

Issue BRIEF



DELAWARE SECTION

TRANSPORTATION INFRASTRUCTURE

Executive Summary

In a report to the National Surface Transportation Policy and Revenue Study Commission, the American Association of State Highway and Transportation Officials (AASHTO) summarized the issues that we see in Delaware:

“With growing congestion, an aging infrastructure, and continuing safety and security concerns, the traveling public demand high-quality roads, put in place as quickly as possible with sensitivity to the environment and at the lowest possible costs. “Business as usual” approaches are not acceptable—construction costs are increasing at alarming rates, and our customers want projects delivered on time and on budget, and want us to “get in, get out, and stay out.”¹

The Delaware Section of the American Society of Civil Engineers has evaluated some of the critical components of the state’s transportation infrastructure to raise the public’s awareness of the critical role that it plays in supporting the economy, and the safety and overall well-being of the citizens of this state. Delaware is now at a critical defining moment with regards to its future. The transportation systems’ needs have been identified by the state’s two Metropolitan Planning Organizations and input received through the Capital Transportation Program Public Hearing process, and the shortfall in funding has been well defined by a Governor’s Task Force. In addition, counties, municipalities and various business and professional groups have continued to stress the need for adequate transportation funding levels to address the concerns of their constituencies. Without additional funding, the ability of the transportation system to meet the state’s needs will be extremely compromised, threatening the quality of life that is such an essential part of being a Delawarean. The Governor has proposed a mix of alternatives to address the funding shortcomings of the Transportation Trust Fund, which addresses traditional sources of revenue—none of which have been raised in 10 years, and some of which have not been raised in more than 40 years. This initiative needs to be fully implemented, or other equivalent funding identified—such as shifting the Delaware Department of Transportation’s (DelDOT) operating costs back to the General Fund—to meet the current and future needs of the citizens of this state.

The following updates the previous infrastructure assessment performed by the Delaware Section in 2000.

¹ AASHTO March 2007 Transportation: Invest in Our Future, Surface Transportation Policy Recommendations For the National Surface Transportation Policy and Revenue Study Commission, pg. 32

Grades

Sector	Grade 2000	Grade 2007	Grade 2010 (with proposed funding)	Grade 2010 (without proposed funding)
Highways	C	C	C+	D-
Bridges	C	B	B	C-
Mass Transit	D	C	C	D-

Overview of Grading System Methodology

Following the precedent set by the Seattle and Colorado Sections of ASCE, the review teams for each infrastructure sector assigned letter grades based on consideration of three general evaluation criteria: (1) condition and performance indices, (2) need versus capacity, and (3) funding versus need. Each review team had the flexibility to define specific criteria within these guidelines that was best suited to evaluating their infrastructure sector. The intent was to be able to compare grades between systems, while recognizing that the characteristics and quality of available data would be highly variable and a certain amount of subjective, but expert, judgment was necessary.

Condition and Performance: The condition and performance indices characterize the physical condition of infrastructure in Delaware. The condition index scale below was provided as a general guideline for grading under this category.

CONDITION INDEX SCALE:

LETTER	GRADE	RANGE	DESCRIPTION
A	Excellent	85 – 100	No noticeable defects. Some aging or wear may be visible.
B	Good	70 – 84	Only minor deterioration or defects are evident.
C	Fair	40 – 69	Some deterioration or defects are evident, but function is not significantly affected
D	Poor	10 – 39	Serious deterioration in at least some portion of the system. Function is inadequate.
F	Failed	0 - 9	No longer functional. General or complete failure of a major component.

Need versus Capacity: For transportation, this criterion relates to the demand on the various systems (i.e., traffic versus system capacity). This is a critical evaluation criterion for Delaware because of our state's steadily increasing population and growth of communities in the central and southern areas of the state, which are predominantly rural, thus placing a strain on the existing transportation infrastructure.

Funding versus Need. The third criterion for evaluating each infrastructure system reflects the status of funding that is dedicated to maintaining, replacing and improving existing infrastructure, and to building new infrastructure that is needed to keep pace with growth. The adequacy of the infrastructure system has been shown to be directly related to maintaining and enhancing the economic vitality, quality of life and safety for the citizens of a city, state and nation.

Infrastructure systems need funding that is dedicated, indexed, steady and long-term. Dedicated funds such as user fees should be used only for the infrastructure systems for which they are raised. Indexing means that the funds need to increase as the use of the system increases, and they must also account for rising costs of materials and labor required to maintain and upgrade. The user fees utilized to provide revenues to the federal trust funds should be indexed to an appropriate inflation index, thus allowing the available trust funds to grow at a rate that at least matches inflation.

Maintenance and construction costs also need to be considered in the evaluation of funding. Steady funding provides for maintenance that extends the life of infrastructure. Long-term, multi-year funding plans should account for growth estimates so that projects can be designed and constructed in anticipation of needs, and not simply in reaction to inadequate capacity or problems caused by poor maintenance.

A composite grade is provided that considers the assessment of the three general evaluation criteria described above. This gives an overall indication of the condition of the specific sector of the transportation system in the State of Delaware.

A. Highways

1. Background

- DeIDOT is responsible for maintaining more than 12,000 lane miles of roads. This represents 89 percent of the total number of lane miles for the entire state, as compared to the national average of 20 percent for other states;
- DeIDOT installs, monitors and maintains more than 900 traffic signals;
- The number of vehicle registrations and the amount of vehicle miles traveled are increasing at a higher rate than the population.

General Information²:

	2002	2003	2004	2005	2006	Change
Registered Vehicles	755,272	778,016	803,942	824,351	847,692	12.2%
Licensed Drivers	577,581	591,713	604,124	614,417	619,877	7.3%
Vehicle Miles Traveled*	8,838	9,010	9,263	9,248	9,700 est.	9.8%
Population	807,382	818,010	838,913	840,692	854,977	5.9%

* - Recorded in millions of miles

2. Pavement Condition

Pavement Condition Rating (PCR)

DeIDOT uses a rating system for pavements based on the Federal Highway Administration (FHWA) Present Serviceability Index (PSI) defined as Pavement Condition Rating (PCR). The survey to determine the PCR is conducted every year. According to this system, pavements are considered good if they have PCR greater than 60, fair for PCR between 50 and 60, and poor for PCR less than 50. The stated goal for DeIDOT is to maintain 85 percent of the roadways at Fair or Good ratings. As can be seen from the following chart, DeIDOT has achieved this goal consistently since 2000 (data prior to 2000 was not readily available). However, the impact of increasing travel, increasing construction costs and stagnant revenue is beginning to have an effect, as can be seen in the increasing percentage of pavement rated Poor.

Maintaining a high pavement condition rating is important for several reasons. First, it provides the traveling public with an acceptable level of ride quality, increasing fuel efficiency and minimizing vehicle maintenance costs. Second, a pavement with a relatively smooth and consistent surface is safer than one with a rough and inconsistent surface. Finally, and perhaps most importantly, it is a sound fiscal practice to maintain pavement to such a level because it extends the useful life of the pavement, thereby minimizing the disruptions to traffic and increased safety risks associated with road construction activities.

² DeIDOT Transportation Facts 2005 (DeIDOT Planning)

Overall Pavement Condition Rating (OPC)³

Year	Centerline Miles	Good	Fair	Fair or Better	Poor
2000	3462	68.7%	23.7%	92.4%	7.6%
2001	1204	80.8%	11.3%	92.1%	7.9%
2002	4175	76.6%	13.6%	90.2%	9.8%
2003	4464	77.5%	14.4%	91.9%	8.2%
2004	4464	73.8%	17.4%	91.2%	8.8%
2005	4453	68.9%	20.5%	89.4%	10.5%
2006	4480	69.3%	20.8%	90.1%	10.0%

Goal = 85 percent of roads to be rated fair or good.

Partial data collection was completed for 2006

3. Congestion

a. Need Versus Capacity

Tracking congestion is difficult. The Delaware Center for Transportation undertakes an annual field data collection effort. This includes assessing percent time in delay on 250-Critical Miles throughout the state. These segments represent the most crucial and important segments on Delaware's road network. The data for 2000, 2001 and 2005 are reported below.

Year	AM Percent Time in Delay Percent	PM Percent Time in Delay Percent
2000 ^{4, 5}	16.0	16.0
2001 ⁶	15.0	20.9
2005 ⁷	12.3	16.3

b. Cost of Congestion

Another important source of data on congestion is the Urban Mobility Report produced each year by the Texas Transportation Institute. The report tracks congestion and its impacts in urban areas. Unfortunately, while the format was being revamped a report was not issued in 2004. Furthermore, congestion in Delaware is reported as part of the Philadelphia metropolitan area that includes Pennsylvania, New Jersey, Delaware and Maryland, and this reporting area has also changed over time. The authors of the report caution against

³ DelDOT Transportation Trust Fund Administration

⁴ Application of Global Positioning System (GPS) to Travel Time and Delay Measurement, 2000 Phase, Delaware Center for Transportation, University of Delaware, September 2001.

⁵ AM and PM data were aggregated for analysis in 2000.

⁶ Application of Global Positioning System (GPS) to Travel Time and Delay Measurement, 2001 Phase, Delaware Center for Transportation, University of Delaware, April 2003.

⁷ Application of Global Positioning System (GPS) to Travel Time and Delay Measurement, 2000 Phase, Delaware Center for Transportation, University of Delaware, (DRAFT) February 2007.

using the data to explore trends, as the methodology changes from year to year. Nevertheless, the data reported below on average hours of delay per traveler and estimated congestion cost underscore the magnitude and extent of congestion with average annual delay approaching the average work week.

Year	Annual Delay per Traveler ⁸ (hours)	Congestion Cost (millions) ⁵
1993	25	
2001 ⁹	17	\$1,515
2002	40	\$1,871
2003	38	\$1,884

c. Source of Congestion

Congestion in Delaware is heavily influenced by the significance and usage of the I-95 corridor and the seasonal effects of beach traffic. While it is generally acknowledged that it is not appropriate or feasible to build our way out of congestion, congestion management, operational improvements, targeted capacity expansion and promotion of public transportation and ridesharing are all feasible strategies that can be effectively utilized if provided the proper level of funding for planning, engineering, implementation, operation and maintenance.

4. Air Quality

Air quality is important for health and quality of life. As mobile emissions (vehicles) is a significant cause of degraded air quality, federal funding for transportation investments requires that Delaware be in conformity with air quality standards set by the United States Environmental Protection Agency. New Castle County is designated as a **moderate non-attainment for ozone** and is considered in **non-attainment for fine particulate matter (PM2.5)**. [11]

Year	Particulate Matter (PM) 2.5 ¹⁰ ($\mu\text{g}/\text{m}^3$)	Ozone ¹¹ (ppm)
2002	~15	1.0
2006	~15	0.9
Standard	~15	0.8

⁸ The 2005 Urban Mobility Report, David Schrank and Tim Lomax, Texas Transportation Institute.

⁹ Includes only PA and NJ

¹⁰ US EPA, <http://www.epa.gov/airtrends/pm.html#pmloc>, Accessed 4/23/07

¹¹ US EPA, <http://www.epa.gov/air/airtrends/ozone.html#ozloc>, Accessed 4/23/07

5. Safety

a. Accidents

In 2006, there were 145 fatal accidents in the state of Delaware, an increase of 8 percent from 2005. This translates into a Fatal Accident Rate of 1.49 per million vehicle miles traveled. This rate is excessive when compared to rates of neighboring states, such as 1.09 for Maryland and 1.01 for Pennsylvania. Only New Jersey has a similar rate of 1.50. Also, Delaware's rate of 1.49 is grossly above the national goal of 1.0.

Many causes of these accidents, such as inattentive or aggressive driving, are the responsibility of the driver. However, it has been shown that increased congestion and a decrease in the quality of the infrastructure system also contribute directly to increases in the number and severity of accidents.



Year	Fatality Rate per 100 Million Vehicle Miles Traveled ¹²
2001	1.58
2002	1.40
2003	1.57
2004	1.44
2005	1.41
2006	1.49 ¹³

¹² Fatal Accident Rates, NHTSA Traffic Safety Facts, Delaware, 2005

¹³ Delaware Office of Highway Safety

b. Costs

Accidents cost the citizens and employers of Delaware millions of dollars each year. According to the National Highway Traffic Safety Administration, the costs to Delaware employers alone for On and Off the Job Motor Vehicle Crash Injuries was 123 million dollars in 2000 (the last year for which data is available). Adding that to the financial cost to those involved in the accidents points to a pressing need for increased funding for roadway improvements.

	Employer Costs of On- and Off-the-Job Motor Vehicle Crashes, 2000¹⁴
Delaware	\$123 Million
USA	\$41.5 Billion

B. Bridges

1. Background

- DeIDOT is responsible for maintaining more than 1,300 bridges which have over 7.3 million square feet of bridge deck
- DeIDOT maintains more than 800 bridges on the National Bridge Inventory (NBI), which includes bridges over 20 feet in length and those that require inspection every two years;

2. Condition

The condition of bridges is measured using the “Bridge Condition Rating” (BCR), which is based on the FHWA publication “Recording and Coding Guide for the structure Inventory and Appraisal of the Nation’s Bridges”. The BCR uses a measurement scale that is based on a condition index ranging from 0 to 9: 0 to 4 for substandard bridges and 9 for bridges in perfect condition. The goal is to maintain 75 percent of the bridge systems at a Good or better condition level.

As can be seen in the following tables, DeIDOT does an excellent job in maintaining the structural integrity of its bridge systems. The increasing number of bridges that are Functionally Obsolete is notable. However, bridges are functionally obsolete because the deck is too narrow, there is insufficient clearance, the approaches are subject to flooding or the load rating is low. Consistent with other states’ departments of transportation, DeIDOT addresses safety concerns first, then structural issues and then functional issues. Given the constrained resources to which DeIDOT is subject, it is not surprising that the number of functionally obsolete bridges is increasing.

¹⁴ NHTSA, What Do Traffic Crashes Cost, 2002 Update

Year	Total Number of Bridges	Structural Rating ¹⁵		
		Good	Fair	Poor
2000	1350	1,021 (75.6%)	245 (18.1%)	84 (6.2%)
2001	1359	1,057 (77.8%)	232 (17.1%)	70 (5.2%)
2002	1386	1,011 (72.9%)	273 (19.7%)	102 (7.4%)
2003	1360	1,012 (74.4%)	259 (19.0%)	89 (6.5%)
2004	1371	1,029 (75.1%)	256 (18.7%)	86 (6.3%)
2005	1374	1,048 (76.3%)	243 (17.7%)	83 (6.0%)

Year	Total Number of Square Feet	Deck Rating ¹⁵		
		Good.	Fair.	Poor.
2000	8,611,605	6,544,268 (76.0%)	1,545,144 (17.9%)	522,193 (6.1%)
2001	8,650,618	6,573,433 (76.0%)	1,570,299 (18.2%)	506,886 (5.9%)
2002	8,653,408	6,522,812 (75.4%)	1,650,368 (19.1%)	480,228 (5.5%)
2003	7,145,202	6,932,464 (97.0%)	172,061 (2.4%)	40,677 (0.6%)
2004	7,163,000	6,731,463 (94.0%)	399,554 (5.6%)	31,983 (0.4%)
2005	7,241,809	6,808,227 (94.0%)	390,978 (5.4%)	42,604 (0.6%)

NBI Bridges¹⁶

Year	NBI Bridges	NBI Structurally Deficient		NBI Functionally Obsolete	
		Number	Percent	Number	Percent
2000	796	39	4.9	98	12.3
2001	803	41	5.1	100	12.5
2002	807	36	4.5	102	12.6
2003	815	35	4.3	99	12.1
2004	815	37	4.5	98	12.0
2005	821	33	4.0	104	12.7
2006	832	19	2.3	131	15.7

¹⁵ DelDOT Transportation Trust Fund Administration

¹⁶ DelDOT Bridge Management Section

C. Mass Transit

1. Background

Mass transit in Delaware is primarily provided by the Delaware Administration for Regional Transit (DART) First State. DART is operated by the Delaware Transit Corporation (DTC), a division of the Delaware Department of Transportation. DART operates fixed route bus service and demand responsive service (also referred to as Paratransit) throughout the state. DART operates:

- 68 fixed routes,
- 193 Paratransit routes,
- 41 Park and Ride lots: 32 in New Castle County, 7 in Kent County and 2 in Sussex County¹⁷,
- 14 Park and Pool lots, and
- 2,410 bus stops

DART also contracts with the South Eastern Pennsylvania Transit Authority (SEPTA) to provide rail service from Delaware to Philadelphia. Other transit services, provided entirely by others or with DeIDOT funding assistance, include the following¹⁸:

- UNICITY bus system, a service of the City of Newark;
- University of Delaware Shuttles;
- Sussex County Dial-A-Ride Connector;
- Cape May-Lewes Ferry;
- CHEER, an independent, private non-profit agency serving the needs of senior citizens in Sussex County;
- Harrington-Dover Shuttle;
- Wilmington Trolley; and
- Jolly Trolley of Rehoboth Beach.

Most of the data presented below applies to DART and was obtained from the Data Tables for the 2005 National Transit Database Report Year, (<http://www.ntdprogram.gov/ntdprogram/pubs/dt/>, Accessed April 21, 2007)

Although ridership is growing, and DART First State has a relatively new fleet, providing transit service to a growing, yet aging and dispersed population, is challenging. Farebox recovery is relatively low (approximately 17.7 percent for bus service in 2005¹⁹), but not inconsistent with systems of similar type and size. DART's service area is characterized as low density with relatively few employment centers. This in itself is a challenge. However, a safe and efficient public transportation system is important to support mobility, economic vitality, improved air quality and quality of life, especially for those citizens who face economic, physical or mental challenges. Achieving these goals requires partnerships among DTC, state and federal agencies, counties, municipalities, employers, developers and the public.

¹⁷ Delaware Transportation Facts 2005

¹⁸ Delaware Transit Links, American Public Transit Association, http://www.apta.com/links/state_local/de.cfm#A2, Accessed April 22, 2007.

¹⁹ Table 26, National Transit Database

2. Condition

Year	Total Ridership ²⁰ (000's)	DART Unlinked Passenger Trips ²¹ (000's)	Number of Vehicles ³	Vehicles Miles (000's) ³	Passenger Miles (000's) ³	*Average Age of Fleet (years) ²²
2001	9,260.3	8,542.9	401	11,564.9	41,595.1	5.2
2002	9,045.2	8,298.2	396	12,262.3	46,216.4	5.8
2003	8,785.3	8,062.1	440	12,052.5	45,474.0	2.8
2004	9,224.9	8,441.3	410	12,821.3	50,124.6	3.4
2005	9,602.7	8,764.1	441	14,087.8	57,749.0	3.9

* Includes both Fixed Route and Paratransit vehicles.

²⁰ 2000-2003 Ridership data from "Transitioning to Transit," DTC's Long Range Plan 2000-2025, <http://www.dartfirststate.com/reports/00-25/dtclrp.pdf>, Accessed April 20, 2007 and DTC Staff.

²¹ Table 19, National Transit Database

²² Table 25, National Transit Database

D. Funding, Costs and Demand

1. Funding Sources

The transportation system is funded through a mix of federal, state and direct user funds—such as fares on buses. Delaware’s state funding is contained in the Transportation Trust Fund (TTF) which was originally established in 1987 with transportation related funding sources such as tolls, document fees and fuel taxes. The TTF was originally identified to be used to fund construction and maintenance costs, with DelDOT’s operating costs remaining in the state’s General Fund along with the operating costs of other state agencies. The General Assembly moved DelDOT’s operating costs from the General Fund to the TTF in the 1990s, but additional funding resources were not added to the TTF.

2. Costs

For transit, operating costs are the challenging element.

Transit Funding and Operating Costs

Year	Federal Funding (000's) ²³	State Funding (000's) ²⁶	Direct Funds (000's) ²⁴	Capital Costs (000's) ²⁵	Operating Costs ²⁶
2002	\$13,264.4	\$50,143.1	\$9,602.7	\$17,055.9	\$55,954.2
2003	\$21,652.0	\$53,746.6	\$10,062.7	\$25,731.7	\$56,735.0
2004	\$8,030.3	\$50,496.8	\$11,579.9	\$8,205.1	\$58,826.9
2005	\$12,905.4	\$59,759.8	\$11,523.5	\$16,384.9	\$64,668.0

All sectors of the transportation system (transit, planning, design, right-of-way, construction, operations and maintenance) have been subject to unprecedented price increases in many of their required commodities.

**Changes in Cost²⁸
2000-2006**

ITEM	PERCENT CHANGE
Fuel	+183.8
Hot-Mix	+140.5
Steel	+64.7
Land	+46.0
Concrete	+24.2
Equipment Operator Labor	+36.9

²³ Table 1 and Table 7, National Transit Database

²⁴ Table 1, National Transit Database

²⁵ Table 11, National Transit Database

²⁶ Table 12, National Transit Database

²⁸ Governor’s Budget Presentation, January 2007

3. Demand

Over the same time frame, demand on the system has increased and applied greater and greater pressure on the limited resources.

**Increased Transportation Demand²⁷
2000-2006**

ITEM	PERCENT CHANGE
Transit Service Hours	+33.3
Transit Service Miles	+33.0
Vehicle Registrations	+17.3
Licensed Drivers	+10.0
Population	+8.7

Since the TTF was established in 1987, several laws, regulations and policies have also been enacted or changed that require additional resources. These include, but are not limited to:

- Erosion, sediment and stormwater management regulations;
- Americans with Disabilities Act-Pedestrian access accommodations;
- Clean Air Act amendments;
- Bicycle accommodations;
- Night-time work restrictions in residential areas;
- Tree replacement and reforestation;
- Wetland identification and mitigation requirements;
- Transportation system security and emergency management; and
- Paratransit accommodations.

²⁷ Governor's Budget Presentation, January 2007

E. Recommendations

From the Governor's presentation to the state legislators in her 2008 financial overview, she proposed the following to meet the current and future needs of the transportation system:

- Increase the Motor Fuel Tax five cents per gallon for fiscal year 2008. The last Motor Fuel Tax increase was in 1995. Delaware currently has the lowest Motor Fuel Tax (\$0.22) in comparison to Maryland (\$0.242) and Pennsylvania (\$0.381).
- Increase the Documentation Fee for motor vehicles 1.25 percent in fiscal year 2008 and 0.50 percent in fiscal year 2009. The last increase in the documentation fee was in 1993. In comparison to Maryland (5.00 percent) and Pennsylvania (6.00 percent), Delaware (2.75 percent) currently has the lowest documentation fee.
- Increase the tolls on I-95 and SR-1. This will be done by implementing the following:
 - Eliminate the 10 p.m. to 6 a.m. commercial E-Z pass discount on I-95 for fiscal year 2008;
 - Eliminate all SR-1 E-Z Pass discounts on SR-1 in fiscal year 2008;
 - Raise the tolls \$1 at the Biddles Corner and Dover toll plazas; 50 cents at the Boyds Corner and Denny Road toll plazas, and 25 cents at the Smyrna toll plazas for fiscal year 2009. The SR-1 toll rates have never been increased since they were first implemented at Dover and Smyrna in 1993.
- Raise vehicle registration fees 50 percent. Delaware has not increased its vehicle registration fee since 1965. Current annual area registration fees are \$20 (Delaware) compared to \$36 in Pennsylvania and \$64 in Maryland.

The Delaware Section of the American Society of Civil Engineers supports the Governor's initiatives toward addressing and funding Delaware's transportation needs and encourages the state's legislators to enact these or other equivalent funding measures.