. Telecare Network), their participation with ITD and the state's network will improve their capabilities and increase the telemedicine coverage area.

VII. Information Technology Department

This section of the report defines the assumptions used in developing the anticipated costs of the new Information Technology Department (ITD). The first and most important assumption is that ITD will replace the current Information Services Division (ISD) of OMB. Therefore, the costs reflected in the accompanying analysis are for the costs due to the change. The costs of ISD, which would have been encountered regardless of this change, are not reflected in the analysis.

The anticipated costs include the following areas:

- Staffing Requirements for salary, benefits and associated recruiting for the following new departmental functions:
    - Office of the CIO and Administrative Support Staff
    - Technology Planning
    - Quality Assurance
    - Process Redesign
    - Citizen Service Delivery
    - Statewide Communication Services
- Increased office space requirements for the additional staff

- New furniture and workstation requirements

- Additional training requirements

- Contract costs for contract personnel and board costs

Costs were first calculated for each year of the next biennium. Annual costs are calculated because, in some cases, the staff may not be needed in year one or the staff may not be available until year two. Each new position will also require additional office space, a workstation and will incur training expenses.

The following information summarizes the new positions added to ITD:

Office of the Chief Information Officer (CIO)

This area modifies the current position of Information Services Director within OMB. This area also creates a new position of Administrative Assistant for the office of the CIO.

Staffing: 1 FTE

The CIO position is a critical position for the state of North Dakota. The CIO will provide vision and leadership in the deployment of new technology initiatives. The CIO will provide oversight for the entire state enterprise in a complex and ever-changing marketplace. For the state of North Dakota, the enterprise includes state agencies as well as the NDUS, public schools, counties and cities.

The effective and strategic use of common enterprise-wide information requires someone with a cross-functional perspective. The CIO's role is to provide leadership in reengineering the enterprise business processes and the underpinning IT infrastructures. These activities should achieve more productive, efficient and valuable use of information within the state.

Technology Planning

This department assumes the current responsibilities of ISD in addition to providing proactive technology planning services for all members of the statewide telecommunications network. It will quantify the needs of member organizations and provide forecasting data to ensure the integrity and operational efficiency of the overall network.

Staffing: 3 FTEs (1 in each of the next three years)

Quality Assurance

Quality Assurance (QA) is a process to improve the likelihood of project success. An independent group that reports to the ITD Board should perform the QA process. By conducting the QA process throughout the project, the Board has a chance to respond proactively to problems before the problems are beyond repair. The term independent can include internal ITD personnel who are in a position to provide an unbiased and impartial assessment of the project status.

Staffing: 2 FTEs (1 in year one and 1 in year two)

Process Redesign

This function is a service to the users of ITD to help ensure they receive maximum value for their technology investments and that the technology is being used in its most efficient and effective manner. The goal of this service is to enable government agencies to redesign their internal processes, shed old ways of doing business and re-invent themselves with modern, streamlined processes.

Staffing: 2 FTEs (1 in year one and 1 in year two)

Citizen Service Delivery

CSD is a new function within ITD to provide leadership for the development of Internet-based applications. It is recommended that this group become a department within Software Development Services.

Staffing: 6 FTEs (3 in year one and 3 in year two)

Statewide Telecommunications Services

This group will have complete responsibility for planning, deploying and managing the statewide area network. This group is currently called Telecommunications Services within ISD. This group will have the added responsibility of supporting the wide area network for schools and cities in addition to the support of state agencies, the university system and counties. It is important for this group to work on a collaborative basis with all members of the network user community.

Staffing: 3 FTEs (1 in each of the next three years)

Cost Summary

The estimated first biennial increased costs for establishing the new Information Technology Department are as follows:

Projected Costs for New ITD	Total Biennium 99-01
Staffing Increases including Recruitment	$1,398,000
Increased Office Space Requirements	$26,400
New Furniture and Workstation Requirements	$36,100
Additional Training Costs	$69,000
Contracting & Board Costs	$310,000
Total	**$1,839,500**

VIII. Telecommunications Financial Analysis

In 1998, the state of North Dakota spent approximately $19.3 million in *wide area network* telecommunications services for state agencies, the university system, public schools, county government and municipal government. A breakdown of the spending is as follows:
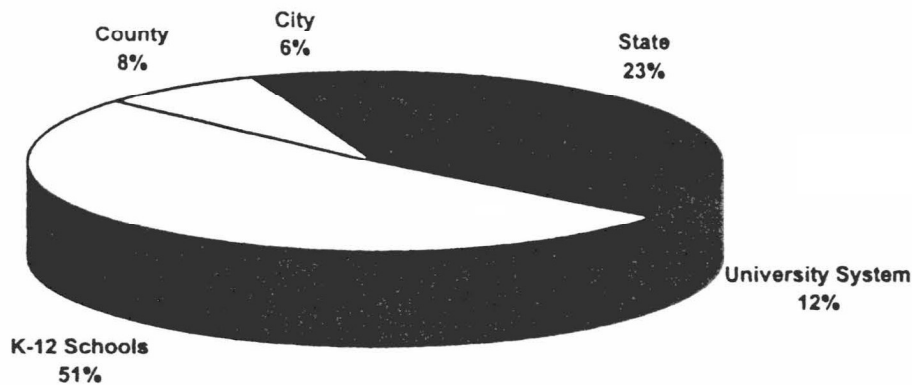
Future spending for telecommunications services is expected to grow at a minimum of 20% annually. Demand for network services (bandwidth) is being driven by new applications and the explosion of remote access and Internet access. Industry analysts are predicting network demand growth of 300% or more over the next five years. Using average growth of 20% annually, telecommunications spending will increase from $19.3 million in 1998 to $57.6 million in 2005.
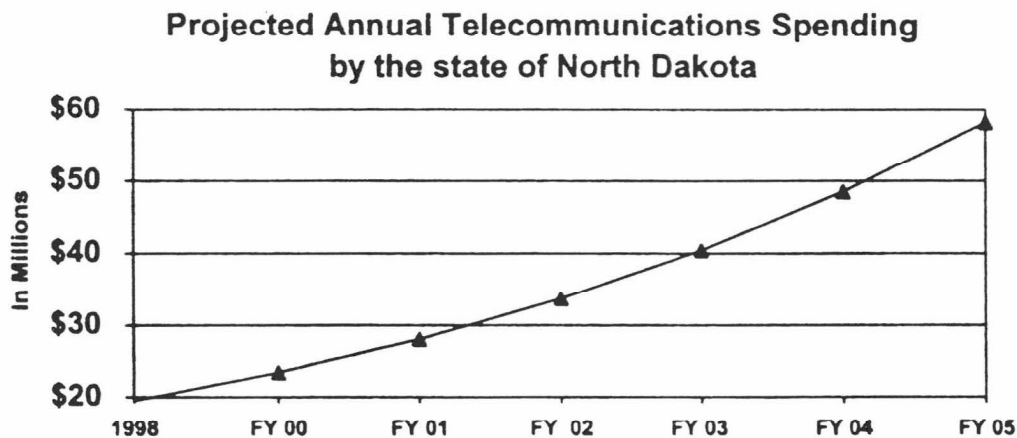

The projected financial benefits of bringing current services and functions under the auspices of ITD were based on the following:

- **Aggregation of Demand.** The addition of schools and municipalities will more than double the state's current telecommunications buying power. The state would be in a powerful and attractive bargaining position with respect to future service requests from telecommunications service providers. It is difficult to target a specific value to each entity of consolidating the state's buying power. However, states that have moved in the direction of aggregation have found they can reduce their overall procurement costs by 20%. Because North Dakota is already aggregating

telecommunications purchases for state government, the university system, and county government, the project team used a much more conservative figure in projecting the benefit.

- **Statewide Strategy.** There is considerable power and value in having a single telecommunications strategy for the entire state. While the value of a single telecommunications strategy is difficult to quantify, it is safe to assume the state will be positioned to direct funding and investments into areas that conform to the overall strategic plan and minimize misappropriated telecommunications dollars.

- **Common Network Model.** By moving to a common network model, the cost of network operations and maintenance can be reduced. Common standards will make networks easier to maintain and reduce training costs. It has been reported that as much as a 50% efficiency in operation and maintenance costs can be achieved on some networks as a result of consolidating network support. The North Dakota networks studied as part of this analysis were running with very efficient staffing levels. Statewide leadership will ensure this continues as the state advances in telecommunications technology and expands the network user community.

- **Standard Purchasing Criteria.** Another area of potential economic benefit is reducing the possibility of errant capital purchases and technical obsolescence. As a result of statewide leadership for standards and procurement decisions, all members of the network community can make technology purchases based on consistent buying criteria. In addition, the state as a whole will be able to more easily integrate applications and services through these common standards.

The following are indirect benefits to consider for the financial analysis:

- Telecommunications development in rural North Dakota is a growing economic development issue. Access to broadband communications services is becoming a necessity for any community, organization or individual to be competitive in today's economy. State government is the single largest telecommunications consumer in the state and can act as a catalyst for the accelerated deployment of these services throughout the state by aggressively pursuing the implementation of these services with telecommunications service providers.

- Networking of all state and local government resources can dramatically impact the cost of delivery of all government services by creating opportunities to reduce administrative costs, aggregate purchasing for all types of products and services, and reduce the costs of delivering government products and services. Government agencies have projected efficiency gains as high as 20-30% in some operations by establishing direct communications with their constituency and reengineering internal business processes.

The following is a summary of the experience of other states in addressing telecommunications issues similar to North Dakota:

Colorado
The state of Colorado has proposed legislation to develop a consolidated network and improve rural telecommunications. The network is based on Asynchronous Transfer Mode (ATM) technology. The state expects to significantly upgrade the capability of the network at the same cost of the current network.

Pennsylvania
Pennsylvania is reviewing a telecommunications strategy that includes the aggregation of telecommunications procurements for all state agencies and related entities. Among other benefits, Pennsylvania's study projects a reduction of overall procurement costs of at least 20%.

Ohio

The state of Ohio is implementing a statewide telecommunications network intended to provide voice, video and data services to state agencies, public libraries, public radio and television, schools, universities and colleges. The projected annual savings is estimated at $12 million based on current usage.

Wisconsin

BadgerNet is the state of Wisconsin's telecommunications initiative. Eligible users are state agencies, universities and colleges, schools, counties and municipalities. The new network has 11 times the capacity of the current network at about one-third of the cost.

San Diego County

San Diego County created a consortium of educational and government entities for the purpose of aggregating buying power. The result was more advanced telecommunications services and a 10% reduction in annual costs.

Oregon

Oregon formed a telecommunications council focused on *"improving the quality of life and economic development in Oregon communities by enhancing the delivery of education, healthcare and government services, and supporting the further development of business through affordable telecommunications."* The major strategies of the council included a consolidation of government networks and a focus on aggregating buying power to serve rural areas.

The table below outlines the analysis used by the project team to determine the overall financial impact of this project. The project team used very conservative numbers in this determination.

Category of Service	% of Total Cost in ND	Plan Impacts	Potential Financial Impact	% used in ND analysis[1]
Lines and Service	51%	Aggregation of demand	Up to 20%	3 to 10%
Hardware / Software	31%	Statewide strategy Aggregation of demand Standard Capital Purchasing	Up to 10%	0 to 3%
Labor	18%	Common Network Model Statewide Strategy	Up to 50%	None[2]
Total	**100%**		**Up to 21%**	**3% to 13%**

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[1] Percentages adjusted to reflect impact to all network spending.

[2] Telecommunications services within the state are currently tightly staffed. While some economies of scale may be gained by adding cities and schools, the project team allocated no financial impact in order to remain conservative.

Financial Analysis Summary[3]

The financial analysis includes $6.2 million in capital expenditures that will be required to complete the installation of a new network. Capital expenditures would include site premise equipment, site preparation and equipment installation costs. An average cost of $10,000 per entity was used to cover the anticipated incremental capital expenditures of this effort.

The table that follows outlines the expected financial benefit to the state of North Dakota. The analysis used the most conservative assumption of ITD having a 3% impact on the expected growth in telecommunication costs. The table includes the anticipated costs of establishing ITD and assumes no financial benefit during the first year (FY 99). Using these assumptions, the projected financial impact is a savings of $6.7 million in telecommunications spending over the next six years.

	FY 99	FY 00	FY 01	FY 02	FY 03	FY 04	FY 05	Total (00-05)
Total Annual Cost	$19.3	$23.1	$27.8	$33.3	$40.0	$48.0	$57.6	$229.8
ITD Staffing Costs		$0.8	$1.0	$0.5	$0.5	$0.5	$0.5	$3.8
Projected Capital Costs			$1.0	$1.0	$1.5	$1.5	$1.2	$6.2
Projected Cost Impact	$0.0	$0.8	$1.3	-$0.1	-$0.9	-$2.6	-$5.1	-$6.7

(in millions of dollars)

Industry Input

The project team also gathered input from industry service providers for this analysis. US West, Dakota Carrier Network, AT&T and Sprint were asked to provide financial estimates for the conceptual network. The industry data suggests the state can significantly improve and increase current capabilities while maintaining or reducing costs from its current levels. This is accomplished through the aggregation of demand and providing the service providers with a commitment to moving forward with current and emerging technologies.

This data indicates the numbers used in the financial analysis are extremely conservative in terms of the potential savings and benefits to the state.

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[3] This financial analysis assumes, based on industry projections, an annual 20% increase in statewide telecommunications spending. ISD and the University System have expressed concerns with this assumption as their current 99-01 budget projections do not include this level of increased spending. The appendix (page 32) includes a financial analysis using a 10% growth figure.

IX. Questions and Answers

1. **How will this plan affect economic development groups?**

   The project team believes rural economic development and increased educational opportunities are the two major reasons for implementing this plan and legislation. By moving forward with this plan, state government will be in a powerful position to impact the deployment of current and affordable telecommunications services in rural areas. It is recommended all economic development groups be informed regarding the value of this network and how other states are using similar networks in their marketing plans and advertising to attract businesses to their state.

2. **Why is participation in the network mandated and not voluntary?**

   The state needs the participation of all schools, cities and counties to aggregate buying power and maximize the potential benefits described in this plan. The state needs to move forward as a single enterprise to effectively influence the deployment of advanced telecommunications capabilities throughout the state. While some individual entities may end up paying more for telecommunications services under this plan, the state as a whole will benefit from decreased costs, improved services and increased economic development.

3. **How will this plan affect E-rate eligibility?**

   The FCC operates a program under the Universal Services Fund called E-rate. This fund provides a reimbursement of certain telecommunications costs for eligible schools, libraries and rural healthcare organizations. While operating under a single state network does not disqualify these organizations from receiving this funding in the future, it is important for the network and services to be properly organized to maintain funding eligibility. This is very feasible as per the current FCC regulations. Other states doing similar network upgrades are finding ways of addressing this important issue.

4. **How will the university research function be affected?**

   University research functions related to technology and telecommunications are vital to higher education and the entire state. It is anticipated the university system will continue to maintain separate connections for research purposes such as Internet 2 and connectivity to national and international higher education institutions.

5. **How do software applications at the organizational level relate to a statewide network?**

   The value of a common statewide network is in the ability to share applications, resources and information. This network connection will help facilitate email and Internet access. However, new applications or new databases, which might operate on the network, are not addressed within this legislation or plan. The new network will allow the existence of new Internet-based applications, but they will need to be budgeted and developed in the future.

6. **What is the importance of collaborative relationships with the network community and suppliers?**

   As the project team conducted research for this project, it became clear the state must find new and better ways of interacting with the vendors who supply technology. They have valuable insight and knowledge of what is happening in the industry and can provide guidance on future technology opportunities including new services and applications that will become available. These relationships are critical as the state moves forward from a technological perspective.

7. **How does this plan relate to Prairie Public Television plans and the telemedicine initiatives developed by the healthcare community?**

The project team conducted meetings with both PPTV senior management and those working with telemedicine and concluded there is potential for their needs to be consolidated with the needs of the state. It is recommended the new Information Technology Department and CIO review the situation and present recommendations to the ITD Board regarding the potential to integrate the plans of these groups.

8. **What bandwidth projections were used by the project team?**

Industry bandwidth projections suggest a 300% to 600% cumulative growth in bandwidth over the next five years. In addition, the project team looked at the state's growth in telecommunications requirements over the recent past. There was concurrence the state would experience substantial growth in the future, particularly in education, where the high-bandwidth requirements are more extensive due to distance education demands and the recognition technology is a fundamental part of today's educational process.

9. **Why is it important to do this now?**

Currently, all public entities are gearing up for increased wide area communications. Further delays will result in the potential purchase of systems that may not be compatible in the future. In addition, systems may be purchased at a lower cost if done as a group under the leadership of the new Information Technology Department.

10. **Would it not be better for each area to work out their own arrangements on an individual basis?**

It is true some individual entities may be able to procure lower cost Internet connections on their own. However, when viewed as an enterprise, the entire state wins by aggregating the buying power of all entities. In addition, without a statewide implementation plan, economic development opportunities will not be realized, and rural areas of the state will continue to be under serviced.

11. **Isn't this expensive?**

The price tag for new communication networks is expensive. This will be true, unfortunately, with or without this plan. Based on the financial analysis performed within the scope of this project, it is anticipated North Dakota taxpayers will spend less under this plan than they will without the plan. Please refer to the Financial Analysis section of this report for a detailed review of this issue.

12. **Will schools be required to replace personal computers as a result of this legislation?**

No. This legislation only addresses wide area network services such as Internet and ITV access.

13. **Section 2 of the bill (Senate Bill 2043) states that the Information Technology Department is responsible for computer support services, host software development, statewide communications services, standards, technology planning, process redesign, and quality assurance. Do these responsibilities extend beyond state agencies and to other entities such as the University System?**

Section 5 of the bill defines ITD's responsibilities to include all executive branch state entities *excluding* the institutions under the control of the board of higher education.

Appendix

A. **Definitions**

B. **Financial Analysis**

C. **Implementation Plan**

D. **Detailed Position Descriptions for ITD**

E. **Methodology Used to Develop this Report**

A. *Definitions*

Backbone	The top level or main circuits in a network. Similar to the water mains in a city water system.
Bandwidth	Typically used to describe the amount of data that can be sent through a telecommunications circuit or connection. Bandwidth is measured in bytes per second. The typical home personal computer has a modem that communicates at a speed of 56K or 56,000 bytes per second.
Broadband	A telecommunications medium that is capable of carrying multiple signals and a wide range of frequencies. Broadband technologies allow carrying voice, video and data signals over a single circuit.
Frame Relay	A form of switching protocol for wide area networks that can be purchased in specific data rates or bandwidth.
Internet	The Internet is the largest electronic network in the world.
LAN	A LAN (or Local Area Network) is a network intended to serve a small area (thus Local) and is usually confined to a building or set of contiguous buildings.
LEO	LEO or Low-Earth Orbit satellite, is a proposed broadband satellite system being developed to address the needs of areas with an inadequate telecommunications infrastructure. Analysts believe by 2003, two or more broadband satellite systems will be operational.
Network	A network can be as simple as two computers connected together, or as complex as 30 million connected together (The Internet). Other devices can be connected to a network as well (i.e. printers, disk drives, terminal server and communication servers).
T-1	A T-1 is a type of circuit with a bandwidth capability of 1.544 megabits per second or 1,544,000 bytes per second.
WAN	A WAN (or Wide Area Network) is a network intended to cover a large geographic area.
xDSL	DSL or Digital Subscriber Line is a technology that can handle multi-megabit data services over traditional copper subscriber loops.

B. *Financial Analysis*

The project team surveyed the following entities to determine the current level of spending for telecommunications services within the state:

- State Agencies
- North Dakota University System
- Counties
- Cities
- Schools

The focus of this financial analysis was on wide area network communications (WAN). For the purposes of the financial analysis, the following definition of a WAN was used:

"the wide area networks which carry voice, data and video from one location to another. A location is defined as a building or a set of buildings on contiguous property for a particular state organization or a single access point for a political subdivision. The wide area network includes the personnel that deploy and manage the networks. From an equipment standpoint, it includes the equipment up to and including the demarcation equipment. It does not include the local area networks that reside within a political subdivision or a building/set of buildings within a contiguous property."

The following costs were collected as part of the financial analysis:

Line and Services Costs for Voice, Data and Video

- From each non-Capitol campus agency location to the wide area network backbone
- From each school district (K-12 schools) to the wide area network backbone
- From each university or college campus of NDUS to the wide area network backbone
- From each city administration campus to the wide area network backbone
- From each county administration campus to the wide area network backbone
- Wide Area Network Backbone

Hardware and Software Costs

- For multi-function equipment, if the major purpose of the equipment is WAN related, the costs were included. If not, the costs were excluded.
- Associated product costs required to connect each of the locations listed above to the wide area network.
- Associated costs for products used to monitor or repair any part of the wide area network.
- Note: All hardware and software costs were annualized. Annualized costs were determined by dividing original purchase price by three for universities and state agencies. This approach provided a more accurate way of forecasting future purchase costs.

Labor

- All state, NDUS, county, city or school personnel costs associated with planning, administering or maintaining the wide area network or capitol backbone (both full-time and part-time personnel). Time was prorated for personnel who do not spend 100% of their time on WAN-related activities.

Other Contract Costs

- All costs not previously mentioned which are associated with WAN vendors.

Internet

- All costs associated with Internet access services currently encountered (either internal or external costs) by the state, NDUS, counties, cities or schools. These costs included hardware, software, tools, operations, administration, personnel, fees, etc.
- All costs associated with Internet hosting services currently encountered (either internal or external) by the state, NDUS, counties, cities or schools. These costs included hardware, software, tools, operations, administration, personnel, fees, etc.
- These costs also included those currently encountered from the public Internet service providers used by the state, NDUS, schools, cities or counties for any or all of the previously listed services.

PBX and Centrex

- These costs included the line to demarcation and the equipment percentage associated with long-distance services.
- PBX costs
- Centrex costs
- Line costs associated with dial tone function provided by rural telephone companies and US West
- In-state long distance calling costs including inbound 800 services

The following costs were excluded as part of the financial analysis:

- Phone sets
- Remote office (non-capitol campus) PBX costs
- Voice Mail services if the costs can be segregated
- Fax-On-Demand services
- Out-of-state long distance

The following table outlines the estimated 1998 spending for telecommunications services:

State Agencies	$1,538,718	$1,046,666	$989,833	$971,382	$4,546,599
University System	$1,582,560	$330,880	$366,507	$0	$2,279,947
K-12 Schools	$3,019,053	$4,638,115	$1,965,112	$185,095	$9,807,375
Cities	$1,055,473	$26,721	$6,667	$29,163	$1,118,024
Counties	$1,491,908	$0	$6,500	$38,333	$1,536,741
Total	$8,687,712	$6,042,382	$3,334,619	$1,223,973	$19,288,686

The following table outlines the projected spending for telecommunications services for the next six years (based on 20% growth)[4]:

	FY99	FY00	FY01	FY02	FY03	FY04	FY05
State Agencies	$4,546,599	$5,455,919	$6,547,103	$7,856,523	$9,427,828	$11,313,393	$13,576,072
NDUS	$2,279,947	$2,735,936	$3,283,124	$3,939,748	$4,727,698	$5,673,238	$6,807,885
K-12 Schools	$9,807,375	$11,768,850	$14,122,620	$16,947,144	$20,336,573	$24,403,887	$29,284,665
Cities	$1,118,024	$1,341,629	$1,609,955	$1,931,945	$2,318,335	$2,782,001	$3,338,402
Counties	$1,536,741	$1,844,089	$2,212,907	$2,655,488	$3,186,586	$3,823,903	$4,588,684
Total Annual Cost	$19,288,686	$23,146,423	$27,775,708	$33,330,849	$39,997,019	·$47,996,423	$57,595,708
Biennium Costs			$50,922,131		$73,327,869		$105,592,131
Total Next 3 Biennia							$229,842,131
Annual % Cost Increase		20.0%	20.0%	20.0%	20.0%	20.0%	20.0%

The table that follows outlines the expected financial benefit to the state of North Dakota. The analysis presented is based on ITD having a 3%, 8%, or 13% impact on the expected growth in telecommunication costs. The table assumes no financial benefit during the first year (FY 99). Using these assumptions, the projected financial impact is a savings of $6.7 to $54.3 million in telecommunications spending over the next six years.

	FY 99	FY 00	FY 01	FY 02	FY 03	FY 04	FY 05	Total (00–05)
Total Annual Cost	$19.3	$23.1	$27.8	$33.3	$40.0	$48.0	$57.6	$229.8
ITD Staffing Costs		$0.8	$1.0	$0.5	$0.5	$0.5	$0.5	$3.8
Projected Capital Costs			$1.0	$1.0	$1.5	$1.5	$1.2	$6.2
Projected Cost Impact (3%)	$0.0	$0.8	$1.3	-$0.1	-$0.9	-$2.6	-$5.1	-$6.7
Projected Cost Impact (8%)	$0.0	$0.8	$0.1	-$2.8	-$5.5	-$9.6	-$15.1	-$32.0
Projected Cost Impact (13%)	$0.0	$0.8	-$1.0	-$5.3	-$9.6	-$15.7	-$23.4	-$54.3

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[4] As stated earlier in the report, the numbers projected are based on industry projections of telecommunications demand and do not reconcile current 99-01 budget projections.

The following table shows the impact to the financial numbers if telecommunications spending growth is slowed to 10% per year.

	FY 99	FY 00	FY 01	FY 02	FY 03	FY 04	FY 05	Total (00–05)
Total Annual Cost	$19.3	$21.22	$23.3	$25.7	$28.2	$31.1	$34.2	$163.7
ITD Staffing Costs		$0.8	$1.0	$0.5	$0.5	$0.5	$0.5	$3.8
Projected Capital Costs			$1.0	$1.0	$1.5	$1.5	$1.2	$6.2
Projected Cost Impact (3%)	$0.0	$0.8	$1.4	$0.1	-$0.2	-$1.3	-$2.7	-$1.9
Projected Cost Impact (8%)	$0.0	$0.8	$0.3	-$2.1	-$3.7	-$6.1	-$9.0	-$19.9
Projected Cost Impact (10%)	$0.0	$0.8	-$2.1	-$4.9	-$7.0	-$9.8	-$13.2	-$36.0

C. Implementation Plan

This section of the report outlines the anticipated approach of eventually serving all of the entities contemplated by the Strategic Telecommunications Plan.

The steps to upgrading and serving all of the cities, schools, counties, universities and agencies with the Network of the Future include at least the following items:

1. Develop a detailed technical design of all of the components of the new network and establish appropriate phases for all of the necessary network changes. This technical design would establish the hardware required for each general category of user to establish communications with the high-speed backbone of the network. This hardware would include any changes of their Local Area Network or PBX equipment needed for interface to the wide area network including routers, CSU/DSU, personality modules, as well as any changes from their current line of demarcation all the way to the backbone.

2. Develop a network RFP that would address the needs of the infrastructure, that is the fiber, hardware, software and tools necessary to maintain a communication network to support the needs of the state.

3. Develop a network equipment RFP for the acquisition and implementation of the hardware and software that the cities, counties and schools would need to connect to the network.

4. Complete the initial staffing plan for the Information Technology Department. This activity would include establishing the Board, the CIO and the key players in the communications department.

5. Develop a business plan for the new Information Technology Department. This plan would establish the operating guidelines for the new organization, pricing models, technical standards for all users of the network, data sharing strategies, security policies, training policies. Most importantly, this plan will focus on how the network can improve the quality of education and the business climate in North Dakota.

6. Upgrade the state's ability (hardware, software, staff, training, capitol backbone) to support the anticipated explosion of Internet-based applications which will proliferate on the new network.

7. Finalize this general plan and establish the exact dates for each city, school, etc. to attach to the new network thus enabling ITD to establish detailed workplans for implementation. ITD can then establish bandwidth requirements for the backbone of the network for each phase of implementation. As more users are added to the network, additional backbone capacity will be necessary.

8. Using the hardware RFP developed earlier, establish a group of vendors that can provide the necessary hookup equipment. This list will enable the entities to buy it using the state contract when necessary.

9. Using the network RFP developed earlier, select a vendor that will take overall responsibility for installing and maintaining the backbone. In addition, this vendor should take responsibility for the local connects that run from the backbone out to each local entity, often referred to as the local Point of Presence (POP).

10. Implement the plan.

D. Detailed Position Descriptions for ITD

Note – The salary ranges used in this study are based on existing salary ranges within ISD for comparable positions. The state may have difficulty attracting experienced personnel for some positions within these existing ranges. This is a problem that extends far beyond the scope of this study and is being addressed by both the executive and legislative branches.

Office of the CIO

Bill Draft: *The governor shall appoint the chief information officer of the state. The governor shall appoint the chief information officer on the basis of education, experience and other qualifications in information technology and administration. The position of chief information officer is not a classified position. The chief information officer services at the pleasure of the governor. The governor shall set the salary of the chief information officer within the limits of legislative appropriations.*

The chief information officer shall:
1. Administer the department.
2. Employ any personnel determined to be necessary to carry out the responsibilities of the department and duties as prescribed by law.
3. Fix the salaries of all employees within the department, within the limits of legislative appropriation. All personnel within the department are entitled to actual and necessary travel expenses at the same rate as for other employees of the state.
4. Participate on the information technology board as a nonvoting member.

Background: This area modifies the current position of Information Services Director within OMB. This area also creates a new position of administrative assistant for the office of the CIO.

Staffing Requirements:	New FTEs are required to address the administrative assistant position. Additional compensation dollars are expected to be required to attract a qualified CIO for the state of North Dakota.
Compensation / Fringe:	Grade Level 18 – Administrative Assistant (Average compensation $24,000/year)
	Add $40,000 additional compensation for CIO position
Space Requirements:	120 square feet per person at $10 per square foot
Training Requirements:	$3,000 per year per person
Furniture/Workstation:	$2,100 for furniture per person
	$2,500 for workstation per person
	$200 for shared resources per person
Contracted Costs:	None
Fiscal Note Assumptions:	Year 1 – Add one staff

Technology Planning

Background: This department assumes the current responsibilities of ISD in addition to the following:

- Network planning for the new statewide network which will serve a variety of new users, i.e. cities and schools.

- Working closely with information technology coordinators within each agency to ensure a coordinated approach for the implementation of technology within the state.

- Working closely with NDUS technology personnel to coordinate standards, procedures and technology implementations within the state.

- Planning for the future of the Citizen Service Delivery department.

- Coordinating Process Reengineering efforts within the state.

- Coordinating the activities of the Quality Assurance department.

- Planning for the future training needs of the consolidated ITD staff.

- Working with vendors in creative ways to ensure North Dakota can take advantage of new technologies coming available. This activity will help ensure its citizens can take advantage of the Internet and high-speed networks to lower costs and encourage economic development.

- Reviewing the Strategic Technology Plans for each user entity attached to the statewide network.

Staffing Requirements: New FTEs are required to address added responsibilities. Initial assumptions allow for three (3) additional FTEs.

Compensation / Fringe: Grade Level 34 (Average compensation $50,000/year)

Space Requirements: 120 square feet per person at $10 per square foot

Training Requirements: $3,000 per year per person

Furniture/Workstation: $2,100 for furniture per person

$2,500 for workstation per person

$200 for shared resources per person

Contracted Costs: $120,000 (900-1,000 hours)

Fiscal Note Assumptions: Year 1 – Add one staff FTE
Year 2 – Add one staff FTE
2001-2003 – Add one FTE staff

Quality Assurance

Bill Draft: *The chief information officer shall establish a project quality assurance process that provides an independent assessment of the status of major projects. The Board shall define a major project, whether by a predefined amount or a determined risk. The personnel responsible for providing the assessment shall report to the Board on a quarterly basis until six months before the actual deployment of a major project. At that time, the personnel responsible for the assessment shall begin providing monthly project status reports to the Board.*

Background: Quality Assurance (QA) is a process to improve the likelihood of project success. Quality Assurance, if implemented correctly, can help projects by identifying requirements for additional resources, training or development tools that might be very difficult for the project manager to request. The QA process should be performed by an independent group that reports to the Board of ITD to enable them to provide the resources ensuring the project's success. By conducting the QA process throughout the project, the Board has a chance to respond proactively to problems before the problems are beyond reparation. The term independent can include internal ITD staff in a position to provide an unbiased and impartial assessment of the project status.

It is recommended the quality assurance personnel report to the Technology Planning function.

Staffing Requirements: Staffing requirements will depend on the definition of a major project and the number of concurrent major projects.

Using an assumption of 30 concurrent major projects, it is anticipated this function will require two (2) new FTEs. This allows for 10-12 hours per project per month.

Compensation / Fringe: Grade Level 27-31 (Average compensation $45,000/year)

Space Requirements: 120 square feet per person at $10 per square foot

Training Requirements: $3,000 per year per person

Furniture/Workstation: $2,100 for furniture per person

$2,500 for workstation per person

$200 for shared resources per person

Contracted Costs: $70,000 (500-600 hours)

Fiscal Note Assumptions: Year 1 – Add one staff FTE / Contracted Assistance
Year 2 – Add one staff FTE
2001-2003 – Maintain staff level of two

Process Redesign

Background: This function is a service to the users of the network to help ensure they receive maximum value for its technology investments. Their role is to enable government agencies to redesign their internal processes, shed old ways of doing business and re-invent themselves with modern, streamlined processes.

It is recommended that Process Redesign personnel report to the Technology Planning function.

Staffing Requirements:	Staffing requirements will depend on the acceptance of reengineering within state agencies and the political subdivisions.
	Initial assumptions allow for two (2) FTEs. This allows 4-5 concurrent reengineering efforts.
Compensation / Fringe:	Grade Level 36 (Average compensation $55,000/year)
Space Requirements:	120 square feet per person at $10 per square foot
Training Requirements:	$3,000 per year per person
Furniture/Workstation:	$2,100 for furniture per person
	$2,500 for workstation per person
	$200 for shared resources per person
Contracted Costs:	$100,000 (700-800 hours)
Fiscal Note Assumptions:	Year 1 – Add one staff FTE / Contracted Assistance Year 2 – Add one staff FTE 2001-2003 – Maintain staff level of two

Citizen Service Delivery (CSD)

Background: CSD is a new function within ITD to provide leadership for the development of Internet-based applications. It is anticipated this group would become a department within Software Development Services. CSD will have the following responsibilities:

- Working in conjunction with the university system to develop common Internet standards for all users of the network. The standards should address appearance, accessibility, security and naming conventions.
- Overseeing the development of all state agency web sites. State agencies may have the responsibility of developing and maintaining their own web sites, however, this will be done under the oversight of the CSD group.
- Developing, deploying and maintaining the Internet applications that provide direct citizen accessibility to government services. This would include electronic commerce.

Ideally, these applications can be deployed at minimal cost to the user agency much like the model used in Kansas. Some of the application costs could potentially be paid for through fees that are charged to Internet users or by savings accrued through the use of better technologies. The ITD Board should review these options and consider this pricing model within the next biennium.

Staffing Requirements: Initial assumptions allow for six (6) FTEs during the first biennium with three (3) additional FTEs added during the second biennium. This allows multiple and concurrent development efforts.

The quantity and complexity of the projects in this group is expected to increase significantly over the next five years. However,

Compensation / Fringe: Grade Level 27-31 (Average compensation $45,000/year)

Space Requirements: 120 square feet per person at $10 per square foot

Training Requirements: $3,000 per year per person

Furniture/Workstation: $2,100 for furniture per person

$3,000 for workstation per person

$200 for shared resources per person

Contracted Costs: None

Fiscal Note Assumptions: Year 1 – Add three staff FTE
Year 2 – Add three staff FTE
2001-2003 – Add three additional staff FTE

Statewide Telecommunications Services (SCS)

Background: This function has complete responsibility for planning, deploying and managing of the state wide area network. This group is currently called Telecommunications Services within ISD. This group will have the added responsibility of supporting the wide area network for schools, cities, and libraries, in addition to support state agencies, the university system and counties.

It is anticipated that SCS will fulfill its responsibilities by contracting various products and services from hardware, software and network vendors doing business in North Dakota. For example, it is not expected this department will replace the telephone company. Instead, SCS will determine new communication requirements and deploy them through the use of vendor contracts.

Staffing Requirements: Initial assumptions allow for three (3) additional FTEs in Network Operations. This allows for the design, deployment and support of the statewide communications network.

Compensation / Fringe: Grade Level 27-31 (Average compensation $45,000/year)

Space Requirements: 120 square feet per person at $10 per square foot

Training Requirements: $3,000 per year per person

Furniture/Workstation: $2,100 for furniture per person

$3,000 for workstation per person

$200 for shared resources per person

Contracted Costs: None

Fiscal Note Assumptions: Year 1 – Add one staff FTE
Year 2 – Add one staff FTE
2001-2003 – Add one additional staff FTE

E. Methodology Used to Develop this Report

The following chart outlines the methodology used for this report:

```
┌──────────────────────┬────────────────────────┐
│  Define Network      │  Define Detailed       │
│  User Community       │  List of               │
│                      │  Participants for      │
│                      │  Next Biennium         │
└──────────────────────┴────────────────────────┘

┌──────────┐   ┌──────────────┐   ┌──────────────┐   ┌──────────┐   ┌──────────┐   ┌──────────┐
│ Organize │   │ Define       │   │ Develop A    │   │ Develop  │   │ Develop  │   │ Final    │
│ Project  │──▶│ Conceptual   │──▶│ Migration    │──▶│ Summary  │──▶│ Financial│──▶│ Report   │
│          │   │ Model of     │   │ Strategy     │   │ Cost     │   │ Analysis │   │          │
│          │   │ Network      │   │ to Conceptual│   │ Analysis │   │          │   │          │
│          │   │ (4-5 Years in│   │ Model        │   │          │   │          │   │          │
│          │   │ Future)      │   │              │   │          │   │          │   │          │
└──────────┘   └──────────────┘   └──────────────┘   └──────────┘   └──────────┘   └──────────┘

               ┌──────────────┐   ┌──────────────┐
               │ Develop Budget│  │ Define Costs │
               │ Requirements  │  │ for          │
               │ for          │──▶│ Contracted   │
               │ Information   │  │ Professional │
               │ Technology    │  │ Services     │
               │ Department    │  │              │
               └──────────────┘   └──────────────┘

               ┌──────────────┐
               │ Develop      │
               │ Anticipated  │
               │ Cost of      │
               │ Telecommuni- │
               │ cations      │
               │ Services     │
               └──────────────┘
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