



State Trunk Highway Program

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State Trunk Highway Program

The Department of Transportation's (DOT) state trunk highway program is responsible for the construction, improvement, and maintenance of the state's 11,205-mile trunk highway system and for improvement on 567 miles of connecting highways under local jurisdiction. This paper provides an overview of the structure and scope of the program, describes how it is administered within DOT, details the four main program components, and describes how the program is financed.

Overview

The responsibility for roads and highways is divided between local governments and the state. The state generally has jurisdiction over arterial roads, which function as corridors for interstate and inter-regional travel. This network is called the state trunk highway system. Generally, counties are responsible for collector roads, which serve short distance, intra-regional traffic or provide connections between arterial roads and local roads. Municipalities (including towns) are responsible for local roads, such as residential streets and town roads, which provide property access and short distance, local mobility services. Certain municipalities also have arterial streets under their jurisdiction that are marked as state highways, which are designated as connecting highways.

Jurisdiction does not always follow this functional classification. For instance, a county road can begin to function as an arterial highway if traffic patterns change. However, current DOT policy is to align jurisdictional responsibilities with functional classifications whenever possible.

Table 1 depicts the distribution of roads by current jurisdictional responsibility. Although state trunk highways and connecting highways together comprise only 10.4% of total road mileage, they carry 60% of the total traffic volume. Of the 11,205 miles of state trunk highways (excluding connecting highways), about 88% are rural and 12% are in urban areas.

Table 1: Road Miles by Jurisdiction

Jurisdiction	Miles	% of Total
State Trunk Highways	11,205	9.9%
Connecting Highways	567	0.5
County Trunk Highways	19,705	17.4
Town Roads	61,780	54.5
Municipal Streets*	18,190	16.1
Other Roads**	<u>1,823</u>	<u>1.6</u>
Total	113,270	100.0%

*Excludes connecting highways.

**Includes park and forest roads and county roads not on the county trunk highway system.

Structure of the Program and Its Organization Within the Department

Prior to the 2001 legislative session, the state highway program had three main components: (1) state highway rehabilitation; (2) major highway development; and (3) highway maintenance and traffic operations. The 2001-03 biennial budget act (2001 Act 16) added a fourth component for the rehabilitation or expansion of freeways in southeast Wisconsin, which had previously been the responsibility of the state highway rehabilitation component or, in the case of highway expansion, the major highway development component.

Since 1996, the administration of the highway program has been shared among three divisions within the Department of Transportation: the Division of Transportation Districts, the Division of Transportation Infrastructure Development, and the Division of Transportation Investment Management. In November, 2004, DOT proposed a reorganization of the Department's divisions that would, among other things, combine the Division of Transportation Districts and the Division of Transportation Infrastructure Development into a new division called the Division of Transportation System Development. The new division would have the primary responsibility for the administration of the state highway program, although the existing Division of Investment Management would retain the statewide planning and financial aspects of the program. At the time of the publication of this paper, the reorganization plan was being reviewed by the Department of Administration, and, therefore, had not been approved or implemented.

In addition to the consolidation of the Department's division structure, the reorganization plan would reduce the number of regional transportation districts from eight to five. These districts are responsible for most project selection and delivery within their respective regions. The existing district structure is shown below.

2004 District Structure

District Office	Counties
Eau Claire	Chippewa, Clark, Dunn, Eau Claire, Pepin, Pierce, St. Croix, and Taylor
Green Bay	Brown, Calumet, Door, Kewaunee, Manitowoc, Marinette, Menominee, Oconto, Outagamie, Shawano, Sheboygan, and Winnebago
La Crosse	Buffalo, Crawford, Jackson, La Crosse, Monroe, Richland, Trempealeau, and Vernon
Madison	Columbia, Dane, Dodge, Grant, Green, Iowa, Jefferson, Lafayette, Rock, and Sauk

2004 District Structure (continued)

District Office	Counties
Rhinelanders	Florence, Forest, Iron, Langlade, Lincoln, Oneida, Price, and Vilas
Superior	Ashland, Barron, Bayfield, Burnett, Douglas, Polk, Rusk, Sawyer, and Washburn
Waukesha	Fond du Lac, Kenosha, Milwaukee, Ozaukee, Racine, Walworth, Washington, and Waukesha
Wis. Rapids	Adams, Green Lake, Juneau, Marathon, Marquette, Portage, Waupaca, Waushara, and Wood

The Department's November, 2004, reorganization plan did not identify where the new district headquarters would be located, although the district boundaries were identified. The counties in each proposed district are as follows:

Proposed Five-District Structure

District	Counties
North Central	Adams, Florence, Forest, Green Lake, Iron, Langlade, Lincoln, Marathon, Marquette, Menominee, Oneida, Portage, Price, Shawano, Vilas, Waupaca, Waushara, and Wood
Northeast	Brown, Calumet, Door, Fond du Lac, Kewaunee, Manitowoc, Marinette, Oconto, Outagamie, Sheboygan, and Winnebago
Northwest	Ashland, Barron, Bayfield, Buffalo, Burnett, Chippewa, Clark, Douglas, Dunn, Eau Claire, Jackson, Pepin, Pierce, Polk, Rusk, St. Croix, Sawyer, Taylor, Trempealeau, and Washburn
Southeast	Kenosha, Milwaukee, Ozaukee, Racine, Walworth, Washington, and Waukesha
Southwest	Columbia, Crawford, Dane, Dodge, Grant, Green, Iowa, Jefferson, Juneau, La Crosse, Lafayette, Monroe, Richland, Rock, Sauk, and Vernon

Planning, Programming, Design, and Construction in the Highway Improvement Program

The highway rehabilitation, major highway development, and southeast Wisconsin freeway rehabilitation components of the highway program are sometimes collectively referred to as the highway improvement program. This program can be divided into four stages of development: planning, programming, design, and construction. This section describes these stages.

Planning

Planning involves both the identification of long-term transportation needs and goals and the monitoring of conditions, such as pavement condition, traffic patterns, and safety. Generally, the planning function is shared between the Division of Transportation Investment Management and the district offices.

In order to be eligible for federal transportation aid, the state must have a highway plan that outlines the broad policy goals for the following 20 years. In developing a transportation plan, DOT must consider a range of planning factors, which are listed in the federal transportation law. For instance, the plan must aim to promote economic vitality, safety, system preservation, and the accessibility and mobility of people and freight. It must also seek to protect the environment and promote energy efficiency and the connectivity between different transportation modes. In addition to the requirements that are included in federal transportation law, the federal Clean Air Act requires the Department's transportation plan to be coordinated with the state's implementation plan, developed by the Department of Natural Resources, which designates how the state intends to control emissions of pollutants in ozone nonattainment areas.

In addition, as a condition of using federal transportation aid, DOT must consult with the state's metropolitan planning organizations (MPOs) in developing the statewide plan. Federal transportation law requires each metropolitan area with a population greater than 50,000 to have a designated MPO representing local governments. Each MPO develops a metropolitan transportation plan in consultation with local governments in the region.

DOT's current state highway plan covers the period between 2000 and 2020. Similar to earlier plans, *Wisconsin State Highway Plan 2020* divides the state trunk highway system into subsystems: (a) Corridors 2020; (b) other principal arterials; (c) minor arterials; and (d) collectors and local function roads. The Corridors 2020 component is a network consisting of 3,650 miles of principal highways, including the state's interstate system, most rural multilane routes, and some important two-lane highways. The network is further divided into the backbone system and the connector system.

The primary segments of the Corridors 2020 backbone system include: (a) STH 29 from I-94 west of Chippewa Falls to Green Bay; (b) USH 53 from Superior to Eau Claire; (c) USH 151 between Fond du Lac and the southwestern border of the state; (d) USH 41 from the Milwaukee area to Marinette in northeastern Wisconsin; (e) USH 10 between the Fox Cities and Stevens Point; and (f) the entire Interstate system. Most of the backbone system consists of multi-lane freeways or expressways. Some segments remain two-lane highways, but the Department intends to eventually upgrade the entire backbone system to four lanes.

The highway plan establishes traffic movement and road condition performance thresholds for each subsystem and, using computer models for traffic growth and pavement deterioration, predicts how much it would cost to rehabilitate and im-

prove highways to keep most segments of highway above those thresholds by the year 2020.

Using this methodology, the plan estimates that the amount of highway expansion and rehabilitation spending needed to meet the plan's goals over the 21-year period between 2000 and 2020 would be \$20.4 billion in 1999 dollars, or an average of \$972 million per year.

Although long-range highway plans like the 2020 state highway plan cover a period of 20 years or more, they generally must be updated every several years to take into account changing conditions and reconsider various transportation goals. The Department is currently conducting a multimodal transportation plan called Connections 2030, which will, among other things, update elements of the highway plan.

The reconstruction and expansion of the Milwaukee area freeway system accounts for 27% of the total cost of the 1999 highway plan's recommended expenditure level. That plan, however, noted that a study of the southeast Wisconsin freeway system by the Southeastern Wisconsin Regional Planning Commission (SEWRPC) that was just beginning at the time would result in updated estimates and recommendations for the reconstruction of those freeways. SEWRPC's study, which was completed in 2003, recommended improvements to the freeway system, including the construction of additional lanes on 127 miles out of a total of 270 miles in the system. SEWRPC estimated cost of the system reconstruction at \$6.23 billion in 2000 dollars. The Department's estimate of reconstructing the freeway system in its long-range highway plan, which included a recommendation to add lanes on 57 miles of freeway, was \$5.4 billion in 1999 dollars.

Programming

The programming stage involves selecting and scheduling improvement projects based on

available funding and policy priorities. In developing this schedule, decisions must be made on which projects should be given highest priority, relying, in part, on the adopted highway plan, which outlines the broad policy goals of the highway program.

The task of programming projects is either done by staff in the transportation districts or by DOT central office staff, depending upon the type of project. Major highway development projects, large or costly bridge projects, and rehabilitation of multi-lane highways are programmed by the central office, while other rehabilitation projects are programmed by the transportation district offices. The portion of the rehabilitation budget that is reserved for the more routine highway and bridge projects is allocated to the districts based on an estimate of the total rehabilitation needs within each district. District offices develop project schedules based on the amount allocated to the district. Although there is some central oversight of this process, the districts are given considerable discretion in choosing which projects to put into the schedule.

Since the number of major highway development projects and larger highway and bridge rehabilitation projects may vary considerably from year to year within a given district, these projects are scheduled by the central office. This way, districts are not forced to exhaust their allocations on large projects, thereby neglecting more routine rehabilitation.

The DOT central office, in consultation with the district offices, compiles program schedules for the following six years for the major highway development and rehabilitation programs into a comprehensive, six-year program. The six-year program, which is updated periodically based on changes in funding and in the plans for individual projects, provides a listing of all anticipated projects that indicates the type of project, the location, estimated cost, and scheduled construction date. The first two years of the six-year program are

based on funding levels provided by the most recent biennial budget. The other years are also based on this funding level, although the schedule for projects in the later years is more likely to change, since funding levels may be changed in subsequent biennial budgets.

Design

The design process typically begins far in advance of actual construction. For major highway projects, the design stage may take eight to ten years, beginning with concept development. Simple resurfacing projects may take one to two years. In part, the length of the design process is dictated by the amount of data that must be collected to complete required environmental reviews and to create the detailed plans for construction. Furthermore, because highway construction affects private landowners, as well as the driving public, the Department uses an extensive public involvement process to receive and respond to multiple concerns regarding proposed projects. In addition, the highway engineers must have detailed information on the quality and type of soil and the physical characteristics of the landscape in order to put together the design proposal, which is eventually used to put the project up for bidding.

In addition to the design work that is directly related to the construction of the highway, there are numerous other preconstruction activities that lengthen the process. For instance, the Department frequently must purchase land for the construction of a new highway or the expansion of an existing highway. This requires negotiation with affected landowners.

For most highway projects the design stage includes environmental studies and mitigation. If an initial environmental assessment on a project determines that the impacts of the project on the environment could be significant, federal and state laws require the Department to do (or to contract for) an environmental impact statement. Because

projects can harm or destroy wetlands or other sensitive wildlife habitat, these consequences must be reported in advance of the project. In response to these expected impacts, the Department must plan to restore or create wetlands to replace those destroyed by the highway project. Environmental impact statements also forecast the effects on residential and commercial development and identify impacts on historically or archaeologically significant sites. When possible, the Department must also respond to these impacts. The impact statements and the mitigation plans must be approved by the federal government, which can increase the amount of time required to complete the design phase.

Funding for the design process is provided within the appropriations for the corresponding programs. During recent biennia, the design budget has been established at about 15% of the net construction program size (total construction budget less funds provided for construction engineering). The design function is carried out by a combination of DOT staff (both in the Division of Transportation Investment Management and the district offices) and private firms.

Construction

The construction stage involves the preparation of projects for bidding and the oversight of the construction work done by contractors. The preparation of bids is done within DOT's central office, while the management of project construction is done by staff in the transportation district offices.

Projects are put up for bidding every month, generally on the second or third Tuesday. Although project bidding is spread throughout the year, the busiest months are in the winter and early spring, which allows the largest projects to begin early in the construction season.

The preparation of a project for bidding starts when a design is completed by district personnel or

an engineering consultant. DOT central office staff review the completed project design to ensure that all of its elements are consistent with state standards and then, from the design, develop a project proposal. The proposal contains estimates of the amount and type of work needed to complete the project. For instance, the proposal may provide an estimate of the amount of excavation or crushed rock needed, typically expressed in cubic meters or cubic yards.

Once the proposals have been completed, the project is advertised, which occurs about five weeks in advance of the bidding date. Contractors interested in making a bid on a project request a copy of the proposal from the Department. The bids are submitted on a cost-per-unit basis. That is, contractors estimate how much it would cost them to deliver one unit of every item in the proposal. Once the bids are received, the unit prices are multiplied by the estimated quantities and then totaled to arrive at the final bid price. If there are no irregularities in the submitted bids, the firm with the lowest bid receives the contract.

Once construction begins, a project manager from the district office monitors the work done by the contractor. This typically involves the monitoring of construction materials and techniques for quality and may involve making minor modifications to the design of the project to account for unanticipated contingencies. For some projects, the extent of DOT monitoring may be limited because the contracts contain warranty provisions that require the contractor to repair any defects that appear within a specified number of years after the completion of the construction.

Major Highway Development

The major highway development program provides for the development and construction of new

or significantly altered highway projects. Major highway projects are defined as projects that have an estimated cost exceeding \$5,000,000 in current dollars and consist of at least one of the following: (a) construction of a new highway of 2.5 miles or more in length; (b) relocation of 2.5 miles or more of existing roadway; (c) the addition of one or more lanes at least five miles in length; or (d) the improvement of 10 miles or more of an existing divided highway to freeway standards. Projects providing an approach to a bridge over a river that forms a boundary of the state are excluded from this definition. Also excluded, since 2001, are any highway expansion projects on the freeways of southeast Wisconsin. These projects are done under the southeast Wisconsin freeway rehabilitation program.

Major Highway Project Selection Process

The process for selecting projects for the major highway development program involves the Legislature to a greater extent than other highway projects since all major highway projects must be enumerated in the statutes prior to beginning construction. In order to assist in this process, the Transportation Projects Commission (TPC) was created to review proposals for major projects and make recommendations to the Governor and Legislature as to which ones should be enumerated. The TPC includes the Governor, who acts as the chairperson, five senators, five representatives, three public members appointed by the Governor, and the Secretary of Transportation (a nonvoting member). In a change adopted in the 2003 legislative session, the statutes specify that a project may not be enumerated unless the TPC has recommended the project for approval.

In addition to making recommendations for project enumeration, TPC approval is also required before DOT can start an environmental impact statement (EIS) or environmental assessment (EA) on a project. An EA is done initially to determine whether the environmental impacts of a proposed

project are significant enough to merit the initiation of the more thorough EIS process. If, as the result of an EA, it is determined that the impacts would not be significant, then no further study is required. These decisions are ultimately reviewed and approved by the Federal Highway Administration.

Since a potential project must first receive TPC approval prior to the start of an EIS or EA and then, after the environmental documents are completed, must be recommended by the TPC for enumeration, the approval of a project by the Commission proceeds in a two-phase process that takes at least two biennial cycles. The typical approval process proceeds as follows.

1. DOT selects potential projects for preliminary consideration based on its analysis of congestion, safety, and public interest.

2. DOT presents a list of potential projects that are considered to be good candidates for proceeding with an EIS or EA to the TPC. The statutes specify that DOT is to present this list by October 15 of odd-numbered years.

3. By March 15 of the following year (even-numbered year), DOT makes a recommendation to the TPC as to which projects should be allowed to proceed to the EIS or EA stage.

4. By the next April 15, the TPC approves a list of projects that may proceed to the EIS or EA stage.

5. Upon completion of the environmental documentation, DOT again presents the project to the TPC for consideration. Typically, a list of these projects are presented in the spring of even-numbered years, but given the time needed to complete the environmental documentation, this may be two years following the approval of the project by the TPC that allowed DOT to proceed with the EIS or EA. For more complex or contro-

versial projects, this stage may be delayed by more than one two-year cycle. The TPC holds public hearings at different locations in the state on the candidate projects.

6. DOT reports its recommendation for projects to be enumerated in the next biennial budget to the TPC by September 15 (even-numbered years). DOT assigns a score to each project using a system outlined in an administrative rule. The system assigns each project a score between zero and 100 for each of five criteria. Each of these scores is multiplied by a weighting factor to determine a final score. The criteria and their weights are, as follows: (a) enhances Wisconsin's economy (40%); (b) improves highway safety (20%); (c) improves traffic flow (20%); (d) minimizes undesirable environmental impacts (10%); and (e) serves community objectives (10%). According to the administrative rule, a project must be worse than the average highway of the same type in terms of either traffic congestion or highway safety to be recommended to the TPC.

7. By the following December 15, the TPC submits its recommended list of projects to be enumerated to the Governor and Legislature. The TPC may or may not include the projects recommended by DOT and may add additional projects. The TPC may designate an otherwise nonqualifying project if it receives a petition for such designation from a city or village for a project that is within its corporate limits and is estimated to cost \$2,000,000 or more, provided that the project is not a freeway.

In another change adopted in the 2003 legislative session, the TPC is prohibited from recommending a project for enumeration unless a final EIS or EA has been approved by the Federal Highway Administration. Previously, projects were enumerated prior to the completion and final approval of the environmental documentation, which could result in lengthening the time between enumeration and construction if the EIS had not

been completed. Under the change, projects should be closer to construction at the time of enumeration. It should be noted, however, that this will not necessarily shorten the overall time between the start of the environmental process and completion of the project, but instead will result in the enumeration of the project at a later stage.

The TPC is prohibited from recommending a project for enumeration unless the project, along with all other enumerated projects, can be started within six years following the project's enumeration, assuming a constant, real-dollar program size throughout the period. The Commission, however, may recommend a project that could not otherwise be started within the six-year time period if it also recommends a funding proposal for the major highway development program that would allow the project to be started in six years.

At the meeting of the TPC in December, 2002, the Department recommended to the Commission that no additional projects be approved, after determining that they could not be started within six years under the current budget for the program. The TPC followed this recommendation and did not, therefore, recommend any projects for enumeration in the 2003-05 biennial budget. The Legislature, however, included four projects in the budget, which was signed by the Governor as Act 33. The four projects are: (a) USH 14 from Westby to Viroqua, in Vernon County; (b) USH 18 from Prairie du Chien to STH 60, in Crawford County; (c) USH 41 from CTH F to CTH M in Brown County; and (d) USH 41 from STH 26 to Breezewood Lane in Winnebago County. Act 33 was enacted before the passage of the prohibition against the enumeration of a project that has not been recommended by the TPC.

In 2004, DOT did not bring any potential projects to the TPC for consideration for enumeration or for approval to proceed to the EIS

or EA stage. The Department has indicated that any potential projects would not be able to be started within six years of enumeration at current funding levels for the major highway development program.

Enumeration gives DOT the authority to build a project, but does not establish a statutory priority or timetable or require a specific design. It also does not require DOT to actually construct the project. Consequently, DOT has the authority to begin an enumerated project either before or after the date indicated in TPC or legislative discussions. With a few exceptions, however, the Department has typically undertaken projects in the same order that they were enumerated.

Table 2 shows the current schedule of enumerated highway projects that have not yet been completed and the estimated amount of funding needed to complete them, as of December, 2004. For some projects, work is completed in phases, so that certain parts of the new highway are opened before the entire project is complete. In other cases, a project may be substantially complete, but the project will continue as work progresses on the local street network connecting to the state highway. For instance, the Eau Claire freeway is currently scheduled to be completed in 2006, although some work will continue on the existing USH 53 within the city at various points over the following years until 2012. The schedule for several projects, including the four projects enumerated in 2003, has not yet been determined.

Several projects are largely complete except for minor improvements, such as frontage road construction, roadway fencing, and landscaping. These projects are not included in the table individually, but the sum of the costs is included at the bottom of the table under the heading "Minor Work to Complete Other Projects."

Table 2: Enumerated Major Highway Projects Remaining to be Constructed (\$ in Millions)

	State Trunk Highway	County	Final Contract Year (a)	Estimated Cost(b) (2005 Dollars)
<u>Projects Enumerated in 1989</u>				
Waupaca to Stevens Point	10	Waupaca & Portage	2007	\$19.5
Stevens Point to Marshfield	10	Portage & Wood	2014	160.5
Waupun to Fond du Lac	151	Fond du Lac	2007	40.1
<u>Projects Enumerated in 1991</u>				
Whitewater Bypass	12	Jefferson & Walworth	2005	5.0
Chippewa Falls to IH 94	29	Chippewa & Dunn	2006	27.2
<u>Projects Enumerated in 1993</u>				
Beloit Bypass	81/213	Rock	To Be Determined	4.6
Sauk City to Middleton	12	Dane	2006	2.9
Houlton to New Richmond	64	St. Croix	2006	61.2
Fond du Lac Bypass	151	Fond du Lac	2005	11.1
<u>Projects Enumerated in 1995</u>				
Oconomowoc Bypass	16/67	Jefferson & Waukesha	2006	15.1
Eau Claire Freeway	53	Eau Claire & Chippewa	2012	64.4
<u>Projects Enumerated in 1997</u>				
Burlington Bypass	11	Walworth & Racine	2011	83.2
I-90/94 to Ski Hi Road	12	Sauk	2009/2016(c)	63.3
La Crosse Corridor	53	La Crosse	2012	76.0
Dyckesville to STH 42	57	Kewaunee & Door	2009	62.8
STH 22 to STH 64	141	Oconto & Marinette	2006	41.0
Dickeyville to Belmont	151	Grant & Lafayette	2005	13.9
<u>Projects Enumerated in 1999</u>				
Oconto to Peshtigo	41	Oconto & Marinette	2009	119.5
STH 67 to USH 41	23	Sheboygan & Fond du Lac	2011	42.9
<u>Projects Enumerated in 2001</u>				
Janesville to Watertown	26	Rock, Jefferson & Dodge	2015	176.2
Wausau Beltline	39/51	Marathon	2012	145.8
<u>Projects Enumerated in 2003</u>				
Viroqua to Westby	14	Vernon	To Be Determined	37.1
Prairie du Chien to STH 60	18	Crawford	To Be Determined	15.5
De Pere to Suamico	41	Brown	To Be Determined	236.1
STH 26 to Breezewood Lane	41	Winnebago	To Be Determined	210.5
Minor Work to Complete Other Projects				1.7
TOTAL				\$1,737.1

(a) "Final contract year" reflects the year that the Department expects to let the final major construction contract for the project. In some cases, the project may not be completed until the following year. With some projects, contracts for auxiliary improvements, such as frontage road work, roadway fencing, or landscaping may be scheduled in later years.

(b) For projects already underway, cost reflects remaining costs as of December, 2004.

(c) The final contract years for this project reflect the completion of different phases of the project.

State Highway Rehabilitation Program

DOT allocates funding in the state highway rehabilitation program between three subprograms:

(1) existing highway improvement; (2) backbone rehabilitation; and (3) state bridges. The purpose of each of these subprograms is to preserve and to make limited improvements on the state highway system.

Existing Highway Improvement and Backbone Rehabilitation

The existing highways and backbone rehabilitation components of the rehabilitation program are responsible for highway surface improvement projects. The existing highway component is responsible for projects on state highways that are not Corridors 2020 backbone routes. These projects are programmed by districts using funds set aside for district allocation. Backbone highways, including interstate highways, are typically more expensive to rehabilitate, so these projects are programmed by the central office, in consultation with the district offices. However, rehabilitation of southeast Wisconsin freeways, as of 2001, are the responsibility of the southeast Wisconsin freeway rehabilitation program instead of the state highway rehabilitation program.

Highway rehabilitation projects can generally be divided into three main types: resurfacing, reconditioning (further classified as major or minor), and reconstruction. These types of rehabilitation are described below.

Resurfacing means placing a new surface on existing pavement to provide a better, all-weather surface and a better riding surface, and to extend or renew the life of the pavement. It generally does not involve improvement in traffic capacity or geometrics (roadway characteristics such as road width and the number and severity of roadway curves and hills). Resurfacing may include some elimination or shielding of roadside obstacles, culvert replacements, installation of signals, marking signs, and intersection improvements. Usually, the acquisition of additional right-of-way is not required, except possibly minor acquisition for drainage and intersection improvements.

Reconditioning refers to work in addition to resurfacing. Minor reconditioning includes pavement widening and shoulder paving. Major reconditioning includes the improvement of an isolated

grade, curve, intersection, or sight distance problem to improve safety. Major reconditioning projects may require the acquisition of additional land for right-of-way.

Reconstruction means the total rebuilding of an existing highway to improve maintainability, safety, geometrics, and traffic service. Major elements may include flattening of hills and grades, improvement of curves, widening of the roadbed, and elimination or shielding of roadside obstacles. Normally, reconstruction would require additional acquisition of right-of-way.

DOT also uses a special classification of reconstruction called pavement replacement. This type of project, like all reconstruction projects, involves the complete rebuilding of the roadway pavement and base. However, pavement replacement generally does not involve changes in the road alignment and does not require additional right-of-way. This type of project is done where an existing pavement and base have deteriorated to the point of needing replacement, but where the road was originally built to high standards, and thus does not need geometric improvements. This is commonly the case on rural interstate highways.

The selection of specific projects is based on an evaluation of surface pavement condition, the number and severity of hills and curves, accident numbers and rates, and traffic congestion. This process, which is also used in preparation of the six-year highway program, allows DOT to identify existing conditions and improvement needs.

In addition to these main highway rehabilitation types, the existing highway and backbone rehabilitation components of the rehabilitation program fund a number of other activities, including: (a) pavement maintenance work that is less extensive than full resurfacing, but more extensive than the pavement repair normally done in the maintenance component of the highway program; (b) additions or deletions to the state trunk highway sys-

tem through jurisdictional transfer agreements with local governments; (c) improvements to permanent weigh scale facilities; (d) construction projects at rest areas; (e) hazard elimination safety projects; (f) noise barriers; and (g) wetland mitigation projects.

State Bridge Improvement Program

The state bridge improvement program provides funding for the replacement or rehabilitation of deficient bridges on the state trunk highway system. Bridge deficiencies may include: (a) structurally deficient bridges; (b) functionally obsolete bridges, characterized by narrow roadways, restricted clearances, or poor alignment; and (c) bridges that have load capacity restrictions. To monitor bridge conditions and to assist in assessing deficiencies, DOT maintains a computer-based bridge appraisal system. This system is developed from bridge field inspections and central office appraisal of the inspection results.

Most bridge projects are programmed by district offices using district allocation funds. DOT allocates funds to the districts for both the bridge and existing highway rehabilitation components of the rehabilitation program, but these sources are combined, so districts can program any mix of bridge and highway projects, as needed.

High-cost bridge rehabilitation projects, however, are programmed by the central office in order to avoid reducing the efforts by the district offices to improve lower-cost, deteriorating bridges. High-cost bridges are bridges with a deck area greater than 40,000 square feet. Table 3 lists the high-cost bridge rehabilitation projects that DOT anticipates constructing between 2005 and 2010. In some cases, local governments may be required to pay for a portion of the cost of constructing these bridges, but the table shows only the portion of the cost paid with state or federal funds.

Table 3: High-Cost Bridges Scheduled Between 2005 and 2010 (\$ in Millions)

County	Highway	Bridge	Final Contract Year(a)	Estimated Cost(b) (2004 Dollars)
Winnebago	Local	Oak Street, Neenah	2005	\$3.3
La Crosse	USH 14	Cass Street, La Crosse	2005	6.7
Milwaukee	USH 18	State Street, Milwaukee	2005	10.4
Marathon	Local	Thomas Street, Wausau	2006	2.2
Pepin	USH 10	Chippewa River, Durand	2006	8.8
Brown	STH 32	Main Street, De Pere	2006	16.2
Crawford	USH 18	Mississippi River, East Channel	2007	2.7
Crawford	USH 18	Mississippi River, West Channel	2007	3.5
Winnebago	STH 44	Wisconsin Avenue, Oshkosh	2007	17.1
Outagamie	Local	College Avenue, Appleton	2008	7.1
Milwaukee	STH 32	Kinnickinnic Ave, CP Railroad Tracks	2008	5.6
Marathon	STH 153	Main Street, Mosinee	2008	2.7
Door	Local	Michigan Street, Sturgeon Bay	2009	23.6
Iowa & Sauk	USH 14	Wisconsin River, Spring Green	2009	9.3
Milwaukee	STH 32	First Street, Soo Line Railroad	2010	13.4
Adams & Juneau	STH 82	Wisconsin River, Point Bluff	2010	4.5

(a) "Final contract year" reflects the year that the Department expects to let the final major construction contract for the project. In some cases, the project may not be completed until the following year.

(b) For projects already underway, cost reflects remaining costs as of December, 2004.

Southeast Wisconsin Freeway Rehabilitation

The 2001-03 biennial budget, 2001 Act 16, created a separate program for the rehabilitation and expansion of southeast Wisconsin freeways. Under this program, southeast Wisconsin freeways are considered to be any state trunk highways within Kenosha, Milwaukee, Ozaukee, Racine, Walworth, Washington, or Waukesha counties that have four or more lanes of traffic physically separated by a median barrier and that give preference to through traffic by limiting traffic access to interchanges only. Wisconsin 2001 Act 109 modified the program by prohibiting the Department of Transportation from performing any rehabilitation, which includes, for the purposes of this provision, the addition of any lanes to existing southeast Wisconsin freeways, using the appropriations for state highway rehabilitation or major highway development.

In both the 2003-05 and 2005-07 biennia, the primary project in this program will be the reconstruction of the Marquette Interchange in Milwaukee. Construction on the project began in 2004 and is currently scheduled to be completed in 2008. The 2003-05 biennial budget provided a total of \$261.0 million for the project, which was in addition to \$160.6 million that had been provided in the previous biennium. In its request for the 2005-07 biennial budget, the Department requested an additional \$370.4 million to complete the project, which would bring the total amount provided over the course of three biennia to \$792.0 million.

The Department has indicated that, following the completion of the Marquette Interchange project, other southeast Wisconsin freeways will need to be reconstructed. As noted earlier, the Department's 1999 long-range highway plan proposed the reconstruction of much of the freeway system over the 21-year period between 2000 and 2020. The cost of these projects, including the cost to add lanes to

57 miles of freeway, was estimated at \$5.4 billion.

As also noted above, a more detailed study of the freeway system was completed by the South-eastern Wisconsin Regional Planning Commission (SEWRPC) in 2003. That study recommends that, as construction proceeds on each segment, changes should be made to "modernize" the freeways (such as improve ramp spacing and curves and remove left-hand exit and entrance ramps) and additional lanes should be constructed on 127 miles out of a total of 270 miles in the freeway system. Although SEWRPC recommended that additional lanes be added on 127 miles of freeway, the final report noted that there is not consensus within Milwaukee County on the addition of lanes to I-94 between the Marquette Interchange and the Zoo Interchange and to I-43 between the Mitchell Interchange and Silver Spring Drive.

The total estimated cost of the freeway system reconstruction in SEWRPC's report is \$6.23 billion over a 30-year period (2001 to 2030), or an average of just over \$200 million per year. It should be noted that SEWRPC's study is a recommendation regarding what action to take. The final decision as to when and how to reconstruct the freeways will be made by the Governor and Legislature.

Any future construction project on southeast Wisconsin freeways that adds lanes to a freeway five or more miles in length would be constructed under the southeast Wisconsin freeway rehabilitation program, instead of the major highway development program. Wisconsin 2001 Act 109 included a provision that creates a separate statutory enumeration process for these projects. Unlike other highway capacity expansion projects completed under the major highway development program, southeast Wisconsin freeway expansion projects will not be reviewed and recommended for enumeration by the Transportation Projects Commission. No lane expansion projects have been enumerated for southeast Wisconsin freeways as of the end of the 2001 legislative session.

Maintenance, Repair, and Traffic Operations

The final component of the state highway program is the maintenance, repair, and traffic operations program. This program is responsible for a variety of activities related to the upkeep of state highways and highway rights-of-way. Unlike the other state highway program components, the activities performed under the maintenance and traffic operations program generally do not require extensive planning and design. The maintenance programs are divided into two program areas: (a) highway maintenance; and (b) highway traffic operations. Each is described below.

Highway Maintenance

The majority of state trunk highway maintenance activities are performed by county workforces under contract with the state. Generally, the counties perform the actual maintenance activities and DOT (primarily through the district offices) oversees their work and sets statewide maintenance policies. This arrangement has existed in its current form since 1932, although counties were involved in some way in the maintenance of state roads prior to that time.

Two areas of general maintenance are performed primarily by private contractors: (a) vegetation management, including plantings, inventory, and the spraying of herbicides along roadsides; and (b) the maintenance of year-round rest areas by disabled citizens participating in sheltered workshops.

Highway maintenance can generally be separated into two types of activities, winter maintenance and general maintenance.

Winter maintenance involves the maintenance and upkeep of state trunk highways during the winter season. The principal activities performed

under this program are snowplowing, drift control, and application of de-icers. These activities are performed almost entirely by county workforces under contract with the state. The state, however, purchases de-icing salt directly and provides it to the counties for use on state highways.

General maintenance involves the daily or periodic repair and upkeep of state trunk highways, including the following activities:

- mowing and weed control, brush and tree removal, trash pickup, and recycling;
- maintenance of rest areas, tourist information centers, waysides, scenic overlooks, and historical markers, including parking, picnic, and toilet facility improvements;
- surface, base, and shoulder repair;
- minor bridge repair;
- plantings and landscaping in rest areas and other areas;
- emergency repairs and accident cleanup;
- drainage, culvert landscaping, erosion control measures, and guard fence repairs;
- lift bridge and ferry operation; and
- repair of damaged traffic signs.

Maintenance Costs

Counties are reimbursed for state maintenance work based on three criteria: (a) county labor costs; (b) county machinery costs; and (c) materials supplied by the county. DOT uses a reimbursement formula that is based on all counties' actual machinery costs, averaged over a period of five years, and each county's employee wage rates. Due to variable county labor contracts, some counties receive a higher hourly reimbursement rate than others.

In order to exercise control over the amount of general maintenance work that is done on state highways, the contract that DOT enters into with the counties establishes a maintenance budget for each county. The budget is established based on a

consideration of various factors present in each county, such as the type of state highways (for example, concrete versus asphalt or multi-lane freeway versus two-lane highway), number of lane miles of each type, condition, and amount of traffic. Once established, counties are generally expected to stay within that budget. This may mean that a county may be directed to curtail certain maintenance activities late in the year to stay within the established budget if expenditures earlier in the year were higher than expected.

Highway Traffic Operations

Highway traffic operations involve the installation of traffic control and safety devices designed to enhance the orderly and efficient flow of vehicles on existing state trunk highways. Highway traffic operation functions include: (a) pavement marking activities, such as centerline and edge line painting, channelization lines, stop lines, curb and crosswalk lines, or the installation of raised centerline reflectors; (b) highway signing activities; (c) traffic signalization activities; and (d) highway lighting activities.

Prior to the passage of the 2001-03 biennial budget (2001 Act 16), many of the capital expenditures under the traffic operations program, such as the installation of traffic signals, signs, and highway lights, were funded from the state and federal appropriations for state highway rehabilitation. A provision included in Act 16, however, required that these expenses be funded from the maintenance and traffic operations appropriations, unless they are included in a larger highway improvement project. The provision also mandated that the installation of any intelligent transportation system, unless included in a highway improvement project, be funded from the maintenance and traffic operations appropriations instead of from the highway rehabilitation appropriations, as had previously been the case. Intelligent transportation systems are designed to improve traffic flow and provide the public with information on traffic con-

ditions in urban areas using such devices as freeway ramp meters, variable message signs, and traffic cameras.

To account for this shift in program responsibilities, \$27.0 million was provided in the maintenance and traffic operations appropriation in 2001-02 for these functions, which was the approximate amount that the Department indicated had previously been spent from the state highway rehabilitation appropriation for these functions on an annual basis. In 2002-03, however, the amount provided for these functions was reduced to \$7.4 million and, in both years of the 2003-05 biennium, this amount was eliminated, which required the Department to reduce capital expenditures on traffic operations items or finance them from other base maintenance and traffic operations funds.

State Trunk Highway Program Finance

The state trunk highway program is funded through several sources. Traditionally, funding for the highway programs has been provided with funds from the state transportation fund, federal highway aid, and transportation revenue bonds. In the several biennia prior to the 2003-05 biennium, state transportation fund dollars have accounted for between 46% and 51% of the program, federal highway aid between 35% and 42%, and revenue bonds between 12% and 14%.

The mix of funds for the 2003-05 biennium differed substantially from past years, however, because changes to the funding for the highway improvement programs were part of a strategy to balance the state's general fund budget. 2003 Act 33 provided a total of \$463.3 million in transportation fund revenues for all of the highway programs during the 2003-05 biennium, compared to \$1,032.3 million in the previous biennium. This reduction in transportation fund revenues in the highway pro-

grams (along with other budgetary decisions) allowed for a total of \$675 million to be either transferred from the transportation fund to the general fund or to be appropriated directly for general fund programs. The reduction in state transportation fund revenues in the highway program was partially replaced with \$565.5 million in general obligation bonds. Overall, the highway programs were funded with 41.3% federal funds, 25.5% general obligation bonds, 20.9% state transportation fund revenues, and 12.3% transportation revenue bonds. In addition, as in every biennium, parts of many highway improvement projects are funded partially with funds from local governments. The following section describes each funding source in more detail.

State Funding

The segregated state transportation fund is the state funding source for the state trunk highway program. The transportation fund is a separate, nonlapsible trust fund administered by DOT. The primary revenue sources for the transportation fund include a motor fuel tax, motor vehicle and driver's license fees, railroad taxes, and aeronautical taxes and fees.

Table 4 shows total state transportation fund revenues appropriated for the state highway program for the past 10 biennia. As can be seen in this

Table 4: State Trunk Highway Programs - State Transportation Fund Appropriations

Biennium	State Segregated Appropriations	Change From Prior Biennium
1985-87	\$404,140,500	
1987-89	563,571,500	39.4%
1989-91	622,130,700	10.4
1991-93	632,628,200	1.7
1993-95	707,424,600	11.8
1995-97	765,822,000	8.3
1997-99	846,210,500	10.5
1999-01	930,437,100	10.0
2001-03	1,032,255,800	10.9
2003-05	463,307,900	-55.1

table, transportation fund appropriations for the highway programs were much lower in the 2003-05 biennium than they were in prior biennia.

Bonding

Revenue bonding authority has been used as an ongoing state funding source for the highway program since the early 1980s. Revenue bonds, as opposed to general obligation bonds, are repaid solely from a dedicated revenue source. In the case of transportation revenue bonds, the dedicated revenue source is the motor vehicle registration fee and related vehicle fees. To ensure the stability of the bonds for investors, bond repayment receives first priority on those revenues.

Revenue bond proceeds are used to fund the construction of major highway development projects and administrative facilities. Bonding authority is generally provided with each biennial budget act. Enough bonding is authorized for anticipated use during the biennium, plus an additional amount to allow projects begun in that biennium to be completed in subsequent years in the event that additional funds or bonds are not provided in a timely fashion for those years. This funding strategy, in contrast to the standard biennial approval of state expenditures, is employed to reflect the high cost and long-term nature of the projects, which may span multiple biennia. Although the approval of unused revenue bond authority could be rescinded by a future legislative action, the early legislative approval of this form of expenditure authority for long-term construction projects is provided as a means of assuring the completion of a project once it is begun.

As noted earlier, \$565.5 million in general obligation bonds were also used in the state highway rehabilitation and southeast Wisconsin freeway rehabilitation programs during the 2003-05 biennium. The debt service on these bonds is to be paid from the transportation fund during the 2003-05 biennium, but, under current law, will be paid from the general fund in 2005-06 and thereafter.

Federal Funding

Federal funds are distributed based on multi-year federal surface transportation authorization acts. As of the time of the publication of this paper, Congress was deliberating on a new authorization act. The new act will replace the Transportation Equity Act for the 21st Century, or TEA-21, which, although it expired in 2003, has been temporarily extended while a new act is being crafted.

Table 5 shows the amount of federal formula-based highway aid (this excludes discretionary grants and Congressional earmarks for specific projects) received in each year since 1991.

Table 5: Federal Formula-Based Highway Aid History (\$ in Millions)

Year	Amount
1991	\$239
1992	324
1993	305
1994	341
1995	346
1996	331
1997	375
1998	410
1999	465
2000	498
2001	531
2002	549
2003	536
2004	596

Federal highway funds are spent both in the state highway program and in other DOT programs, such as: (a) the local transportation facility improvement assistance program, which funds rehabilitation projects on principal streets and highways under local jurisdiction; (b) the local bridge improvement assistance program; (c) the congestion mitigation and air quality improvement program, which provides funds for projects designed

to reduce traffic congestion and pollution caused by vehicles; (d) the transportation enhancements program, which provides grants for bicycle and pedestrian facilities and the rehabilitation of historic transportation facilities; and (e) the railroad crossing improvement program, which mainly funds the installation of crossing warning signals and gates.

In the state highway program, federal appropriations are estimates of funding to be received and do not control the amount that may be spent. DOT can spend all funds received from federal sources, not just the amounts specifically estimated by the Legislature in budgetary schedules.

DOT is required, however, to submit a plan for making adjustments to its appropriations to the Joint Committee on Finance for the Committee's approval if the amount of federal aid received in a given year differs by more than 5% from the amount estimated.

In both years of the 2003-05 biennium, the Governor, through a partial veto of the biennial budget act, wrote-down the amount of federal highway aid reflected in the appropriation for the state highway rehabilitation program (by \$74,799,600 in 2003-04 and \$47,776,600 in 2004-05). In his veto message, the Governor indicated that he was directing DOT to allocate these amounts, instead, to the major highway development program. However, because this increase to the major highway development program could not be reflected in the appropriations as they appeared in the act (the Governor can decrease an appropriation through partial veto, but cannot increase an appropriation), the total amount of federal highway aid reflected in DOT's appropriations was below the aid estimates that the Legislature had used during deliberations on the bill. For this reason, the Department will be required to submit reports to the Joint Committee on Finance for adjusting the federal appropriations even if the amounts received are the same as the amounts the Legislature originally had included in

the bill.

The biggest adjustment in the Department's 2003-04 plan was a \$74,799,600 increase to the major highway development appropriation, which was the amount that the Governor directed in his veto message be reallocated to that program. Since the amount of highway aid received was above the estimates that the Legislature had included in the bill, additional funding was available for making other adjustments. The plan provided these other increases, as follows: (a) \$15,000,000 for the local bridge improvement assistance program; (b) \$14,000,000 for southeast Wisconsin freeway rehabilitation; (c) \$13,040,000 for the local transportation facility improvement assistance program; (d) \$3,931,100 for departmental management and operations; and (e) \$1,405,300 for highway administration and planning.

As of the time of the publication of this paper, the Department had not submitted a plan for 2004-05, since the amount of federal highway aid that the state will receive in federal fiscal year 2005 was unknown at that time.

Local Funding

Local funds for the improvement of state trunk highways are provided principally to fund portions of a project that are a local priority. Local funds can include both monies from local governments and private businesses. In conjunction with DOT's improvement projects, local communities fund certain project components that are not eligible for state or federal funding. These local initiatives may include sidewalks, curbs, gutters, special access traffic lanes for local traffic, lighting, and other traffic control features.

Local cost sharing is required by DOT for: (a) the cost of items not directly associated with the transportation services provided by the highway

project, such as parking lanes; (b) costs incurred at state and local road interchanges and intersections, with local units paying for the costs on the local road and sharing in the costs of the interchange bridges; (c) 25% of the cost of preliminary engineering for all improvements on connecting highways; and (d) a portion of the costs for improvements on state trunk highways, or connecting highways, that provide a substantial, direct benefit to a community or its members.

Funding Level

Table 6 shows the funding, by source, for the four components of the state highway program, plus for administration and planning. Since local funding is not used for programming purposes and the actual amounts used are not reflected in budget appropriations, this funding source is not included in the table.

An adjustment to the federal funds provided for the major highway development program has been made in this table to reflect the Governor's intent, as expressed in his veto message for the 2003-05 biennial budget, to reallocate \$47,776,600 in 2004-05 from the state highway rehabilitation program to the major highway development program. The Governor, through a partial veto, reduced federal funds appropriated for the state highway rehabilitation program by that amount and directed the Department to allocate these funds to the major highway development program. (A related adjustment in 2003-04 of \$74,799,600 has already been made to the major highway development appropriation by the Joint Committee on Finance in approving the Department's federal funds plan for that year.)

Table 7 shows total funding (excluding local funding) for the five components of the highway program for the past six biennia.

Table 6: State Trunk Highway Programs -- 2003-05 Biennium Funding (\$ in Millions)

Program	Gen. Ob. Bonds	Revenue Bonds	Current Revenue Funding Sources		All Sources
			State	Federal	
Major Highway Development	\$0.0	\$273.0	\$23.2	\$182.5	\$478.7
State Highway Rehabilitation	483.9	0.0	47.5	561.8	1,093.2
Southeast Wisconsin Freeway Rehabilitation	81.6	0.0	20.0	159.4	261.0
Highway Maintenance, Repair, and Traffic Operations	0.0	0.0	331.1	2.1	333.2
Administration and Planning	<u>0.0</u>	<u>0.0</u>	<u>41.6</u>	<u>9.2</u>	<u>50.8</u>
TOTAL	\$565.5	\$273.0	\$463.3	\$915.0	\$2,216.9

NOTE: Totals may not add due to rounding.

Table 7: State Trunk Highway Program Funding History -- All Funds (\$ in Millions)

	Major Highway Development	State Highway Rehabilitation	Southeast Wisc. Freeway Rehabilitation*	Highway Maintenance/ Traffic Operations	Administration and Planning	Total
1993-95	\$318.0	\$767.1	---	\$266.3	\$34.7	\$1,386.1
1995-97	338.8	853.4	---	277.2	40.3	1,509.7
1997-99	402.8	1,002.8	---	290.2	45.4	1,741.2
1999-01	439.5	1,107.8	---	311.4	50.5	1,909.2
2001-03	473.6	1,142.0	\$203.9	363.3	49.0	2,231.8
2003-05	478.7	1,093.2	261.0	333.2	50.8	2,216.9

*This program component was part of the state highway rehabilitation component prior to the 2001-03 biennium.