PB98-108970



# SUSTAINABLE DEVELOPMENT TASK FORCE REPORT

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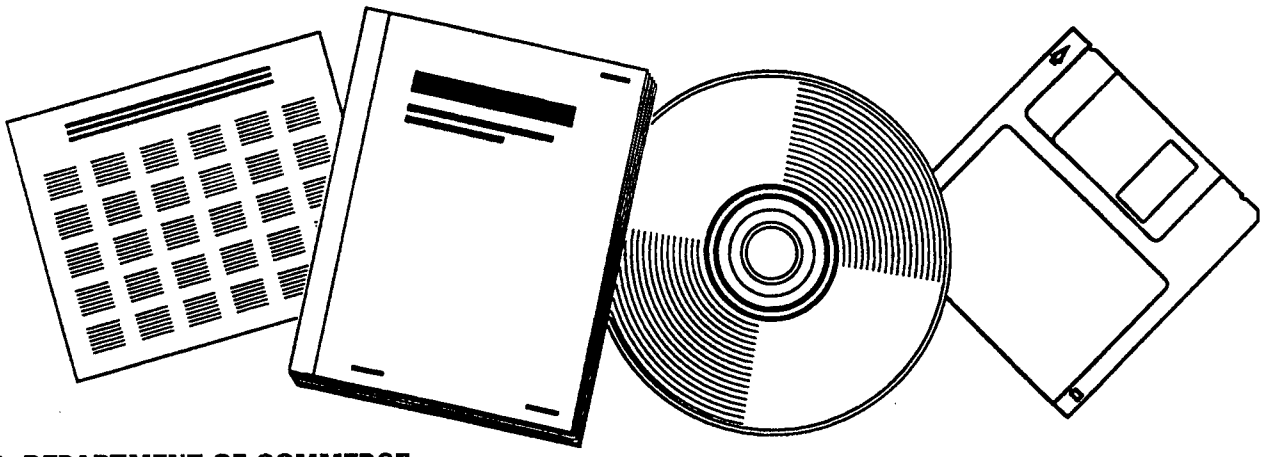

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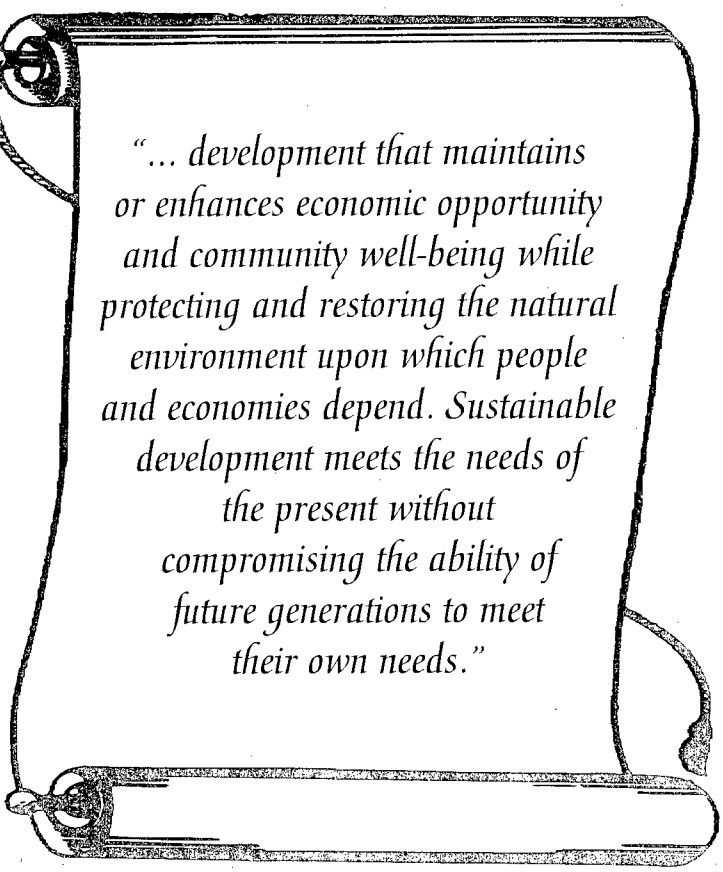


# Sustainable Development Task Force Report

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On April 11, 1996, Governor Arne Carlson signed into law an act relating to sustainable development in Minnesota. This act defines sustainable development as "development that maintains or enhances economic opportunity and community well-being while protecting and restoring the natural environment upon which people and economies depend. Sustainable development meets the needs of the present without compromising the ability of future generations to meet their own needs." The Minnesota Department of Transportation's (Mn/DOT) Sustainable Development Task Force adopted this definition.

This report examines four different aspects of transportation policy and their roles in a sustainable community. It reviews Mn/DOT's activities currently under way in those policy areas including: land use and transit; pricing; technology; and research and education. It outlines the following seven specific steps for future action:

- Comply with sustainable development legislation in Minnesota--Minnesota Legislative Act Chapter N. 454, H.F. No. 1800
- Integrate sustainability measures into Mn/DOT's family of measures
- Improve the link between transportation investments and land use decisions
- Participate actively in sustainable development interagency working group
- Establish a statewide access management program
- Review the Transportation Research Board report on sustainable transportation
- Develop alternatives for sustainable transportation

Mn/DOT Deputies' Staff adopted these recommendations on June 3, 1997.

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# Sustainable Development Task Force Report

**Final Report**

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# Executive Summary
## SUSTAINABLE DEVELOPMENT TASK FORCE

On April 11, 1996, Governor Arne Carlson signed into law an act relating to sustainable development in Minnesota. This act defines sustainable development as "development that maintains or enhances economic opportunity and community well-being while protecting and restoring the natural environment upon which people and economies depend. Sustainable development meets the needs of the present without compromising the ability of future generations to meet their own needs." This definition was adopted by the Minnesota Department of Transportation's (Mn/DOT) Sustainable Development task force.

The task force's report examines four different aspects of transportation policy and their roles in a sustainable community. It reviews Mn/DOT's activities currently underway in those policy areas including: land use and transit; pricing; technology; and, research and education. The report also outlines seven specific areas for future action. The following recommendations were adopted by Mn/DOT Deputies' Staff on June 3, 1997.

## RECOMMENDATIONS FOR MN/DOT SUSTAINABLE DEVELOPMENT ACTIVITIES

### 1. Comply with Sustainable Development Legislation in Minnesota

**Minnesota Legislative Act Chapter No. 454, H.F. No. 1800**

*Mn/DOT Lead: Office of Environmental Services*

Mn/DOT was directly affected by this act for it required that each state department, agency, and board should report to the Environmental Quality Board (EQB) on how their respective missions and programs reflect and implement the state sustainable development principles, or how they

could be changed to do so. Mn/DOT's Office of Environmental Services took the lead in preparing this report for the EQB and it was submitted on January 31, 1997. Copies of the report are available for review and can be obtained by contacting Jerry Larson at 779-5094.

## 2. Integrate Sustainability Measures into Mn/DOT's Family of Measures

Mn/DOT will continue to explore the possibility of incorporating sustainability measures into its Family of Measures. In establishing measures, one must first determine what the desired outcome, or goal, is and then determine the appropriate measure which will allow you to know whether the outcome has been achieved. In Mn/DOT's Family of Measures, two outcomes have been established under which Sustainability measures could potentially be included. These outcomes are:

- Environment: Mn/DOT is a proactive, responsible environmental steward; and,

- Regional Socioeconomics: Transportation investments will yield the highest possible economic return to the region, tempered by an evaluation of community values and social impacts.

The measures which Mn/DOT has identified for the above two outcomes are:

**Environment:** Number of residents in incorporated areas exposed to freeway and expressway noise exceeding established standards.

Amount of chemicals (salt, herbicides...) used on roadways by Mn/DOT.

Number of wetland areas impacted and replaced by Mn/DOT.

**Regional Socioeconomics:** Number of major investments that have conducted benefit/cost analysis.

Number of major investments that have a positive (greater than 1) benefit/cost ratio.

### 3. Improve the Link Between Transportation Investments and Land Use Decisions

*Mn/DOT Lead: Districts/Metro Division in coordination with Office of Investment Management*

One of the ways in which Mn/DOT can accomplish this is by linking district transportation plans to local land use plans. For example, Mn/DOT's Metro Division recently completed their *Transportation System Plan* connecting division transportation goals and priorities to the Metropolitan Council's *Metro Growth Management Strategy*. Four transportation system investment goals have been established: preservation; management; improvement; and, expansion. The goals are listed in order of importance to emphasize the Metro Division's desire to preserve and manage the existing system prior to improving or expanding it. This means the Metro Division will invest its resources to first fully-preserve and fully-manage the existing system and then invest the remaining resources in improvement and expansion of the highest priority segments of the system.

### 4. Participate Actively in Sustainable Development Interagency Working Group

*Mn/DOT Lead: Office of Environmental Services*

Mn/DOT is a participating member of the Sustainable Development Interagency Working Group. The group was formed to move the sustainable initiative forward within agencies of the state of

Minnesota. There may be many things which state agencies can do either independently or working cooperatively to advance the cause of sustainable development. By coming together periodically to share information, each participating agency can learn from others how it can possibly integrate sustainable development principles or practices into everyday activities of the agency.

### 5. Establish a Statewide Access Management Program

*Mn/DOT Lead: Engineering Services Division*

Access management is a comprehensive approach for improving traffic operations by attempting to balance the movement (flow of traffic) and access (ability to enter the system) functions. It accomplishes this balancing act by managing the location, design, and operation of driveways, median openings, and street connections to a roadway.

Most transportation organizations, such as Mn/DOT, have very little control over land use and development. However, a comprehensive access management policy can advance growth management objectives. The National Cooperative Highway Research Program, in a recently released report entitled, "Land Development Regulations that Promote Access Management" stated that;

> "Discouraging urban sprawl, maintaining roadway level of service, protecting community character, and coordination and consistency of land use and transportation decisions are areas where access management and growth management converge. For example, access management can be facilitated through land use strategies that discourage strip development and promote clustering of land uses into unified developments with shared access systems. These same techniques address some defining characteristics of sprawl, strip development and inadequate connectivity among land uses."

Mn/DOT's Access Management Initiative is currently under way. A report and recommendations for statewide access management policy are expected by January 1, 1999.

### 6. Review TRB Report on Sustainable Transportation

*Mn/DOT Lead: Office of Environmental Services*

The Transportation Research Board is currently conducting a study on transportation and a sustainable environment. It is expected that this study will generate greater understanding within the U.S. transportation community of the concept of sustainability and define areas of common ground among public interest groups, environmental groups, and transportation professionals. This should foster the development of more realistic, pragmatic priorities for guiding the process by which the U.S. transportation community addresses sustainability. The committee met for the first time in November 1995 and is scheduled to publish its final report in the summer of 1997. Mn/DOT will review the report upon its publication and take into consideration at that time any recommendations or policies advocated by the TRB.

### 7. Develop Alternatives for Sustainable Transportation

*Mn/DOT Lead: Office of Advanced Transportation Systems*

In September of 1994 a number of alternative transportation program activities including bicycling, walking, telecommuting and public transit technology initiatives came together in what is now called Sustainable Transportation Initiatives (STI) within Mn/DOT's Office of Advanced Transportation Systems (Minnesota Guidestar--ITS Program). The recent work of Mn/DOT's Sustainable Development Task Force sets up an opportunity to carry on elements of the Task Force's focus through the mission of STI. Specific work elements are helping to build sustainable and intermodal transportation systems that integrate bicycling, pedestrians, and teleworking with traditional transportation.

# I. Sustainable Development Task Force

At the December 27, 1995 meeting of the Modal Integration Council held at the Transportation Building in St. Paul, a task force was proposed to study the issue of sustainable development and livable communities. Previous discussions of the Council had highlighted the growing interest of other state agencies, counties, and communities in these concepts. It was also clear that how and where transportation services are provided is a critical factor in meeting community and environmental sustainability objectives.

In order to better understand these related concepts of livability and sustainability, an internal task force was formed and charged with:

- Gathering, assessing, and communicating associated literature so that all Minnesota Department of Transportation (Mn/DOT) staff are knowledgeable in the concepts;

- Formulating policies and strategies that enable Mn/DOT to effectively implement actions that support public goals;

- Supporting Mn/DOT efforts to coordinate activities with other agencies and organizations with similar interests; and,

- Examining the link between transportation investment decisions and local community development.

This sustainable development task force was composed of the following individuals:

1. Steve Alderson, District 6, Rochester
2. Donna Allan, Office of Transit
3. Bob Benke, Office of Research Administration
4. Larry Foote, Environmental Services
5. Randy Halvorson, Transportation Research Investment Management - Chair
6. Tim Henkel, Metro Division
7. Kathryn Knutson, Office of Investment Management - Staff Support
8. Scott Peterson, Office of Investment Management
9. Al Schenkelberg, Office of Investment Management
10. Bob Works, Office Advanced Transportation Systems

The Modal Integration Council and the task force was also asked to examine the feasibility of establishing an external task force formed in partnership with other agencies and organizations that are likely to share an interest in sustainability and livability issues. A subgroup of Mn/DOT's internal task force would also serve as members of the external task force so that activities could be integrated more easily.

*The charge to the task force was approved by Deputies' Staff on January 30, 1996*

# II. Definitions Of Sustainability

"Trying to define sustainability is akin to trying to define democracy, justice, and other important principles that guide our society; it may be difficult to put down on paper, yet we know some of the general qualities worth striving for."

**Alice Hubbard of the Rocky Mountain Institute**

"Sustainability is intimately connected with the issues of justice, rights and obligations. Beyond these broad ideas, attempts to present a single definition tend to be counter-productive. A sustainable future is dependent upon the retention of a diverse range of approaches and opinions about the best way to achieve sustainable development. Diversity is essential for successful evolution and that is really what sustainability is about: encouraging and facilitating the evolution of social and economic activity in directions that improve the welfare of present and future people."

**Mike Young, "Sustainable Investment: the Economic Challenge," 1992**

"There are many ways to define sustainability. The simplest definition is: A sustainable society is one that can persist over generations, one that is farseeing enough, flexible enough, and wise enough not to undermine either its physical or its social systems of support."

**Dana Meadows, Co-Author,. *Beyond the Limits***

"Sustainable development is development that meets the needs of the present without compromising the needs of future generations to meet their own needs."

**World Commission on Environment and Development, *Our Common Future,* 1987**

"A sustainable community is a community that uses its resources to meet current needs while ensuring that adequate resources are available for future generations. A sustainable community

seeks a better quality of life for all its residents while maintaining nature's ability to function over time by minimizing waste, preventing pollution, promoting efficiency and developing local resources to revitalize the local economy. Decision-making in a sustainable community stems from a rich civic life and shared information among community members. A sustainable community resembles a living system in which human, natural and economic elements are interdependent and draw strength from each other."

**Common Ground: Achieving Sustainable Communities in Minnesota, 1995**

"Sustainable development means improving people's quality of life while maintaining nature's ability to function over time. It means having an economy that works for the environment and for communities."

**Rolf Nordstrom and John Wells, Environmental Quality Board**

"Sustainable development means development that maintains or enhances economic opportunity and community well-being while protecting and restoring the natural environment upon which people and economies depend. Sustainable development meets the needs of the present without compromising the ability of future generations to meet their own needs."

**Statutory definition taken from 1996 Minnesota Legislature, Chapter 454 (H.F. 1800)**

## COMMON THEMES OF SUSTAINABILITY

- Long time horizon;
- Economic values that are complemented by civic, cultural, and environmental values;
- Reinforcement of local decision-making and local economic investment;
- Emphasis on economic and social equity; and,
- Reduction in the use of non-renewable resources.

These themes are embraced and enhanced by several of Mn/DOT's strategic directions. These directions were set in 1993 after extensive efforts to involve citizens throughout the state in a discussion of transportation issues and needs. The directions relating to sustainability themes are as follows:

**Access.** Minnesota's transportation system should provide a minimum level of critical access to goods and services for all; sustain and enhance regional centers; exploit the strength and utility of all modes; and maximize total access within given resource constraints. Mn/DOT's role must change from reactive implementor to proactive shaper.

**Energy and Environment.** While continuing to meet the accessibility needs of various users, Mn/DOT must develop and implement transportation strategies to: (a) preserve and enhance the environment; (b) promote greater energy efficiency; and (c) encourage innovation to reduce negative impacts.

**Values.** Mn/DOT needs to develop meaningful transportation alternatives that link and balance personal, social, economic, and environmental values.

**Education.** Mn/DOT should play a leadership role in continuous education, both externally and internally, in order to effect quality transportation decisions as they relate to awareness of social and environmental issues.

## WORKING DEFINITION OF SUSTAINABILITY

Mn/DOT's task force on sustainable development felt it necessary to come to agreement on a working definition of sustainability. Believing that it was neither necessary nor productive to draft yet another new definition, the group decided to make use of one already in existence. On April 11, 1996, Governor Arne Carlson signed into law an act relating to sustainable development in

Minnesota. This act defines sustainable development as "development that maintains or enhances economic opportunity and community well-being while protecting and restoring the natural environment upon which people and economies depend. Sustainable development meets the needs of the present without compromising the ability of future generations to meet their own needs." This definition was also adopted by Mn/DOT's task force. A copy of the act is included in the attachments to this report for your information.

For those who are interested in reading more about the issue of sustainable development and/or sustainable transportation, a bibliography is included as part of this report. It includes references for all the sources listed above, in addition to other sources that were used as background material in the preparation of this report.

## SUSTAINABLE DEVELOPMENT POLICIES

Public policies that would promote sustainable development would:

1. **Take a long-term perspective** that includes present and future generations;
2. **Be self-regulating:** where the price of a product, service or activity covers its actual social, economic and environmental cost;
3. **Encourage cooperation among diverse interests,** where possible, rather than regulatory mandates to achieve the same or better outcomes;
4. **Account for their full social, economic and environmental costs and benefits;**
5. **Reward resource efficiency** as well as financial efficiency;
6. **Provide a transition** period away from unsustainable behavior;
7. **Promote an ecological economy** that is based on high efficiency, low waste production and consumption, and "feedback" systems (usually in the form of prices) that produce outcomes that are best for the environment, businesses and the larger community.
8. **Allow regulatory flexibility** based on public-private consensus and commitment

to long-term goals;

9. **Ask polluters and users to pay** the full costs of their actions;

10. **Take a systems approach** that integrates social, economic and environmental goals;

11. **Promote equitable solutions** and equal opportunity; and,

12. **Address root causes** of problems.

Excerpted from "Demystifying Sustainable Development" by Rolf Nordstrom and John Wells, Environmental Quality Board

# III. Transportation's Role In Sustainable Development

Transportation has a critical role to play in a sustainable community. The daily challenges that people encounter in getting to work, taking their children to school and day care, doing the grocery shopping, and providing for recreation and entertainment highlight the impact that transportation has on our quality of life. The balance to be struck is between peoples' desire for a quality of life that includes both a high level of personal mobility and a clean environment. The trade-offs to be made between mobility and access, economic development and preservation of open space and clean air have been and will continue be an overarching concern for the transportation industry.

Transportation is a major sector of the U.S. economy and a major consumer of non-renewable energy and land. Nationally, it contributes nearly one-third of carbon dioxide ($CO^2$) resulting from human activity and is a major source of emissions regulated by the Clean Air Act. Most of these emissions (about 80 percent) comes from automobiles, light trucks, and heavy trucks. Transportation consumes almost one-third of all energy use annually and its consumption of petroleum accounts for two-thirds of domestic demand and continues to grow. Only expenditures for housing (31 percent of household income) exceed annual expenditures on transportation which account for nearly 17 percent of GDP. In 1990 Americans owned nearly twice as many cars as they did in 1960, and they traveled 40 percent more miles in them. Clearly the car is a valued component of the American lifestyle. The impact that the personal automobile has had on American's choice of where to work, live, and recreate is profound. Underscored by the statistics cited above is the commitment our society has made to life built around the flexibility and convenience of the automobile.

A report prepared by the Center for Energy and Environment entitled "Energy Efficiency, Economic Development and Reduced Emissions" estimated that transportation is responsible for about 32 percent of Minnesota's $CO^2$ emissions. This percentage is expected to increase in the

future. This same report urges a reduction in vehicle miles traveled as a crucial element of any plan to reduce $CO^2$ emissions. Since automobiles account for 85 percent of all vehicle miles traveled, this would obviously require a change on the part of many individual's behavior. However, the Center for Energy and Environment predicts that improving energy efficiency and reducing emissions in the transportation sector could have many economic benefits. By reducing vehicle miles traveled, congestion would be reduced, thereby increasing productivity. In addition, new infrastructure outlays could be avoided or significantly delayed, saving the government much needed capital for other needs.

Obviously, transportation is a significant factor in any plan for a sustainable future. It is a major component of the U.S. economy, a valued part of the American lifestyle, and a major source of environmental concern. Any serious efforts to move toward more sustainable communities will have to give consideration to what a sustainable transportation system might look like.

## CHARACTERISTICS OF SUSTAINABLE TRANSPORTATION

European nations have done a significant amount of work defining sustainable transportation and determining policies that would achieve sustainability goals. One European Group, Transport 2000 has identified nine such policies. They are:

- Motor Fuel Taxes: Value the costs of road transport to the environment (e.g., fuel tax, vehicle excise duty);
- Company Cars: Weekly mileage of company cars is twice that of household cars. The tax system should directly tax the private mileage as a private benefit;
- Road Pricing: In order to relieve congestion, road tolls are needed with revenue targeted to support public transport, cycling, and traffic calming;

• Parking Controls: Reducing parking in city center is needed to reduce use of the auto for the trip to work. Also charging market rates for parking in center and suburbs and enforcement of parking restrictions are needed;

• Improving Public Transport: In order to maintain current ridership and attract car drivers, need to create an integrated system of bus, rail, light rail, and community transport. Bus frequency and reliability must be improved. Commuter railways must be upgraded and expanded;

• Promoting Walking and Cycling: Half of all journeys are under two miles and ideal for walking/cycling. Reallocate road space for cycling and pedestrians, traffic calming, provide cycle parking and lanes;

• Land Use Planning: Develop residential and commercial areas so they encourage more pedestrian, bicycle, public transport trips. Only allow shopping or office facilities that are accessible by public transport, pedestrians, and bicycles;

• Lower Speed Limits: To achieve energy savings, motorway speeds should not exceed 50 mph, residential areas should not exceed 20 mph; and,

• Emission Standards for Vehicles: Require manufacturers to incorporate technology to reduce air pollutants and to improve fuel economy.

Several of these policies have already been examined by Mn/DOT, which makes this list an interesting departure point from which to begin a discussion of the steps which Mn/DOT has taken to create a more sustainable transportation system.

## THE ROLE OF LAND USE AND TRANSIT

One of the hallmarks of a sustainable transportation system is the availability of modal choice. Is transit readily accessible, reliable, and does it serve the areas where people live, work, and shop? Are alternatives to the automobile such as biking and walking, for transportation purposes in addition to recreation, feasible? Oftentimes the answer to the preceding questions can be found by

examining the ways in which our communities have been designed. It is difficult to discuss developing a more sustainable transportation system without first changing the ways in which we develop land. Low-density housing that is far-distant from work, shopping, and entertainment opportunities will necessitate frequent trips, often by automobile, and drastically reduce the viability of more sustainable transportation modes such as biking, transit, and walking. For this reason, many discussions of sustainable transportation inevitably become discussions of American land use patterns.

The central paradox for any transportation agency in pursuing a more sustainable transportation system is this: although transportation accounts for a great deal of society's "unsustainable" behavior, (use of fossil fuels and production of regulated emissions) one of the major contributing factors to transportation demand is almost entirely outside the regulatory purview of most transportation agencies; land use.

Decisions on land use and development are primarily made at the local level in Minnesota. There is no statewide land use plan or set of policies for land development. The Sustainable Economic Development and Environmental Task Force, in their report to the Governor entitled "Common Ground: Achieving Sustainable Communities in Minnesota", recommend that all Minnesota counties "develop comprehensive sustainable development plans covering urban and rural development, environmental preservation, agricultural uses, economic development, transportation and so forth". Cities and township could also develop their own plans, as long as they were compatible with the county's. These plans would then provide the "legal basis for using land use controls, adopting development decisions and gaining access to state funds".

The 1997 Minnesota state legislature passed the Community-Based Planning act that establishes goals and provides funds for local land use plans. This new statute, and the resulting plans which it will support, will assist in achieving the goals outlined in Mn/DOT's *Minnesota Statewide*

*Transportation Plan.* In the guidelines developed for the policy statement on "Enhanc[ing] access for Economic Development, guideline #9 states that, "[p]riority should be given to development projects that are consistent with local land use plans, policy plans, and long-range transportation plans for all levels of government."

On April 11, 1996, Governor Arne H. Carlson signed into law an act that will allow the first steps toward realizing the recommendation of the Sustainable Economic Development and Environmental Task Force for advancing sustainable land use and community development policies. This act provides for the office of strategic and long-range planning to develop and publish a planning guide for local units of government to plan for sustainable development. They shall also prepare a model ordinance to guide sustainable development. This model ordinance will specify the technical and administrative procedures necessary to guide sustainable development. Additionally, the act requires that each state department (including Mn/DOT), agency, and board shall report to the environmental quality board by October 15, 1996 on how their mission and programs reflect and implement the state sustainable development principles, or could be changed to do so.

## THE ROLE OF PRICING

In a society which assumes that rational choices are made by consumers paying prices that truly reflect the total costs of the goods and resources they consume, it is imperative that goods and resources are, in fact, priced accurately. If they are not, then the costs are borne by others, if not at present then in future generations. Furthermore, inaccurate pricing of goods and resources encourages consumption at rates greater than the environment or the producer can sustain as consumers literally take more in goods and resources than they return in the form of charges.

Mn/DOT created the Office of Alternative Transportation Financing to identify appropriate and potential road pricing projects and to study the feasibility of various road pricing options. Road

pricing is an umbrella term for fees charged motorists for use of a road. Current road pricing options being considered include congestion pricing, toll roads, and vehicle mileage-based tax.

- **Congestion Pricing:** Motorists pay a fee for using a roadway, generally during peak operating hours (rush) hours. This term is used when the purpose of the fee is travel demand management.
- **Toll Roads:** Motorists pay a fee to use a roadway. A fee is considered a toll when revenues generated pay for constructing and operating the road.
- **Mileage-based tax:** Motorists pay a fee for using roadways based on how many miles a vehicle is driven. This type of fee can be implemented statewide and is considered a possible replacement for the existing gas tax.

**Toll Roads:** In July 1995, Mn/DOT initiated a program called TRANSMART. This program seeks partnerships with private industry to build toll facilities such as bridges, tunnels, highways, and related improvements. A request for proposals was issued at this time inviting national and international investment and development firms as well as local contractors and consultants to submit potential toll road projects for consideration. There were five proposals submitted by the November 22, 1995 deadline. All of the proposals were then evaluated by a TRANSMART Project Evaluation Task Force which received input from Mn/DOT, the Attorney General's office, the Department of Finance, the Federal Highway Administration, and financial consultants. Any project finally approved would meet the following criteria:

- Proposed facilities must have community support and demonstrate a public need;
- Proposed facilities must meet the same standards for design and construction as any other transportation project; and,
- Proposed projects must provide for maintenance, snow removal, and police services which meet or exceed state standards and will be subject to regular inspection.

The Highway 212 proposal to construct as a toll road a new section of state Trunk Highway 212 from Eden Prairie to Cologne was selected in May 1996 to move forward to the next step in the process: negotiation of a development agreement between the project proposers and the state. Considerations in the negotiations ranged from approval of planning, design, and construction to financing, bonding, and audit procedures as well as addressing any concerns or suggestions from affected communities. An agreement was finalized and presented to the affected communities for consideration. By law, once a toll agreement is signed, the affected communities have 30 days to review the agreement, and, if they wish, veto its implementation. On September 3, 1996, the Eden Prairie City Council voted to veto the proposal. The state legislature reviewed the issue of toll roads during the 1997 session; the major provisions of the toll road statute were unchanged.

**Congestion Pricing and Mileage-Based Tax:** Most economists agree that fuel prices do not presently reflect the true costs incurred by all aspects of automobile use. Nor are the costs of congestion on our highways adequately reflected in the current user costs of auto licensing and registration fees. Congestion pricing is an attempt to more accurately price the cost of crowded roadways. It does so by charging the user of that roadway a certain price, usually in the form of tolls. This charge can vary by time of day so that peak-period (rush-hour) users, are charged more than those who travel at other times of day.

In 1994 the Minnesota State Legislature mandated the Minnesota Department of Transportation and the Metropolitan Council to jointly conduct a study of road pricing options with potential for implementation in the State of Minnesota and in the Twin Cities metropolitan area. Two parallel road pricing strategies were undertaken: congestion pricing in the metropolitan area and mileage-based tax statewide.

Under congestion pricing, motorists would be charged based on the time of day travel takes place and the level of congestion on the roadway. Under mileage-based tax each vehicle would be charged based on the number of miles traveled by that vehicle each year. Mileage-based tax could partially or totally replace the present highway user taxes on motor fuel and motor vehicle registration fees.

Underlying the legislative mandate was the recognition that the current method of financing roadway improvements through the gas tax does not address regional traffic management goals, does not provide for alternative transportation modes such as transit, and does not account for anticipated shortfalls in financing current and future highway needs.

**Congestion Pricing:** The major benefits of congestion pricing are as follows:

- It has the ability to change people's mode of travel, time of travel and route of travel;
- It has the ability to reduce congestion, thereby reducing delays;
- It can raise revenues to fund transit and other alternatives to single-occupant vehicles;
- It can raise revenues needed to maintain and improve the roadway system; and,
- It can reduce vehicle-miles of travel, thus reducing air pollutant emissions.

New technology makes congestion pricing technically feasible and cost-effective. Electronic detection systems can be signaled when a car enters and exits the freeway or expressway with bills automatically sent to the driver's home. This eliminates the delays and frustrations inherent with more traditional toll booth or toll collection facilities.

Before congestion pricing can be implemented, a number of public and political concerns must be addressed including:

- Adverse impacts on some low-income and disadvantaged groups;
- Impacts of traffic diversion on local streets;
- Actual and perceived lack of existing, convenient transportation options to tolled roadways (i.e., alternative routes, modes, and time of travel);
- Opposition of some commercial interests;
- Concern that revenues collected will not be used for the transportation purposes for which they are collected, or in the areas in which they are collected; and,
- Lack of understanding of new technology and lack of confidence in government.

**Mileage-Based Tax:** The Congestion/Road Pricing Study concluded that the concept of a mileage-based tax is technically feasible, but did not appear to be cost effective at this time. To ensure a reasonable level of enforcement and accountability, virtually every vehicle in the state would have to be equipped with an electronic odometer or equivalent requiring a substantial initial investment. Out-of-state vehicles would also have to be equipped with the devices, which is impractical at this time.

If the concept gained acceptance nationally, or at least regionally, several of the cost inefficiencies and other difficulties would be reduced. More importantly, future technological advances may well occur, which would significantly enhance the attractiveness and feasibility of a mileage-based tax. In the not too distant future, electronic odometers, global positioning systems, multiple-use transponders, and other intelligent features may well become "standard equipment" on motor vehicles. Once this equipment is in place, the cost of implementing and operating a mileage-based tax program would be greatly reduced, thus eliminating cost as a barrier to implementation.

## THE ROLE OF TECHNOLOGY

New technological advances have the potential to facilitate many of the aims of sustainability. The Hubert H. Humphrey Institute of Public Affairs recently wrote that "[t]echnological innovation is

critical to designing transportation systems that simultaneously promote economic growth, social equity, and environmental protection." Technology innovations in transportation can be broken down into two basic categories: supply-side options such as alternative fuels, engine technologies, and vehicle design technologies; and, demand-side policies such as intelligent transportation, and telecommunications and information technology.

The revolution in **telecommunications** could have a fundamental effect on the nature of the metropolitan form. These effects could be positive through a potential reduction in travel demand and vehicle miles traveled and a consequent reduction in emissions. It could also allow for unprecedented access to a variety of information (including information on transportation and its environmental impacts), as well as making small towns less isolated. However, it could have unintended consequences such as accelerating decentralization and perhaps even increasing trips made by households as more people give up commutes to a central office but travel intermittently throughout the day.

Mn/DOT has recently initiated a project in Cambridge, Minn., in partnership with the city and U S WEST, to develop a telework center that may result in decreased demands on existing highways. In addition, Mn/DOT has completed a study aimed at estimating the potential impacts of telecommuting on travel needs. *A Report to the Minnesota Legislature on: Telecommuting in the Twin Cities Metropolitan Area* was submitted on April 20, 1994. A survey undertaken for this study and conducted in the Fall of 1993 revealed that: 20 percent of employees in the Twin Cities Metro Area (TCMA) telecommute at least one day per month; 17 percent of employees telecommute from home on an average of two days per week; 3 percent of employees telecommute from a satellite work location on an average of approximately four days per week; overall an average of about 9 percent of employees telecommute per workday from either home or a satellite location. The 20 percent of the employees in the TCMA who are currently telecommuting far exceeds the

findings of a national survey that estimated rates of from 2 to 6 percent. The national survey apparently included rural areas and towns in addition to metropolitan areas.

Under an optimistic forecast of telecommuting habits in the year 2003, it was estimated that up to 40 percent of the TCMA work force would be telecommuting some days. This could reduce work-commute travel by about 21 percent. Under this optimistic scenario, total rush-hour travel could be reduced about 8 percent in the morning and 4 percent in the evening in the year 2003.

The following recommendations were made in the report for the State of Minnesota and its agencies to undertake in order to expand telecommuting:

- Establish and encourage partnerships/coalitions with the public, non-profit, and private sectors/organizations to engage in educational, promotional, research, pilot studies, and other efforts to encourage telecommuting.
- Strongly encourage metropolitan planning organizations (MPOs) to systematically include telecommuting in their transportation planning processes and congestion management systems.
- Establish and evaluate focused telecommuting pilot projects within the commuter-shed of the Twin Cities in various locations (e.g., rural, exurban, suburban, central cities). Such pilot projects could involve satellite telecommuting centers and targeted industries and occupational groups. Such pilot projects could also evaluate the effects of telecommuting on family life and other social and economic activities in addition to the transportation effects.
- Establish/encourage initiatives within government agencies and the private sector to establish and monitor telecommuting programs and document the results.

**Intelligent transportation systems (ITS)** offer revolutionary new ways of providing transportation services. They have the potential to change travel mode, travel demand, and route of travel. Additionally they can provide feedback on overall system performance to transportation agencies implementing the technology.

The Federal Highway Administration and ITS America have defined several major goals for ITS deployment including reduced congestion, reduced emissions and energy consumption, increased safety, and enhanced efficiency in providing increased capacity. ITS technologies would be crucial to successfully implement any of the pricing strategies discussed in the previous section.

Minnesota Guidestar is the state's Intelligent Transportation System (ITS) program, which is developing better statewide transportation systems for Minnesota citizens and businesses. Guidestar is testing and deploying new technologies that improve the movement of people, goods and services. Its contributing partners include units of government, the private sector and academia. Guidestar bases its efforts on identifying and satisfying the needs of travelers throughout the state; provides the latest and most economical transportation services to people of all incomes; and, invests public and private resources in projects that will result in real environmental, social and economic benefits.

In August 1994, a new work activity was added. Much of the focus of this effort will be on developing the "livable communities" concepts that have been initiated in various parts of the country and emphasized recently by the Federal Transit Administration (FTA). The Community Transportation Design Group (CTDG) offers various implementation strategies that will promote more balanced transportation and land use practices. Initial projects underway are the Hutchinson Project, a bicycle and pedestrian friendly city, and the Cambridge Telework Center design effort. These are good examples of how human-scale transportation applications and advanced technology support systems can be combined to create more livable communities.

Finally, new technological advances in vehicle technology and **alternative fuels** may have a significant role to play in achieving sustainability goals. Alternative fuels have the potential to reduce, if not eliminate, automobile emissions. On March 14, 1996 the United States Department of Energy enacted the final rules on the Alternative Fuel Transportation Program. This rulemaking process was mandated under the Energy Policy Act of 1992 dated October 24, 1992.

As a result of this legislation and associated rulemaking, states are required to purchase set percentages of alternative fuel vehicles. Starting with model year 1997, 10 percent of all light-duty vehicles purchased to be used in state government fleets must be capable of running with the use of alternative fuels. These fuels are considered to be:

- Fuel mixture of at least 85% (by volume) methanol, denatured ethanol, and other alcohols;
- natural gas;
- liquefied petroleum gas (LPG or propane);
- hydrogen;
- coal-derived liquid fuels;
- fuel derived from biological materials (including neat biodiesel); and,
- electricity.

Excluded from consideration in this rule are:

- emergency vehicles;
- law-enforcement vehicles;
- vehicles that the Secretary of Defense exempts for national security reasons; and,
- vehicles, that when not in use, are normally parked at a personal residence of the individual who usually operates it, rather than at a business location.

The rules also have established a program that allows fleets to earn alternative fuel credits for acquiring alternative fuels vehicles earlier than mandated. Mn/DOT has purchased several alternative fuel vehicles to date that would be considered credits. The Central Office motor pool has acquired 22 E-85 (85 percent ethanol fuel) passenger cars and the Metro Division Highway Helper program has acquired 10 propane-fueled highway helper pickups. Mn/DOT is currently examining their alternative-fueled vehicle policy to implement these mandates in a coordinated fashion.

Obviously, these are not all the emerging technologies that promise to have an impact on furthering the goals of a sustainable transportation system. Time does not permit an exhaustive inventory. The technologies discussed above are those that Mn/DOT is currently, or plans in the near future to be involved with, implementing.

## THE ROLE OF RESEARCH AND EDUCATION

Mn/DOT has been an active supporter of transportation and energy-related research. We believe that our efforts and investments will create new knowledge that will lead to better policies, better practices and the better use of technology. The Office of Research Administration under the Transportation Research and Investment Management Division coordinates the overall Mn/DOT research program. Public/private and public/public research partnerships are a growth area in our research program as we seek to improve transportation products and services. Mn/DOT is involved in a significant number of these partnerships, some of which have earned national and international acclaim.

Specific examples of research partnerships include:

- **Enterprise**, a multi-state , public-private consortium focused on Intelligent Transportation Systems (ITS) technology research and development, primarily involving commercial trucking operations;

- **Aurora**, an emerging international consortium of state and federal agencies, Canadian and European governments, and private companies involved in advancement of road and weather information systems for maintenance and driver information applications; and,
- **Northland Transportation Consortium**, a joint effort with the Wisconsin and Iowa Departments of Transportation and the seven research universities in the three states. The purpose of the consortium is to foster additional joint ventures and shared investments between the partners in response to common research issues including sustainability. Participation by other states and Canadian provinces in the multi-state/provincial economic activity area is anticipated.

Education is the final ingredient in a sustainable transportation system. It is vital that communication between transportation providers and agencies with their customers be initiated so that appropriate priorities and policies regarding transportation programs can be established. Education has been identified as one of Mn/DOT's ten strategic directions that were used by the Department to clarify where transportation must go if it is meet customer needs now and into the 21st century. Public involvement and support is crucial to successful implementation of any government program, but particularly so in reaching sustainability goals where potential sacrifices and lifestyle changes must be made by all.

# IV. Recommendations For Mn/Dot Sustainable Development Activities

## 1. COMPLY WITH SUSTAINABLE DEVELOPMENT LEGISLATION IN MINNESOTA

**Minnesota Legislative Act Chapter No. 454, H.F. No. 1800**

*Mn/DOT Lead: Office of Environmental Services*

The 1996 Minnesota Legislature enacted a law which defines sustainable development as follows: *"...development that maintains or enhances economic opportunity and community well- being while protecting and restoring the natural environment upon which people and economies depend. Sustainable development meets the needs of the present without compromising the ability of future generations to meet their own needs."* The act requires the Office of Strategic and Long-Range Planning to prepare a sustainable development planning guide and a model ordinance for use by local government. It also directs the Environmental Quality Board to adopt the principles of sustainable development. The EQB is has accepted the use of the following principles which were initially adopted by the Minnesota Round Table on Sustainable Development:

**Global Interdependence**. Economic prosperity, ecosystem health and social justice are linked and our long-term well-being depends on maintaining all three. Local decisions must be informed by their regional and global context.

**Stewardship**. Stewardship requires the recognition that we are all caretakers of the environment and economy for the benefit of present and future generations. We must balance the impacts of today's decisions with the needs of future generations.

**Conservation**. Minnesotans must maintain essential ecological processes, biological diversity and life-support systems of the environment; harvest renewable resources on a sustainable basis; and make wise and efficient use of our renewable and non-renewable resources.

**Indicators**. Minnesotans need to have and use clear goals and measurable indicators based on reliable information to guide public policies and private actions toward long-term economic prosperity, community vitality, cultural diversity and healthy ecosystems.

**Shared Responsibility.** All Minnesotans accept responsibility for sustaining the environment and economy, with each being accountable for their decisions and actions, in a spirit of partnership and open cooperation. No entity has the right to shift the costs of its behavior to other individuals, communities, states, nations or future generations. Full cost accounting is essential for assuring shared responsibility.

Mn/DOT is directly affected by this act for it also requires that each state department, agency, and board shall report to the Environmental Quality Board (EQB) on how their respective missions and programs reflect and implement the state sustainable development principles, or how they could be changed to do so. Mn/DOT's Office of Environmental Services took the lead in preparing this report for the EQB and it was submitted on January 31, 1997. Copies of the report are available for review and can be obtained by contacting Jerry Larson at 779-5094.

## 2. INTEGRATE SUSTAINABILITY MEASURES INTO MN/DOT'S FAMILY OF MEASURES

*Mn/DOT Lead: Sustainable Transportation Initiatives Section, Office of Advanced Transportation Systems in cooperation with office of Investment Management*

In a report recently issued by the Hubert H. Humphrey Institute at the University of Minnesota entitled "Transportation and Information Technologies for Sustainable Communities Interim Report" the importance of developing sustainability indicators, or measures, is highlighted. They write,"[n]o matter how attractive the concept of sustainable communities may be as a transportation design goal, the concept will only be of practical use if it can be operationalized with specific measures or indicators that can be reliably used to gauge social and ecological carrying capacity over time." Instead, concrete methods must be developed to measure the success of implementing sometimes "fuzzy" sustainable development concepts.

Mn/DOT is in the process of developing Department-wide measures called the family of measures. The Mn/DOT Family of Measures is being used in a number of ways:

- to give us facts on which to base Mn/DOT's key investment decisions;
- to better enable customers and stakeholders to communicate with us about the choices that are made;
- to guide employees and partners in focusing resources on the most important work - those things that are the focus of the measures; and,
- to define gaps between expectations and performance and help us target process improvement areas so that better products and services can be delivered.

In establishing measures, one must first determine what the desired outcome, or goal, is and then determine the appropriate measure which will allow you to know whether the outcome has been achieved. In Mn/DOT's Family of Measures, two outcomes have been established under which sustainability measures could potentially be included. These outcomes are:

- Environment: Mn/DOT is a proactive, responsible environmental steward; and,
- Regional Socioeconomics: Transportation investments will yield the highest possible economic return to the region, tempered by an evaluation of community values and social impacts.

The measures which Mn/DOT has identified for the above two outcomes are:

**Environment:** Number of residents in incorporated areas exposed to freeway and expressway noise exceeding established standards.

Amount of chemicals (salt, herbicides...) used on roadways by Mn/DOT.

Number of wetland areas impacted and replaced by Mn/DOT.

**Regional Socioeconomics:** Number of major investments that have conducted benefit/cost analysis.

Number of major investments that have a positive (greater than 1) benefit/cost ratio.

The Humphrey Institute, in their "Interim Report," identified some measures that may be used to indicate whether sustainable development outcomes were being achieved. Travel accessibility measures were identified as:

- ratio of on-road vehicles to inhabitants;
- peak and average traffic flow levels;
- VMT per capita;
- single occupancy vehicle (SOV) use;
- transit/HOV use; and,
- availability of alternative transportation modes (e.g., pedestrian-friendly streets, bicycle lanes).

Mn/DOT will continue to explore the possibility of incorporating sustainability measures into its Family of Measures.

## 3. IMPROVE THE LINK BETWEEN TRANSPORTATION INVESTMENTS AND LAND USE DECISIONS

*Mn/DOT Lead: Districts/Metro Division in coordination with Office of Investment Management*

The relationship between transportation and land use is very strong. From the earliest settlements, transportation was the primary influence on land use decisions. Today, our mobility affects where we live and work as well as where society locates other human activities. Accessibility has become a key to land use decisions with the highest level of accessibility yielding the most valuable land. This fact directly influences every land use decision made today.

Unfortunately, decisions about land use and transportation are too often made without full recognition of this relationship. Sustainable principles require that decisions about transportation and land use be integrated so the impacts of the decisions can be weighed against the goals of sustainability.

One of the ways in which Mn/DOT can accomplish this is by linking district transportation plans to local land use plans. Mn/DOT's Metro Division was able to make use of land use policies outlined in the Met Council's *Metro Region Growth Management Strategy* plan to establish transportation investment goals for the metro area. Not surprisingly, outstate districts are faced with different land use goals and policies than those found in the seven county Minneapolis-St. Paul metropolitan area (TCMA).

Land use and transportation investment decisions made in rural districts often are concerned with maintaining long term, small-community economic viability. Often these decisions are presented as economic development options. Tax base and employment are seen as critical needs contributing to sustainability. The six metropolitan areas outside the TCMA, in addition to counties attractive to retirees and vacationers, are experiencing significant growth. As this continues, land use decisions will have a tremendous impact on the sustainability of transportation systems. There is room for significant improvement in the coordination of land use and transportation investment decisions both within the TCMA and in the larger regional framework.

Mn/DOT's Metro Division recently completed their *Transportation System Plan* connecting division transportation goals and priorities to the Metropolitan Council's *Metro Growth Management Strategy.*

The regional growth management strategy adopted by the Metropolitan Council identifies an urban growth and development pattern for the region, supported by guiding principles of incentives and pricing mechanisms, rather than government regulations, to carry it out. The plan includes an urban growth area, a rural area, and subareas within them.

The Metropolitan Council's Transportation Policy Plan's five strategies, listed below, support this plan:

1. **Reduce Travel Demand**

2. **Increase Transportation Capacity Through Better System Management**

3. **Replace and Improve the Existing Highway System**

4. **Improve the Transit System**

5. **Expand Highway Capacity**

These policies are supported by the *Transportation System Plan* (TSP) developed by Mn/DOT's Metro Division. The TSP's direction is laid out in a set of four Goals and three Objectives, which

reinforce and support the land use and development goals of the Metropolitan Council while guiding planning for future transportation investments.

## Plan Goals

Four transportation system investment goals have been established. The goals are listed in order of importance to emphasize the Metro Division's desire to preserve and manage the existing system prior to improving or expanding it. This means the Metro Division will invest its resources to first fully-preserve and fully-manage the existing system and then invest the remaining resources in improvement and expansion of the highest priority segments of the system.

*Preservation* — The Metro Division places the highest priority on the use of resources to preserve the existing transportation system.

*Management* — The Metro Division places the next highest priority on the use of resources to manage the existing transportation system to optimize system and corridor safety and capacity.

*Improvement* — The Metro Division places priority on the use of resources to improve and replace existing corridor elements.

*Expansion* The Metro Division places priority on the use of resources to increase the capacity of (expand) the existing transportation system.

### Plan Objectives

The following three plan objectives outline what the Metro Division hopes to accomplish in the long-term within the framework of the plan goals of *preserve, manage, improve*, and *expand.*

(1) To identify and address current and projected (2020) congestion, the use of multiple modes, and deficiencies in safety and infrastructure.

(2) To align roadway jurisdictional classification (which indicated ownership of the roadway) with functional classification (which indicates the function the roadway performs).

(3) To conduct access management to provide for safe, efficient operation of the roadway system.

## 4. PARTICIPATE ACTIVELY WITH SUSTAINABLE DEVELOPMENT INTERAGENCY WORKING GROUP

*Mn/DOT Lead: Office of Environmental Services*

Mn/DOT is a participating member of the Sustainable Development Interagency Working Group. This group was formed under the initiative of Edward Garvey, Director of the Office of Environmental Assistance, and Rod Sando, Commissioner of the Department of Natural Resources.

The group was formed to move the sustainable initiative forward within agencies of the state of Minnesota. The Minnesota Round Table on Sustainable Development is composed of Minnesota Citizens. Agencies are not present or represented on the Round Table. There may be many things

which state agencies can do either independently or working cooperatively to advance the cause of sustainable development. By coming together periodically to share information, each participating agency can learn from others how it can possibly integrate sustainable development principles or practices into everyday activities of the agency.

## 5. ESTABLISH A STATEWIDE ACCESS MANAGEMENT PROGRAM

*Mn/DOT Lead: Engineering Services Division*

Access management is a comprehensive approach for improving traffic operations by attempting to balance the movement (flow of traffic) and access (ability to enter the system) functions. In broad context it is resource management since it is a way to anticipate and prevent congestion. It accomplishes this balancing act by managing the location, design, and operation of driveways, median openings, and street connections to a roadway.

As noted elsewhere in this report, most transportation organizations, such as Mn/DOT, have very little control over land use and development. However, a comprehensive access management policy can advance growth management objectives. The National Cooperative Highway Research Program, in a recently released report entitled, "Land Development Regulations that Promote Access Management" stated that;

> "Discouraging urban sprawl, maintaining roadway level of service, protecting community character, and coordination and consistency of land use and transportation decisions are areas where access management and growth management converge. For example, access management can be facilitated through land use strategies that discourage strip development and promote clustering of land uses into unified developments with shared access systems. These same techniques address some defining characteristics of sprawl, strip development and inadequate connectivity among land uses."

Mn/DOT recently sponsored an Access Management Workshop to which various transportation professionals from around the state were invited. The workshop identified several objectives for Minnesota that implementation of an access management program would help to meet. They are:

- Recapture of roadway operating capacity to avoid the need for construction investment;
- Improve roadway operating capacity with minimal right-of-way investment;
- Increase roadway travel speeds, reduce travel times, and increase the effective marketing areas for adjacent businesses;
- Prolong the effective operating life of existing highway systems (makes current capital available for other transportation needs); and,
- Protect existing and proposed highway corridors from the impacts of land use change.

Input gathered from the workshop participants, solicited in facilitated breakout sessions to which all attendees were invited, will be used to develop alternative proposals which will be evaluated as Mn/DOT establishes a statewide access management program. This initiative is currently underway and is expected to have completed its report and recommendations for statewide access management policy by January 1, 1999.

## 6. REVIEW TRB REPORT ON SUSTAINABLE TRANSPORTATION

*Mn/DOT Lead: Office of Environmental Services*

The Transportation Research Board is currently conducting a study on transportation and a sustainable environment. It is expected that this study will generate greater understanding within the U.S. transportation community of the concept of sustainability and define areas of common ground among public interest groups, environmental groups, and transportation professionals. This should foster the development of more realistic, pragmatic priorities for guiding the process by which the U.S. transportation community addresses sustainability. The committee met for the first time in November 1995 and is scheduled to publish its final report in the summer of 1997.

Mn/DOT will review the report upon its publication and take into consideration at that time any recommendations or policies advocated by the TRB.

## 7. DEVELOP ALTERNATIVES FOR SUSTAINABLE TRANSPORTATION

*Mn/DOT Lead: Office of Advanced Transportation Systems*

In September of 1994 a number of alternative transportation program activities including bicycling, walking, telecommuting and public transit technology initiatives came together in what is now called Sustainable Transportation Initiatives (STI) within Mn/DOT's Office of Advanced Transportation Systems (MN. Guidestar--ITS Program). The recent work of Mn/DOT's Sustainable Development Task Force sets up an opportunity to carry on elements of the Task Force's focus through the mission of STI. Outlined below are specific work elements that are helping to build sustainable and intermodal transportation systems that integrate bicycling, pedestrians, and teleworking with traditional transportation.

- Establishing Actual Models for Innovation

- A citizen driven transportation planning process for Cambridge, Minn. Early results at the local level suggest this, Transportation Action Model, could have wide application for rural community and neighborhood use. It has been designed to foster a partnership with transportation planners and their local and regional stakeholders.

- The Hutchinson "light" Traffic Plan portrays actual networks and facility concepts that have been supported out of a community-wide house-hold survey. Bicycle, pedestrian and local transit elements combine to "model" transportation features other communities could consider.

• Deploying Modal Elements and Delivering Statewide Technical Assistance

• Implementing actual telecommuting programs for Mn/DOT and other state agency employees that include both telework centers and home-based applications.

• Continue to foster and deliver bicycle facility design training and project promotion in partnership with local interest groups, transportation planners, the State Bicycle Advisory Committee, and Mn/DOT District staff.

• Carry-out the Strategic Plan elements that tie Intelligent Transportation System's research, testing, and deployment to sustainable transportation advances. Specific focus could be placed on project concepts that reduce single vehicle occupancy (SOV) use, increase transit/HOV use, and establish emissions management tools that would provide an information source for sustainability measurement.

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# Appendix

## INVENTORY OF SUSTAINABLE INITIATIVES

# MINNESOTA DEPARTMENT OF TRANSPORTATION
# ENVIRONMENTAL INITIATIVES FOR SUSTAINABILITY

May 1996

Environmental stewardship is an integral part of the activities of the Minnesota Department of Transportation (Mn/DOT). Recognized by the Federal Highway Administration (FHWA) as one of the most environmentally sensitive transportation departments in the nation, Mn/DOT has been awarded numerous national, state, and local honors for our environmental activities. The following are some of the environmentally related initiatives undertaken by the department:

**Landscaping** - Through contract installation, partnerships, and our own maintenance forces, Mn/DOT has planted an average of over 80,000 trees/shrubs, and over 10,000 wildflowers/perennials per year for the last five years.

**Landscape Partnerships** - Mn/DOT offers technical and financial assistance to communities that want to install and maintain entrance landscape plantings on state highway rights-of-way. In five years over 130 roadside landscape projects have been cooperatively developed with the assistance of nearly 8,000 volunteers.

**Native Vegetation** - Native plant communities on MN/DOT right-of-way have been inventoried and construction impacts to native vegetation are avoided or minimized. Mn/DOT replants a significant portion of new construction with native vegetation, such as prairie species.

**Wildflower Routes** - Six "Wildflower Routes" have been dedicated in Minnesota. They consist of over 400 miles of roadsides with exceptional displays of native wildflowers growing naturally. Several more routes may be dedicated in the next few years. T.H. 75 is a possible "International Wildflower Route" extending from Canada to Texas.

**Prairie & Roadside Corridor Enhancement** - Also referred to as "biodiversity corridors," these cooperative projects with the Nature Conservancy, Minnesota Department of Natural Resources (Mn/DNR), Pheasants Forever, and counties, involve connecting large nature preserves adjacent to highways with 1/4 mile wide corridors of native vegetation.

**Integrated Roadside Vegetation Management** - A roadside management program to reduce the maintenance cost of roadside vegetation and reduce herbicide use by replanting and managing native vegetation.

**Deer Reflectors** - The department has installed red reflectors along roads in high deer-kill areas to reduce the number of vehicle-deer collisions. This cost-effective safety measure generally pays for itself in 1-2 years by reducing accidents.

**Nesting Boxes** - Nest boxes for species of special concern have been installed on or in highway fenceposts (bluebirds) and on the backs of traffic signs (kestrels) in a successful effort to expand species numbers.

**Hazardous Waste Management** - The department has committed significant resources to develop, implement, and maintain the department's waste management program (central office staff and district waste management coordinators). Two environmental professionals have become Certified Hazardous Material Managers. (CHMM) To our knowledge, these are the only CHMM's within the Minnesota State Government.

**Hazardous Waste Reduction** - The department has successfully reduced the total amount of hazardous waste generated by our operations, an estimated 30% to 40% over the last four years. Continued reduction is expected.

**Pollution prevention** - The department has eliminated lead and chrome in its road striping paints and drastically reduced the amount of solvent used in road striping operations and 1,1,1 - trichloroethane used in the materials laboratory. A study of maintenance shop sorbents has been completed. As a result the department no longer landfills petroleum soaked sorbents. All sorbents are now sent to companies which use the material as fuel.

**Wetland Banking** - In 1983 the department started a wetland banking program, in cooperation with the Department of Natural Resources (Mn/DNR) and the U. S. Fish and Wildlife Service. To date approximately 1800 acres of wetlands have been created, restored or enhanced to offset approximately 500 acres of wetland impacts. Approximately 200 net acres are currently in the bank. The Department has programmed for FY 1997 $1 million dollars.

**Cooperative Research** - Current investigations with UM include investigating salt tolerance of short stature native grasses, establishment of sedges, and other wetland vegetation in created wetlands, and reestablishment of naturally occurring soil fungi in native plant community restorations.

**Biotechnology** -Mn/DOT excavates thousands of cubic meters of petroleum contaminated soil annually during fuel storage tank removal operations and highway construction. The Office of Environmental Services developed a method to treat petroleum contanimated soils. The technique, based on composting, reduces treatment costs as compared to other methods and results in a usable top soil amendment for highway construction projects.

The U.S. Environmental Protection Agency (EPA) expressed much interest in Mn/DOT's treatment process. With a grant from the EPA, Mn/DOT completed a field research evaluation of the composting technique. The EPA has distributed Mn/DOT's compost treatment design and has retained Mn/DOT staff to provide training in compost operations for state environmental regulators across the country.

## Mn/DOT ENVIRONMENTAL INITIATIVES
## ( Continued - Page 3)

Another ongoing biotechnology project is trying to develop a "bio-herbicide" for treating Canada Thistle.

**Deicing Salt Reduction** - The department conducts extensive research into alternatives for winter deicing, such as Calcium-Magnesium Acetate, and measures to reduce current salt usage, such as salt pre-wetting, liquid salt application, calcium chloride use, and improved snow plowing equipment.

**Winter Maintenance** - Recognizing the corrosive and environmentally damaging nature of winter deicing salt, department maintenance forces have been going on a "reduced salt diet." Equipment and procedural improvements have resulted in lower salting rates while maintaining public safety. Understanding the groundwater contamination potential of salt storage, all salt stockpiles are stored indoors. Runoff collection systems are being installed around salt and sand stockpiles and truck washing areas. Maintenance yard housekeeping practices are designed to minimize salt brine runoff.

**Erosion Controls** - The Department has had an extensive erosion control effort in place for many years. Included in this effort is training for design and construction personnel, preparation of erosion control plans on every project, development of erosion control specifications and Standard Plan Sheets, and joint workshops sponsored by Mn/DOT and the Associated General Contractors. Mn/DOT specifications and standard plan details are commonly referenced on county, municipal, and private construction projects.

**Storm water Management** - The control and detention of Storm water is a major component of highway construction, particularly in urban areas, and is necessary to reduce flooding, erosion, and water pollution. Highway drainage systems are often constructed as joint developments with local units of government. Entering into cost-share agreements reduces the economic and environmental costs of constructing and maintaining dual drainage systems.

**Bridge Runoff Controls** - Where possible, stormwater runoff from bridge decks is not directly discharged into water bodies. Runoff is directed off the ends of the bridges so overland flow can remove some pollutants and there is an opportunity to contain the runoff of any accidental spills.

**Noise Monitoring** - Existing noise levels are monitored for use in noise impacts analysis for transportation projects, special studies such as barge fleeting operations, and development of noise mitigation designs for highway projects.

**Noise Walls** - Highway noise at adjacent receptors is reduced through the construction of noise walls and berms, use of noise reducing landscape materials, and design of depressed

highway corridors in developed areas. Mn/DOT has one of the most extensive noise wall systems in the nation.

**Historical Preservation** - The department has funded the restoration of historic sites, such as the James J. Hill House, Commandants House at Fort Snelling, and Stone Arch Bridge through the Great River Road and ISTEA Enhancement programs.

Archaeologic / Historic Surveys - The department conducts surveys to determine if transportation projects impact any archaeological or historic sites, as per the Memorandum of Agreement with the Minnesota Historical Society. Measures are then taken to avoid, minimize and/or recover the information contained at the site.

**Visual Quality /Aesthetics** - Mn/DOT has developed a nationally recognized process to analyze transportation projects by reviewing the visual characteristics and relationships of all the components imposed on the landscape. This gives the designer the opportunity to create or add a sense of beauty to an environment created through engineering , science, technology, and architecture. Computer photo-simulation and artist renderings are used to review and explore alternative designs.

**Design Considerations** - Structures such as bridges, retaining walls, noise walls, and buildings are designed so that they are integrated with the physical and visual environment of the corridor and it's adjacent land use. The I-94 Capital Commons area and the award winning I-35 in Duluth are examples of these efforts.

**Joint Development and Amenities** - Roadside enhancements along highways in areas of scenic or recreational interest are promoted by jointly developing rest areas, scenic overlook, walkways, and urban parks. TH 61, Baptism River Rest Area is a recent example of the cooperative effort of Mn/DOT and the Mn/DNR. A similar effort is currently underway at Gooseberry State Park and TH61.

**Enhancements** - The 1991 Federal Transportation Bill (ISTEA) sets aside funds for transportation enhancements. Specifically, projects for pedestrians, bicycles, historic preservation, landscaping, scenic byways, control and removal of outdoor advertising, archeological planning and research, preservation of abandoned rail corridors, and water pollution control are eligible.

**Scenic Byways** - A route designation program intended to highlight outstanding scenic roads that enhance the travelers enjoyment, appreciation, and understanding of Minnesota's unique landscapes as well as the excellent natural, cultural, historical, archeological, and recreational resources. 1822 miles have been designated to date.

## MN/DOT ENVIRONMENTAL INITAITIVES
## (Continued - Page 5)

**Great River Road (GRR)** - The Great River Road is a 3,00 mile network of federal, state, and local roads on both sides of the Mississippi River, from Canada to the Gulf. Mn/DOT implemented both the 430 mile National Route and the 755 mile State Route. Together, they provide 1,185 miles of scenic, historic, and recreational opportunities for the traveler in Minnesota.

**Natural Preservation Routes** - Existing or proposed county state-aid highways that possess unique scenic, environmental, or historical characteristics may be designated by the Commissioner upon petition of a local county board. Examples may include roads along lakes, rivers, wetland, or through forests or rough terrain where designation permits design and construction with less environmentally intrusive standards.

**State Entrances** - The State Entryways Rehabilitation Program is an effort to improve our state's "Welcome" to travelers coming into Minnesota. The 67 trunk highway and interstate entries into Minnesota have been given special attention by MN/DOT since the 1930's. The condition of these elements has deteriorated over the years calling for a need to evaluate and rehabilitate many of the entryway sites.

**Junkyard Screening** - The department administers a junkyard program which includes screening or removal and relocation of nonconforming junkyards on interstate and trunk highways.

**Billboard Control** - Mn/DOT Coordinates and monitors an ongoing outdoor advertising program associated with interstate and trunk highways in order to reduce visual clutter within the highway corridor.

**Air Quality** - The department actively promotes alternatives to single passenger automobile use, such as car pools, transit, bicycles, and walking, as a means to improve regional air quality. Partnerships have been developed with the MPCA and Met Council to implement congestion management practices such as ramp metering, preferential high occupancy vehicle lanes, use of roadway shoulders, incident management strategies, and enhanced information on traffic conditions to help safely accommodate traffic and reduce air quality emissions and energy consumption.

**Hutchinson Project** - The goal of this pilot project is to develop a model community network of safe and attractive bicycle and pedestrian ways combined with transit services. Started in 1993, the project is a joint effort of the city of Hutchinson, the Finnish National Road Authority, FHWA, and Mn/DOT.

**Bikeways** - For twenty years Mn/DOT has had a program to integrate safe, efficient, and accessible bicycle travel facilities into the state's roadway network. The Bicycle System Plan highlights major bicycle corridors and identifies priorities for improvements. The Bicycle Transportation Plan identifies and prioritizes those trunk highway sections in need of bicycle

related improvement.

**Rails to Trails** - A cooperative interagency effort between transportation agencies, the Legislative Commission on Minnesota Resources, the Mn/DNR, and the Metropolitan Council developed a process for preserving abandoned railroad lines for future public use . Several Projects are currently underway.

**UPDATE ON: MINNESOTA DEPARTMENT OF TRANSPORTATION'S COMMITMENT TO WASTE PRODUCT UTILIZATION**

Efforts to phase out the environmentally and economically costly practice of landfilling have stimulated the pursuit of non-landfill disposal or reuse of waste products. Due to the continuous and high volume of materials it requires, the highway industry is often looked upon as a potential consumer of waste products. Since most transportation network construction in Minnesota is done under specifications drafted by the Department of Transportation (DOT), the DOT has been sought to define uses for several waste products. The following is a partial listing of waste products and Mn/DOT activities to develop their use:

**PRODUCT: Sewage Sludge Incinerator Ash**

The two plants operated by the Metropolitan Waste Control Commission (MWCC) produce 21,000 tons per year of dry sewage sludge incinerator ash (2). This ash is presently stockpiled. The Minnesota Pollution Control Agency (MPCA) has issued a permit, No. SW-292, which allows for the use of ash as an admixture to asphalt or other preapproved commercial product.

**- Mn/DOT Activity**

Mn/DOT investigation of using sludge ash as a mineral filler in asphaltic concrete began in 1982. A report documenting lab testing was presented at the Transportation Research Board annual meeting in 1988. While addition of 3% by weight sludge ash displayed slight stiffening of the asphalt concrete mixture, lab results commanded the need for long-term field evaluations. While the MPCA permit governed present activities, prescribing liability should the environmental standards become more restrictive in the future delayed the placement of field test sites. Legislation in 1989 revitalized the project by directing the MWCC and Mn/DOT to conduct field tests with the State assuming any and all liability. One field site was constructed in 1989, further test sites are being selected for construction in 1990.

**PRODUCT: Waste Tires**

Approximately 4,000,000 tires are discarded annually in Minnesota. The legislature prohibited landfilling waste tires in 1985. The majority of waste tires now collected or removed from dumps are burned as tire derived fuel (TDF). Some have been used as lightweight fill material for road embankments. Emission concerns compel the MPCA to not promote TDF as the long term solution and laboratory leachate analysis has constrained the use of waste tire lightweight fills to include only above water table applications.

**- Mn/DOT Activity**

Past research has included the use of asphalt-rubber in interlayer, sealcoat, crack sealing and asphalt concrete systems as well as the use of a patented rubber-modified asphalt concrete, Plus-Ride. Any benefits observed from these tests did not appear to justify the increase in costs. Present activities include further analysis of the lightweight fill concept, cultivating uses for tire bales, aiding Hennepin County's efforts to construct a non-patented rubber-modified asphalt concrete overlay and a joint effort with the MPCA and the Department of Natural Resources to

develop a similar paving mix with higher percentages of reclaimed rubber suitable for jogging and bike paths.

**PRODUCT: Municipal Incinerator Ash**

There are twelve municipal/county trash incinerators in Minnesota, over one hundred operating nationally (3) and more are being proposed. These incinerators reduce the waste stream volume and often generate electricity. Each incinerator has a unique and seasonally variable waste stream, employs different equipment and creates both stack ash and bottom residue. Therefore, the implications and merits of using a certain incinerators residue (stack ash, bottom residue or combined; treated or untreated) must be analyzed separately.

**- Mn/DOT Activity**

The DOT was contacted by the Legislative Commission on Waste Management (LCWM) in December of 1988 to provide its expertise toward the utilization of incinerator ash products as a construction material. An LCWM technical committee, including the MPCA, Mn/DOT and several incinerator owner/operator agencies, developed a pilot study project. The pilot project will assess the environmental and physical viability of using treated/pelletized ash from the Hennepin County incinerator in a bituminous mixture. The MPCA is now developing a permit for this pilot project which includes an aggregate/bituminous mixture testing protocol provided by Mn/DOT. As this project progresses, Mn/DOT has committed to appraise the data from the aggregate/bituminous mixture testing, assist with review of the construction and provide some long term testing, evaluation and documentation.

**PRODUCT: Waste Roofing Shingles**

Organic and fiberglass shingles, the two types presently produced in the United States, contain approximately 30% and 19% asphalt cement, respectively. The remainder is primarily filler and granular material with a small percentage of mat or felt. Due to the production of ends of runs, samples, off color shingles and tabs, approximately 5% of the 9,500,000 tons of shingles produced annually in the U.S. are scrap which require costly disposal. Disposal of old removed shingles, which may contain 30% asphalt cement, is also of concern (5).

**- Mn/DOT Activity**

Mn/DOT has been presented samples from two local shingle manufacturers to investigate their use in an asphalt cement concrete. The percentage of asphalt cement in the material would be economically beneficial, however the presence of organic material (recycled paper and pulp wood) may promote moisture/frost damage. Continued lab evaluations are planned coupled with contacting other agencies conducting similar research.

**PRODUCT: Coal Fly Ash**

Generating electricity from a coal fired plant also produces coal fly ash. While some fly ash is suitable for use as an admixture in portland cement concrete, other fly ashes are not acceptable for this use. These coal fly ashes can be employed as binder in soil stabilization.

**- Mn/DOT Activity**

Northern States Power (NSP) has approached Mn/DOT with the hopes of establishing a market for coal fly ash in soil stabilization. Although common in some areas of the U.S., soil stabilization is not widely used in Minnesota. However, Mn/DOT has offered to help NSP formulate and implement a research and development proposal.

**PRODUCT: Coal Boiler Slag**

Another by product from generating electricity from coal is boiler slag. Coal boiler slag is a dark pumice-like coarse sand. It has been used as a sand replacement for road de-icing. The Illinois Department of Transportation has successfully used the material as the cover aggregate for an asphalt seal coat.

**- Mn/DOT Activity**

Mn/DOT has offered to assist NSP with producing a study of uses for this product. Developing an asphalt concrete paving mixture for placement and evaluation at one of NSP's facilities is being considered.

**PRODUCT: Waste Glass**

The Metropolitan Transit Commission (MTC) generates tons of broken, non-recyclable bus windshield/window glass each year. The MTC regards Mn/DOT as a potential consumer.

**- Mn/DOT Activity**

Although no research is underway at Mn/DOT, contacts with other states with some background in waste glass usage are being established.

**PRODUCT: Used Paint Sand Blasting Grit**

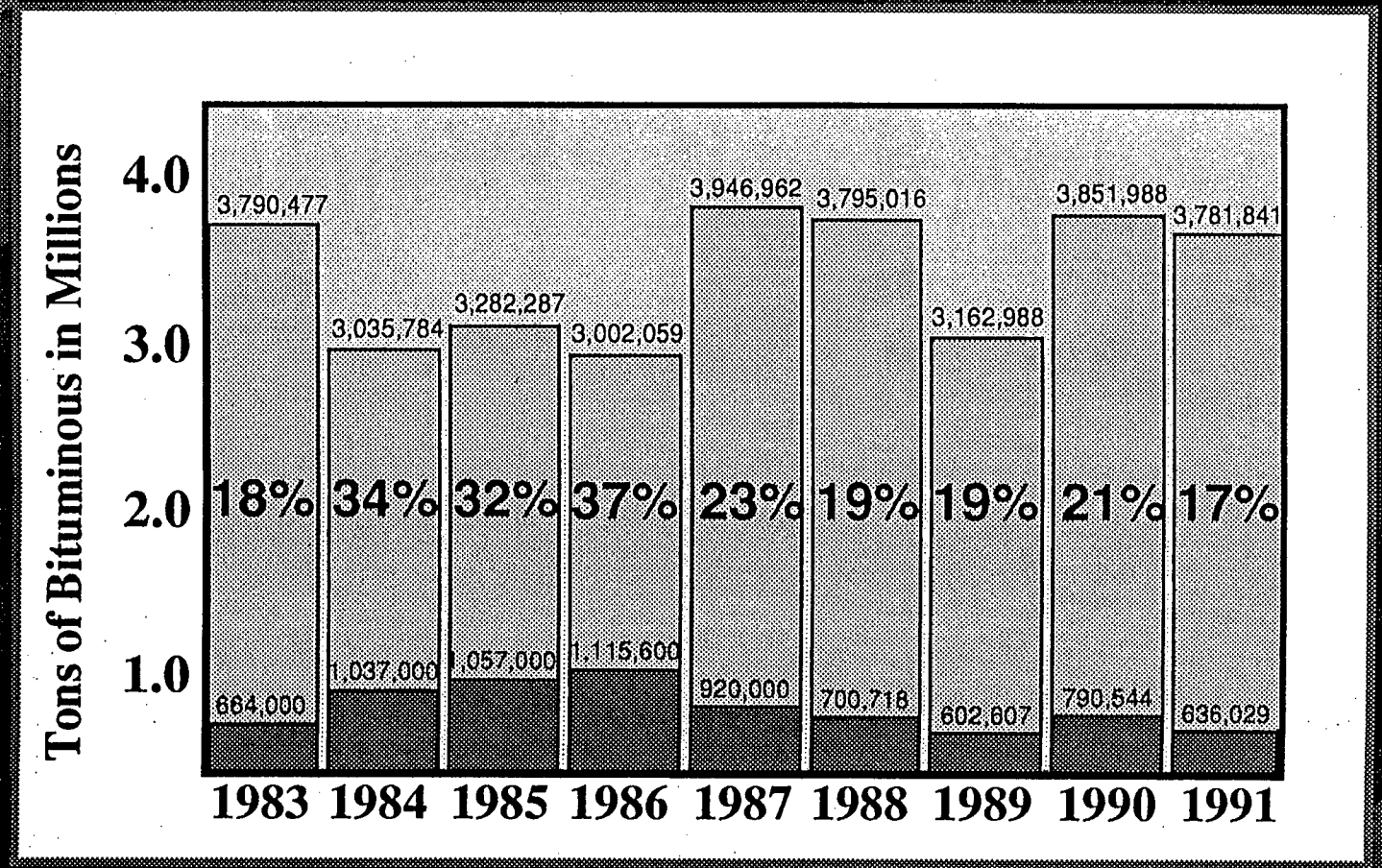
The disposal of used sand blasting grit is an obstacle due to the chemicals/materials in the removed paint.

**- Mn/DOT Activities**

Working with a consultant, Mn/DOT has obtained an MPCA permit for a test project for the use of used sand blasting grit as a portion of an asphalt cement concrete roadway.

The Minnesota Department of Transportation is committed to assist, whenever our technical expertise and resources allow, in the utilization of waste products as construction materials.

# Tons of Bituminous Paved/Salvaged



# Waste Products Recycled

- Rubber Tires
  - Crumb Rubber
  - Chunked Tires
- Sludge Ash
- Roofing Shingles
- Garbage Ash
- Glass

# Concrete – Recycled

- Remove Inplace Pavement
- Crush - Screen
- 60% Recycled
- Size Dictates Usage
- Aggregate Problem
- Marketplace

# MINNESOTA DEPARTMENT OF TRANSPORTATION
# FREEWAY OPERATIONS PROGRAM
## Status Report - January 1996

**CONTROL FACILITY:** The Mn/DOT Traffic Management Center (TMC) is the operations center for managing freeway traffic in the Twin Cities Metro Area. The TMC was constructed and opened in 1972 as part of the I-35W Urban Corridor Demonstration Project. The TMC is located at 1101 4th Avenue South, Minneapolis, MN 55404, and the phone number is (612) 341-7500.

**RAMP METERS:** The TMC currently operates 398 ramp meters with 345 of them centrally controlled (on-line) by the TMC's mainframe computer and 24 isolated (stand-alone). By the end of 1998, a total of 490 ramp meters will be in operation, all on-line to the TMC.

**CLOSED CIRCUIT TV:** There are 156 CCTV cameras located along segments of the freeway system. Plans call for a total of 180 cameras by the end of 1995. CCTV cameras along I-94 between the Minneapolis and St. Paul CBDs are mounted on top of tall buildings. Video signals from these cameras are transmitted to the TMC via microwave. More than a hundred cameras are connected to the TMC with fiber optic cable and the others with coaxial cable. All cameras connected to the TMC with coaxial cable will be changed over to the fiber optic communications network within the next five years.

**CONTROL ROOM REDESIGN:** A redesign of the control room at the TMC was completed in late 1990 with additional changes made in December 1992. The new design includes two independent operator stations, a radio announcer station, an information officer work station, computer graphics terminals, and a large screen for map display. Each operator station has 24-17 inch monitors, and computer terminals with graphics capabilities to control on-line ramp meters and changeable message signs (CMSs). The Mn/DOT Traffic Radio broadcaster station currently has a bank of 128 nine-inch monitors. The information officers utilize a variety of audio communications equipment for additional monitoring of traffic and weather conditions. A large computer generated map displays real time traffic conditions on the Metro Area freeway system. With continued rapid deployment of traffic management systems, another redesign of the control room is underway.

**CHANGEABLE MESSAGE SIGNS:** There are currently 51 CMSs in operation and an additional five CMSs will be in operation by the end of 1995. Mn/DOT currently uses the six-sided rotating drum type sign, but recognizes the need for more flexible message capability, and is currently analyzing new technology for accomplishing this.

**HIGH OCCUPANCY VEHICLE (HOV) FACILITIES:** Mn/DOT currently operates 38 HOV ramp meter bypasses as an incentive for carpool, vanpool, and transit use in accessing the freeway system. Forty additional bypasses will be added by the end of 1995.

I-394, an HOV facility between the Cities of Wayzata and Minneapolis, opened in October 1992. I-394 is a six-lane radial freeway with 16 HOV only access ramps, three miles of reversible HOV lanes, and eight miles of concurrent (diamond) HOV lanes. Seven of the ramps provide direct access to the reversible HOV

lanes between the Minneapolis CBD and TH 100. The other nine ramps are meter bypass ramps. During the AM peak period (6 - 10 AM) there are 106 inbound buses carrying over 3400 passengers. There are nearly 1600 vehicles using the HOV lanes during the A.M. peak hour (7 - 8 AM), carrying approximately 50% of the inbound people.

Mn/DOT is providing other incentives to promote the use of I-394 HOV facilities. Three parking garages with direct access from I-394 are located on the fringe of the Minneapolis CBD. Registered carpools are able to park there for $25/month while others pay $90/month. There are 5923 spaces available in three garages, and over 1900 spaces are occupied by registered I-394 HOVs. Other incentives include seven remote Park-and-Ride lots and timed transfer stations for public transportation. There are 1021 spaces available at Park-and-Ride and time transfer stations, of which 677 or 66% are used on an average weekday. The I-394 HOV facility evaluation period began in 1992 will be completed spring 1995.

**TEAM TRANSIT:** Team Transit is an interagency, cooperative effort to improve service to HOV and transit facility users. Team Transit projects are usually low cost enhancements to the existing transportation infrastructure. Project types include converting freeway shoulders to bus lanes, developing ramp meter bypasses, and permitting shoulder use to bypass queues at traffic signals.

**"HIGHWAY HELPER" PROGRAM:** The Highway Helper program was initiated in December 1987 to remove stalled vehicles from the roadway, assist stranded motorists and aid the State Patrol with incident management. Management of the program was transferred to the TMC in March 1993. Six heavy duty pickup trucks patrol 70 miles of the most congested freeway segments from 5 AM to 7:30 PM Monday through Friday. Each month the Highway Helpers assist at approximately 1064 incidents (177 per route) and remove 44 vehicles from traffic lanes. During the first year of management under TMC the program assisted 12,800 motorists. The estimated annual benefit of the program due to reduction in congestion is $230,000 per route. The program cost is approximately $98,000 per route per year. A pilot project involving private tow truck operators led to a Metro wide freeway policy where tow truck operators are directed to an accident scene by the State Patrol dispatcher immediately, rather than waiting for a trooper to verify a tow is needed. The pilot project was successful, reducing response and removal time by 20 minutes. Funding for an AVL system was recently approved, and the system should be operational spring 1995.

**MOTORIST INFORMATION PROGRAM:** Mn/DOT is currently in the sixth year of a contract with the Minneapolis Public Schools (MPS) to provide a Traffic Radio service for the Twin Cities Metro Area. The MPS public radio station (KBEM, 88.5 FM) is used to provide live traffic reporting weekdays during peak traffic periods, broadcasting a two to three minute report every ten minutes. During major incidents, motorist information is broadcast continuously and drivers are alerted by signs and flashers to tune in to the Traffic Radio station for live reports. Twenty-seven Traffic Radio signs and all of the 49 CMSs can be individually activated from the TMC for this purpose.

A Cable TV Traffic Channel has been operational for 20 months, utilizing channel 42B on the Minneapolis Paragon Cable system. The broadcast includes a real-time graphics map showing traffic flow conditions on all of the currently instrumented freeways, videotext providing lane control information and other public service announcements, and live video from on-line CCTV cameras. The audio feed is supplied by KBEM, 88.5 FM, and during peak periods includes the Traffic Radio broadcasts. Wider circulation of this motorist aid is being pursued with other cable companies.

**VIDEO IMAGE VEHICLE DETECTION:** A system of 39 Autoscope cameras has been installed on a three mile section of the I-394 corridor to serve as a live laboratory for measuring volume, lane occupancy, speed, headway and vehicle classification utilizing video imaging technology. The primary purpose of the system is for testing and calibrating an automatic incident detection system and studying traffic flow characteristics. Mn/DOT is currently integrating the autoscope data into the existing loop detector system for purposes of calibration and use in ramp metering algorithms. Evaluation of this system should be completed later this year.

**IVHS OPERATIONAL TESTS:** The TMC's principal involvement with IVHS technologies is with Advanced Traffic Management and Traveler Information Systems. The TMC is currently participating in several federally funded Operational Tests administered through the Minnesota Guidestar Program. Principal involvement is with the Integrated Corridor Traffic Management (ICTM), Trilogy, Genesis, and Travlink operational tests. ICTM and Trilogy are managed by TMC personnel.

The ICTM project is being implemented along a 7.9 mile segment of I-494. The objective is to improve the efficiency of traffic movement throughout the corridor, on the freeway, adjacent and intersecting arterials. This objective will be achieved by integrating freeway and arterial traffic control devices in an adaptive traffic control environment, developing unified traffic control strategies through interjurisdictional cooperation, implementing an incident management plan, and a comprehensive motorist information program.

Mn/DOT is currently conducting three pilot tests of the Radio Broadcast Data System technology. The project is called Trilogy. The pilot tests have determined the feasibility of sending and receiving digital traffic information. Users may receive information graphically, by synthesized voice, and text. The Trilogy Project recently received federal funding for an operational test of en-route driver advisory systems including Radio Broadcast Data System-Traffic Message Channel, FM Subsidiary Carrier Authorizations, and 220 MHz transmission systems and various receivers. The objective is to determine the effect of this type of motorist information tool.

The Travlink and Genesis operational tests also involve TMC resources, but to a lesser degree than ICTM and Trilogy. Travlink is an operational test of Advanced Public Transportation Systems using an Automated Vehicle Location System with a traveler information sub-system. Travlink will get traveler information from the Genesis operational test which will provide real time traveler information to personal communication devices.

Travlink will test the impacts of various advanced traveler information and AVL systems on transit ridership and traveler behavior. Audio and videotext services will deliver real-time transit schedules and traffic information. This information will be available through kiosks at shopping malls and transit stations, and from terminals located at work locations and home. AVL technologies will be used as an input to real-time transit information services and as a fleet management tool.

**RESEARCH AND DEVELOPMENT:** In addition to the IVHS operational tests, the TMC conducts a traffic management research and development program. This program includes evaluation of HOV facilities and programs, incident management research, new product evaluation, traveler information research, simulation and modeling, and traffic management studies.

**SYSTEM BENEFITS:** The following highway user benefits are from the I-35W project between downtown Minneapolis and Burnsville, and are typical of other large systems:

- Roadway capacity increased from 1800 to 2200 vehicles per hour per lane.
- Peak period speeds increased 35% from 34 to 46 mph.
- The number of peak period accidents decreased 27%, from 421 to 308 per year.
- Peak period accident rates decreased 38%, from 3.40 to 2.11 accidents per million vehicle miles traveled.
- Peak period fuel consumption was reduced by one million gallons per year.
- Peak period air pollutant emissions (carbon monoxide, hydrocarbons, and nitrogen oxides) were reduced by four million pounds per year.
- One million dollars a year in road user benefits are attributed to reduced accidents and congestion.

CHAPTER No. 454
H.F. No. 1800

# AN ACT



relating to local government; requiring a sustainable development planning guide and a model ordinance to be developed for local government use by the office of strategic and long-range planning; directing the environmental quality board to adopt principles of sustainable development; requiring reports; proposing coding for new law in Minnesota Statutes, chapter 4A.

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF MINNESOTA:

Section 1. [4A.08] [SUSTAINABLE DEVELOPMENT FOR LOCAL GOVERNMENT.]

Subdivision 1. [DEFINITIONS.] (a) "Local unit of government" means a county, statutory or home rule charter city, town, or watershed district.

(b) "Sustainable development" means development that maintains or enhances economic opportunity and community well-being while protecting and restoring the natural environment upon which people and economies depend. Sustainable development meets the needs of the present without compromising the ability of future generations to meet their own needs.

Subd. 2. [PLANNING GUIDE.] The office of strategic and long-range planning must develop and publish a planning guide for local units of government to plan for sustainable development, based on the principles of sustainable development adopted by the environmental quality board with advice of the governor's round table on sustainable development. The office must make the planning guide available to local units of

government within the state.

Subd. 3. [MODEL ORDINANCE.] The office of strategic and long-range planning, in consultation with appropriate and affected parties, must prepare a model ordinance to guide sustainable development.

Subd. 4. [SPECIFICITY AND DISTRIBUTION.] The model ordinance must specify the technical and administrative procedures to guide sustainable development. When adopted by a local unit of government, the model ordinance is the minimum regulation to guide sustainable development that may be adopted. Upon completion, the office of strategic and long-range planning must notify local units of government that the model ordinance is available, and must distribute it to interested local units.

Subd. 5. [PERIODIC REVIEW.] At least once every five years, the planning office must review the model ordinance and its use with local units of government to ensure its continued applicability and relevance.

Sec. 2. [AGENCIES' REPORTS TO BOARD.]

Each state department, agency, and board shall report to the environmental quality board by October 15, 1996, how the mission and programs of the department, agency, or board reflect and implement the state sustainable development principles, or how the mission and programs could be changed to do so.

Sec. 3. [REPORT TO LEGISLATURE.]

The environmental quality board shall report to the legislature by January 15, 1997, on the state agencies' review of their missions and programs in relation to the principles of sustainable development.

Sec. 4. [EFFECTIVE DATE.]

This act is effective the day after final enactment.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