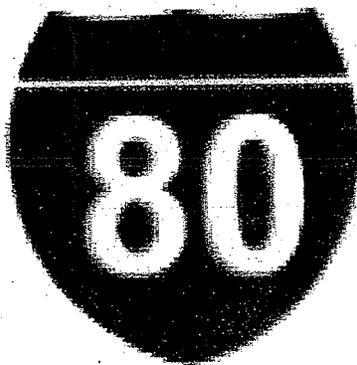


# **I-80 Tolling Study**



Study Prepared by  
Pennsylvania Department of Transportation  
February 2005

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## Executive Summary

This is a study by the Pennsylvania Department of Transportation (PennDOT) to evaluate the viability and implications of placing tolls on I-80 across Pennsylvania. The study benefited from staff assistance from the Pennsylvania Turnpike Commission (PTC) for evaluation of tolling scenarios, and for development of operations and maintenance costs, revenue projections and cash flow analysis. The study built upon a 1994 feasibility study conducted by Gannett Fleming, Inc. for the PTC. The study assumed that a converted toll facility would provide a premium level of service to the user, similar to those provide by the existing Pennsylvania Turnpike.

I-80 has been nicknamed the "Keystone Shortway," and traverses the northern tier of the Commonwealth over a length of 311 miles with 57 interchanges and 16 roadside rests. Tolling of I-80 has previously been proposed as a means to pay for the historically high cost of continuing reconstruction and maintenance of I-80 and because the high volume of through travelers could provide a substantial source of revenue. This study provides an update to several previous reports on this subject.

A number of regulatory hurdles would have to be met to convert I-80 to a toll road. Historically, states have not been allowed to toll an existing free Interstate highway. However, current federal transportation law allows for a pilot program under which three pilot states could propose collecting tolls for the purpose of reconstructing or rehabilitating an Interstate highway. An application and environmental review process with the Federal Highway Administration would be required to gain approval. State authorizing legislation would also be required to move forward with a tolling alternative.

In the past, commuters, vacationers and truckers have complained about the condition of I-80. I-80 was built in the 1960's and 1970's with a concrete pavement design that did not hold up to heavy traffic and, in fact, is no longer used. Unfortunately, I-80 began to deteriorate prematurely, and its ride quality was very poor. As a result, PennDOT initiated a program in the 1980's to methodically rebuild I-80 over its entire length. During the past 24 years, an average of \$46 million in state and federal funds has been spent per year to rebuild I-80. In some years, expenditures topped \$100 million.

Currently, one section of original pavement remains along I-80. This last section, located in Centre County, has been bid and reconstruction will begin in 2005. Travelers on I-80 now experience similar ride conditions as compared to other Interstate highways in Pennsylvania and in other states. Furthermore, PennDOT now has I-80 on a far more manageable preservation cycle.

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Proposed charges would average \$0.08/mile for passenger vehicles and \$0.24/mile for an 80,000 pound truck. Toll barriers would be spaced so that users would be able to make free trips between barriers. However, each time any motorist crosses a toll barrier, an average toll of \$2.50 would be charged. For a truck, a toll of \$7.50 would be charged.

Implementation of the toll system was assumed to be staged from west to east in four sections. This staging concept was adopted to generate sufficient revenue to bond finance installation of the initial fixed facilities and then, subsequently, the remaining fixed facilities and larger roadway improvements along the eastern sections of I-80. The four sections are:

1. Ohio State Line to East of US 219
2. East of US 219 to East of I-180
3. East of I-180 to East of PA 115
4. East of PA 115 to New Jersey State Line

Staged implementation of the toll system would alleviate the need to perform all improvements and conversion activities at one time. It would also allow for toll revenues to flow sooner and would delay making the most costly improvements in the eastern portion of the corridor, until a point where toll revenues would handle the required cash flow.

Various costs were estimated to address converting I-80 to a toll road including the cost to build the tolling infrastructure, the capital cost of upgrading all of I-80 to current design standards, the ongoing cost to resurface and reconstruct I-80, and the annual operations and maintenance cost. All costs were developed in current day (2004) dollars. Conversion costs total \$665 million, which includes construction of toll collection facilities, maintenance facilities and police stations. Initial capital improvements total over \$2.2 billion which addresses bringing I-80 up to current highway standards. Annual Operations and Maintenance is estimated to cost \$100 million/year based on current similar costs on the Pennsylvania Turnpike. Finally, costs to keep I-80 on an acceptable resurfacing/reconstruction schedule are estimated to average \$65 million per year.

A cash flow analysis compared expected toll revenue against the annual operations cost and capital costs noted above. All costs were adjusted for inflation throughout the analysis period. This cash flow analysis determined that converting I-80 to toll would be financially achievable over the long-term. Securing bond financing would need to occur early to pay for the construction of the toll facilities, and several additional influxes of bond revenue would be required to pay for all capital improvements. Debt

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A cash flow analysis compared expected toll revenue against the annual operations cost and capital costs noted above. All costs were adjusted for inflation throughout the analysis period. This cash flow analysis determined that converting I-80 to toll would be financially achievable over the long-term. Securing bond financing would need to occur early to pay for the construction of the toll facilities, and several additional influxes of bond revenue would be required to pay for all capital improvements. Debt service would run 35 years after the initial bond issue, and positive cash flow balances would occur in the later years.

Considerable lead time would be required to fully implement a toll system on I-80. State enabling legislation is needed to be able to proceed with the tolling of I-80. The Federal approval process, including environmental clearance for the capital improvements would require several years before conversion could begin. Conversion of all 311 miles to toll is anticipated to take approximately nine years. The earliest that toll collection could begin is projected to be six years after approval to proceed. Tolls would be initiated in the western section of the corridor, with the other three sections following in years 9, 10 and 11. Design and construction of initial capital improvements would be expected to take 14 to 18 years. Figure 2 shows the projected time line for completion of key activities, based on an approval to proceed.

Based on this study, it is recommended that tolling of I-80 not be pursued at this time. This conclusion is based on the following:

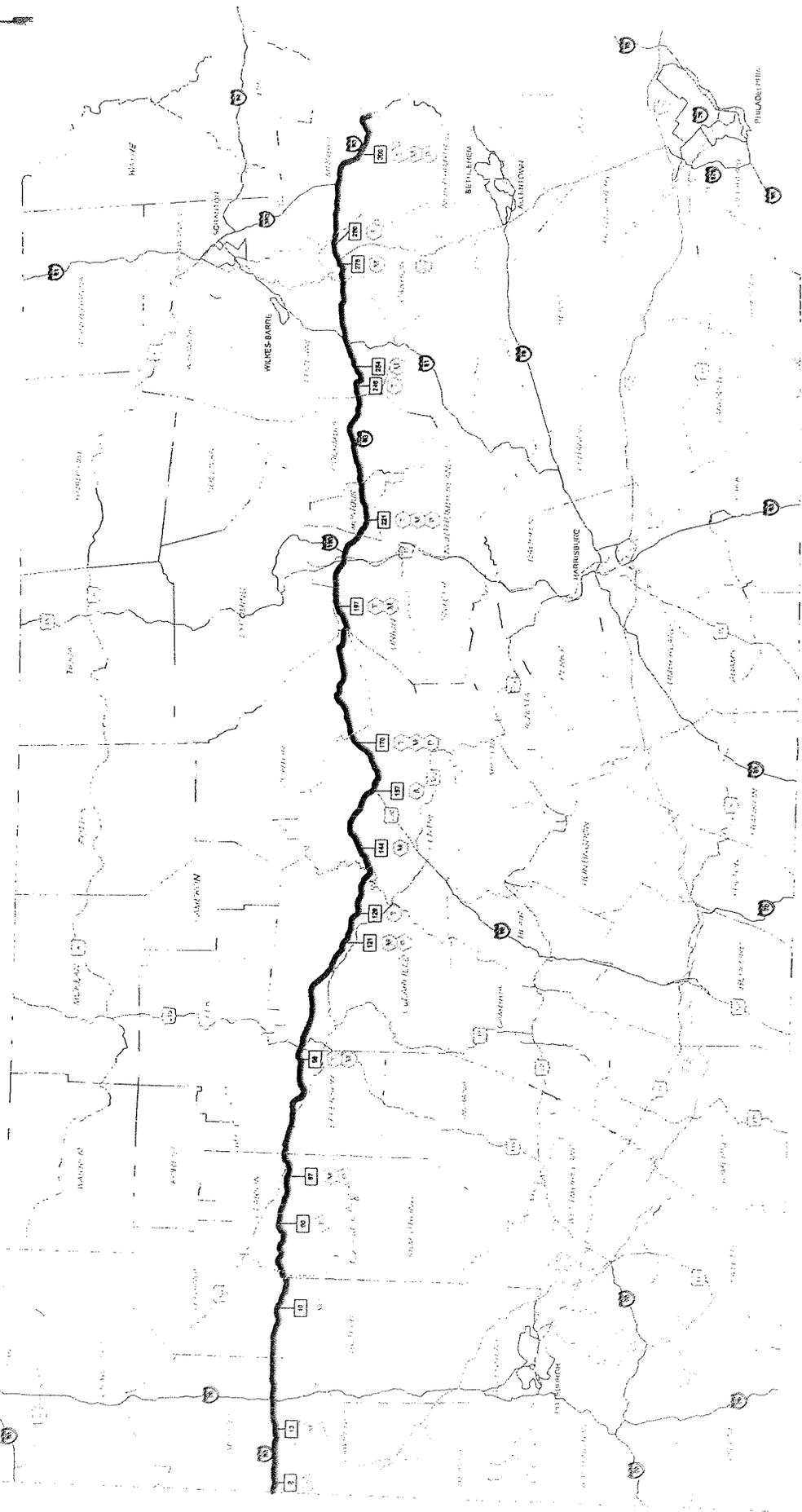
- The initial impetus for converting I-80 to a toll road no longer exists;
  - The once deteriorated condition of I-80 has been corrected by PennDOT. The single remaining section of I-80 that needs to be rebuilt, located in Centre County, will be under construction next year.
  - The annual cost of maintaining I-80 in acceptable condition is no longer an abnormal drain on PennDOT's budget.
  - Out of state trucks pay for their use of I-80 through their participation in interstate compacts for registration and fuel use.
- Converting I-80 to a toll road probably does not meet current federal criteria, as outlined in TEA-21. The criteria, however, might be relaxed during reauthorization of the federal transportation program.
- Motorists and truckers traveling along I-80 would be charged \$2.50 and \$7.50 respectively for each toll barrier they cross. Motorists and truckers traveling along the entire 311 mile length of I-80 would be charged \$25.00 and \$75.00 respectively. Traveling on I-80 today is free.

## I-80 Tolling Study

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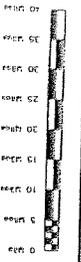
- If a toll system was installed on I-80, motorists and truckers would pay both the applicable toll plus the current gas tax and other various fees that finance the Pennsylvania Motor License Fund.
- Since the benefits to users of an I-80 toll road would be insignificant for a considerable period of time, it would be wise to avoid investing almost \$700 million in barriers and maintenance facilities that, themselves, produce no value. A better philosophy might be to raise user fees by a commensurate amount and use the revenue to modernize the eastern section of I-80 on a shorter term basis.

# I-80 TOLLING STUDY



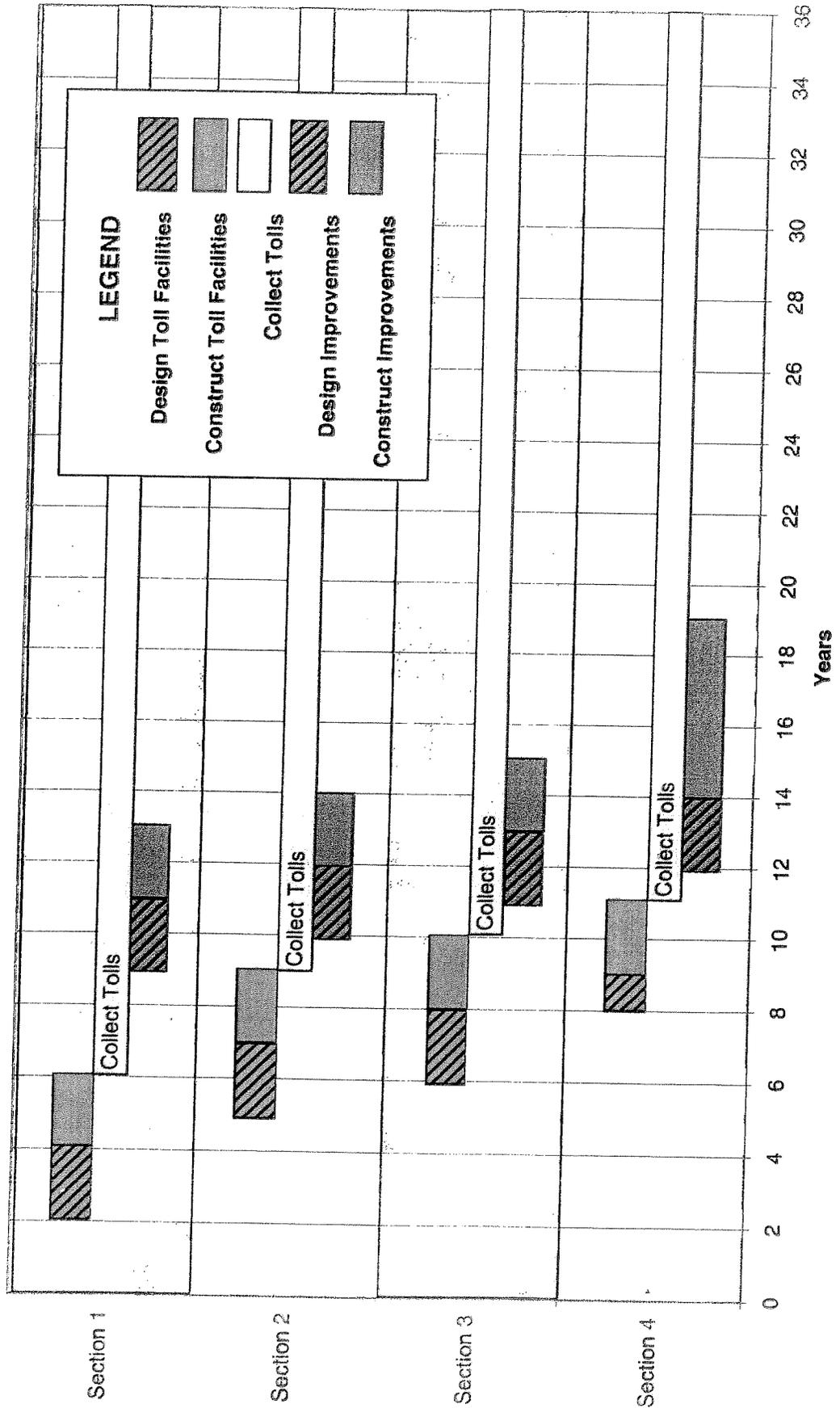
**LEGEND**

- I-80**
- M** Maintenance Facility (12)
- P** Police Station (9)
- T** Toll Plaza (10)
- A** Administration Building (1)



Pennsylvania Turnpike Commission  
Figure 1

**FIGURE 2**  
**I-80 Time Table for Toll Collection and Improvements**



# I-80 Tolling Study

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## Introduction/Purpose

The purpose of this study is to examine the costs and impacts of converting I-80 into a toll road. The concept of placing tolls on I-80 has been the subject of debate for a number of years.

There have been several perceptions regarding I-80. First, there has been considerable road work along I-80 which has led to concerns that the continual upkeep of I-80 is a large drain on available statewide resources. It has been proposed that financing the reconstruction and ongoing maintenance of I-80 through toll revenue would allow federal and state funds presently expended on I-80 to be utilized on other highways throughout the Commonwealth. Second, the fact that I-80 provides a direct free route between the major metropolitan areas of New York and Chicago has led to the belief that many out-of-state motorists, especially trucks, are passing through Pennsylvania on I-80 without paying their fair share of the upkeep of the highway.

The concept of tolling I-80 was previously raised by a Governor's Toll Roads Task Force in the "Pennsylvania Toll Roads Feasibility Study" completed in December 1983. The Pennsylvania Turnpike Commission had Gannett Fleming, Inc. complete a study in 1994 on more specific aspects of the feasibility of tolling I-80 and other interstate highways. This report provides an update of data in the 1994 report along with a review of the current tolling authority and requirements.

This study was undertaken by the Pennsylvania Department of Transportation (PennDOT) with staff assistance from the Pennsylvania Turnpike Commission (PTC). A study team was assembled to answer questions pertaining to finances, timing, viability and other issues. Consultant assistance was employed in development of capital improvements required along I-80.

## Background

I-80 traverses the northern tier of the Commonwealth over a length of 311 miles and contains 57 interchanges and 16 roadside rest areas. It is the longest east-west interstate route in Pennsylvania. I-80 has been nicknamed the "Keystone Shortway" as it is part of the most direct interstate route between Chicago and New York City. I-80 was originally conceived in 1938 by a group of Williamsport community leaders who wanted tourists from the Midwest to go through their community on the way to the New York World's Fair in 1939. World War II delayed matters, and it was in 1952 that a Northern Pennsylvania Turnpike Committee envisioned a proposed toll road. State legislation in 1955 authorized the construction of a cross-state toll road.

# I-80 Tolling Study

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Following the 1956 Federal-Aid Highway Act, I-80 was designated as part of the nation's Interstate Highway System, and its construction became eligible for 90 percent federal-aid highway dollars. Construction began in 1959, and the first section, from the New Jersey state line to East Stroudsburg, opened in 1960. On September 17, 1970, the final section near Milesburg was opened to traffic. The original cost of construction for the entire highway was \$424 million.

I-80 offers a "free" east-west route through Pennsylvania. The New York Thruway to the north and the Pennsylvania Turnpike to the south are the major east-west alternatives, and both these routes are currently toll roads. I-80 is a toll road in Ohio and Indiana to the west, but it is a "free facility" in Pennsylvania and eight other states it traverses in the U.S. While it is true that auto users can pass through Pennsylvania on I-80 without stopping for fuel or food, commercial vehicle drivers are required to account for their miles driven in Pennsylvania. All Interstate commercial vehicles greater than 26,000 pounds are required to participate in the International Registration Plan (IRP) and the International Fuel Tax Agreement. Through these compacts, commercial users must maintain travel logs. Based on relative mileage driven in each state, registration fees are apportioned among the states, and fuel taxes are credited to each of the states.

## **Condition of I-80**

In past years, commuters, vacationers and truckers have registered complaints about the condition of I-80. The original concrete design was susceptible to premature slab cracking. While current design standards have corrected this flaw, I-80 deteriorated quickly in the early years. Since the early 1980's, PennDOT has spent considerable resources in methodically reconstructing segments of I-80 across the Commonwealth. PennDOT records show that over the period from 1980 to 2004, PennDOT has spent over \$1.1 billion in rehabilitation and reconstruction of I-80. In some years, capital expenditures exceeded \$100 million. The average annual capital expenditure over the past 24 fiscal years was approximately \$46 million, without accounting for inflation. Further detail is contained in Appendix A.

Currently, there is only one section of original pavement along I-80 which has not been upgraded. That section, in Centre County, is scheduled for reconstruction in 2005. Today, annual surveys of Interstate ride quality indicate that the rideability of I-80 is now similar to other Interstate highways in Pennsylvania. Furthermore, conditions compare favorably to average conditions on the nation's Interstate System.

While the reconstruction of I-80 has required significant federal and state resources, the situation is more stable today. PennDOT has estimated that I-80 is now on a more

cyclical preventive maintenance schedule. Therefore, while continual attention must be placed on maintaining I-80 and all other Interstate highways in Pennsylvania, the preservation of I-80 is expected to be manageable.

Routine maintenance costs were reviewed for a five year history. This shows an annual average of \$8.3 million on routine maintenance, which includes activities such as general highway maintenance, signs and markings, roadside vegetation management, rest area operations and winter maintenance.

## **Legislative Authority**

The legislative authority to implement tolls at both the state and federal levels was also examined.

Until 1998, there was no legal mechanism by which a state could convert a free Interstate highway to a toll road. The passage of the Transportation Equity Act for the 21<sup>st</sup> Century (TEA-21) in 1998 changed that by establishing a pilot program under which a State may collect tolls on an Interstate highway for the purpose of reconstructing or rehabilitating an Interstate highway that could not otherwise be adequately maintained or functionally improved without the collection of tolls (Section 1216(b)). TEA-21 allowed for up to three pilot projects nationally.

The selection process and the accompanying submittal of required information for candidates under this pilot program is administered by the Federal Highway Administration in two phases. In Phase 1, States are required to submit general information on the candidate interstate route. In Phase 2, a candidate project will be required to satisfy compliance with the National Environmental Policy Act (NEPA) process.

An application from a State must address items and conditions set forth in Section 1216(b)(3) of TEA-21, as follows:

- An identification of the facility on the Interstate system proposed to be a toll facility, including the age, condition, and intensity of use of the facility.
- In the case of a facility that affects a metropolitan area, an assurance that the metropolitan planning organization established under 23 U.S.C. 134 for the area has been consulted concerning the placement and amount of tolls on the facility.
- An analysis demonstrating that the facility could not be maintained or improved to meet current or future needs from the State's apportionments and allocations made available by the TEA-21, including amendments to the act, and from revenues for highways from any other source without toll revenues.

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- A facility management plan that includes:
  - A plan for implementing the imposition of tolls on the facility.
  - A schedule and finance plan for the reconstruction or rehabilitation of the facility using toll revenues.
  - A description of the public transportation agency that will be responsible for implementation and administration of the pilot project.
  - A description of whether consideration will be given to privatizing the maintenance and operational aspects of the facility, while retaining legal and administrative control of the portion of the Interstate route.

In addition, the application should:

- Show how the plan for implementing tolls takes into account the interests of local, regional and interstate travelers.
- Provide an environmental scoping analysis of the proposed project's impacts to the social, economic, and environmental resources located in the vicinity of the project. This scoping analysis should form the basis for the more detailed environmental evaluation done in Phase 2.
- The analysis should show what effect the proposed construction, as well as the imposition of tolls, may have on such resources as:
  - current or planned land uses,
  - historic, cultural, natural, or recreational resources,
  - economic or community resources,
  - safety and livability,
  - ambient light, noise, and air quality levels,
  - sensitive receptors, and
  - minority and low-income populations.

At the current time, reauthorization of TEA-21 (TEA-3) has not been completed, but the pilot toll program is expected to be continued. Under TEA-3, it is expected that the pilot program will be changed to remove the requirement to show that the facility cannot be adequately maintained without the collection of tolls and replace it with a requirement which demonstrates that tolling would be the most efficient, economical or expeditious way to advance the reconstruction or rehabilitation of the highway.

At the state level, legal staff has determined that there is no existing State legislative authority to impose tolls on Interstate 80. State enabling legislation would be required to convert I-80 to a toll road and to authorize PennDOT, PTC or some other body to act as the operating entity.

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Considerable time would be needed to comply with all state and federal requirements and to implement tolls. State enabling legislation would be required early in the process. Federal application requirements are realistically expected to take two to five years to gain approvals to move forward with toll conversion. NEPA compliance for the improvements to be done on I-80 could potentially take a couple of years for small and modest improvements, but could take five to eight years for major improvements.

## Tolling System

The tolling system devised for this study is a refinement of the system developed in the Gannett Fleming, Inc. study for the Pennsylvania Turnpike Commission (PTC) during the 1990's. It includes tolling I-80 by providing 10 mainline barriers spaced approximately 30 miles apart and by situating maintenance and police facilities at selected locations to provide for operations similar to the mainline Pennsylvania Turnpike. Figure 1 shows the location of the 10 toll barriers and other facilities assumed for this study.

An advantage to this scheme is that many local short trips could be "free" for Pennsylvania residents. The tolling facilities would be spaced so that there are approximately 5 interchanges between them. Short vehicle trips between toll plazas would remain free. However, local trips that would cross any of the toll barrier locations would be assessed the toll.

Express electronic toll collection would be implemented as the preferred method of fare collection at the mainline barriers. This could be incorporated into the EZPass system currently used on the Pennsylvania Turnpike and other toll facilities in the northeast United States. Toll collection equipment could also be installed to accommodate cash payment for non-EZPass equipped users.

I-80 was split into the following four sections to facilitate implementation of the tolling system in a staged manner over several years.

1. Section 1, 97 miles - Ohio State Line to East of US 219
2. Section 2, 115 miles - East of US 219 to East of I-180
3. Section 3, 72 miles - East of I-180 to East of PA 115
4. Section 4, 27 miles - East of PA 115 to New Jersey State Line

These sections were determined based on staged implementation between major cross routes. Staged implementation would alleviate the need to finance and perform all improvements and conversion activities at one time. Toll collection could proceed sooner by starting at the Ohio border, since fewer improvements would be required. Section 4 is the shortest section but is the most costly due to the realignments needed

# I-80 Tolling Study

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to bring it up to today's design standards. Starting with Section 1 in the west and working east to Section 4, allows for tolls to be collected on three sections before starting the most costly, and makes the financing more feasible.

## Capital Costs

Capital costs for I-80 were estimated in the following categories:

- Conversion Costs, which include the construction of toll collection facilities, maintenance facilities, State Police barracks and communication infrastructure.
- Roadway Improvement Costs, which include the improvements needed to bring the entire 311 mile highway to a service standard that would be expected by the users of the new toll road:

The total cost of converting I-80 to a toll road and constructing initial capital improvements is estimated at \$2.9 billion as shown in Figure 3.

The costs to convert I-80 to a toll road are estimated at \$665 million in 2004 dollars. The largest conversion cost is the cost of constructing the 10 toll collection facilities. The next largest cost is the construction of Turnpike maintenance facilities along the entire length of I-80. Six major facilities and six satellite facilities were assumed. Six state police stations would be co-located with the maintenance facilities. Other costs would include the implementation of Intelligent Transportation Systems items and communications links.

It was assumed that to pay tolls on this currently free road, users would expect a higher level of service on I-80 than they receive today. Numerous upgrades are necessary to the highway and bridges in order to improve the service of I-80. Capital Improvement Costs were developed for the entire length of I-80 to bring the highway to current National Highway System design criteria. This included a review of current conditions versus design criteria for horizontal and vertical geometry, travel lanes, shoulders, guide rail, vertical clearances, and acceleration and deceleration lane lengths. Parsons Brinkerhoff Quade & Douglas, Inc. assisted the study team in developing these costs along with information from PennDOT's Central Office and Engineering Districts. A range of estimated costs was developed using historical unit prices. All costs were converted to 2004 dollars for the final analysis.

The improvement categories to bring I-80 up to acceptable standards focused on the following items:

1. Truck climbing lanes for critical lengths of grades.
2. Interchange improvements such as acceleration/deceleration lengths.

Figure 3

I-80 Estimated Toll Conversion Costs Per Section (\$millions)						
	Section 1 Ohio Line to US 219 (97 Miles)	Section 2 US 219 to I-180 (115 Miles)	Section 3 I-180 to PA 115 (72 miles)	Section 4 PA 115 to NJ Line (27 miles)	Total	
Toll Plazas	3 @ \$34 \$102	3 @ \$34 \$102	3 @ \$34 \$102	1 @ \$34 \$33	\$339	
Maintenance Facilities	2 @ \$20 \$40	2 @ \$20 \$40	1 @ \$20 \$20	1 @ \$20 \$20	\$120	
Satellite Maintenance Site	2 @ \$10 \$20	2 @ \$10 \$20	1 @ \$10 \$10	1 @ \$10 \$10	\$70	
Police Facilities	2 @ \$2 \$4	2 @ \$2 \$4	1 @ \$2 \$2	1 @ \$2 \$2	\$12	
ITS	(\$50/312mi)101mi \$16	(\$50/312mi)111mi \$18	(\$50/312mi)62mi \$18	(\$50/312mi)37mi \$13	\$51	
Communications	6 Sites 15mi ea @ \$3 \$20	7 Sites 15mi ea @ \$3 \$21	4 Sites 15mi ea @ \$3 \$12	3 Sites 15mi ea @ \$3 \$9	\$62	
Administration	Interim (\$10/4sections) \$3.0	Interim (\$10/4sections) \$3.0	Interim (\$10/4sections) \$3.0	Interim (\$10/4sections) \$3.0	\$11	
Subtotal	\$215	\$208	\$162	\$80	\$665	

I-80 Estimated Initial Capital Improvement Costs Per Section (\$millions)					
	Section 1 Ohio Line to US 219 (97 Miles)	Section 2 US 219 to I-180 (115 Miles)	Section 3 I-180 to PA 115 (72 miles)	Section 4 PA 115 to NJ Line (27 miles)	Total
Subtotal	\$219	\$638	\$304	\$1,065	\$2,226

Total (\$millions)					
	Section 1 Ohio Line to US 219 (97 Miles)	Section 2 US 219 to I-180 (115 Miles)	Section 3 I-180 to PA 115 (72 miles)	Section 4 PA 115 to NJ Line (27 miles)	Total
Total	\$434	\$846	\$466	\$1,145	\$2,891

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3. Pavement conditions.
4. Bridge replacement/rehabilitation based on sufficiency rating.
5. Bridge vertical clearance.
6. Capacity improvements from projected traffic volumes for the design horizon of 2010.
7. Noise Barriers where widening is proposed.

The estimated roadway improvement costs total over \$2.2 billion in 2004 dollars. These costs represent a one time set of improvements to bring I-80 to an acceptable standard and are summarized by the proposed segments, as follows:

Segment	Capital Costs (\$ millions)
1. Ohio State Line to East of US 219	219
2. East of US 219 to East of I-180	638
3. East of I-180 to East of PA 115	304
4. East of PA 115 to New Jersey State Line	1,065
<b>Totals</b>	<b>2,226</b>

A more detailed list of the improvements by each of the four sections is shown in Appendix B. The high cost of improvements for Segment 4 is based on the need to reconstruct the section from I-380 to the New Jersey State Line from four lanes to six lanes. This 18 mile section also requires correction of geometric deficiencies and reconstruction of the interchanges, grade separated structures, and bridges and culverts that cross rivers and streams.

The above costs only include one cycle of pavement rehabilitations based on current conditions. Since the cash flow analysis required looking at a 30 year bond repayment schedule, it was necessary to calculate ongoing costs for resurfacing and reconstruction of all sections of I-80 over an extended period. Improvements were based on a cycle of doing a complete reconstruction within 40 years of initial construction and conducting preventive maintenance (resurfacing) projects at ten year intervals. This projected an additional \$2.1 billion in improvements over a 32 year period, or an average of \$65 million per year.

I-80 projects that are currently programmed on the Commonwealth's Twelve Year Program were considered to be completed with State and Federal funding, rather than being part of the toll financed program. This totals \$337 million during the first eight years, which is above and beyond the capital, resurfacing and reconstruction costs mentioned above.

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## Operations and Maintenance Costs

Operation and Maintenance costs were estimated for each section based on similar costs on the existing Pennsylvania Turnpike. In general, ratios were applied to the 2003-2004 PTC budget line items to determine corresponding operating and maintenance costs, based on the number of toll and maintenance facilities to be located along I-80. Costs would cover fare collection, maintenance, state police and other related costs. These costs were estimated at \$100 million annually in 2004 dollars, and they are shown by sections below:

### **ANNUAL OPERATIONS AND MAINTENANCE COSTS**

<b>Segment</b>	<b>Operation &amp; Maintenance Costs (\$ millions)</b>
1. Ohio State Line to East of US 219	31
2. East of US 219 to East of I-180	37
3. East of I-180 to East of PA 115	23
4. East of PA 115 to New Jersey State Line	9
<b>Totals</b>	<b>100</b>

## Revenue Projections

Existing traffic volume data was extracted from PennDOT data bases for the various segments of I-80. Traffic ranged from 22,000 to 50,000 in average daily traffic. Truck traffic ranged from approximately 22% to 41% of the total traffic within various segments. A history of traffic volumes over the last 20 years was also compiled so that appropriate growth factors could be developed for predicting traffic volumes for the next 20 years.

Based on this traffic volume information, revenue projections were developed for three toll rate scenarios. Passenger car rates ranged from \$0.06/mile to \$0.08/mile. Commercial vehicle rates vary by class and weight. For this analysis, an 80,000 pound truck (PA Turnpike Class 7) was tested with rates ranging from \$0.18/mile to \$0.24/mile. Following the August 1, 2004 toll increase, the Turnpike's rates average \$0.059/mile for passenger cars and \$0.321 for a Class 7 truck.

The projected revenue factored in diversion (motorists taking alternative routes) and evasion (motorists not paying their tolls). Figure 4 indicates the three separate tolling scenarios for the year 2002 traffic and for the projected 2010 traffic. 2002 was

Figure 4

I-80 Revenue Projections

Revenue Based on 2002 Traffic

\$0.06/mile passenger cars and \$0.18/mile trucks

Gross Revenue	Diversion	Net Revenue
\$311,000,000	3%	\$301,670,000
	7%	\$289,230,000
	14%	\$267,460,000

\$0.07/mile passenger cars and \$0.21/mile trucks

Gross Revenue	Diversion	Net Revenue
\$364,000,000	3%	\$353,080,000
	7%	\$338,520,000
	14%	\$313,040,000

\$0.08/mile passenger cars and \$0.24/mile trucks

Gross Revenue	Diversion	Net Revenue
\$416,000,000	3%	\$403,520,000
	7%	\$386,880,000
	14%	\$357,760,000

Revenue Based on 2010 Traffic

\$0.06/mile passenger cars and \$0.18/mile trucks

Gross Revenue	Diversion & Evasion	Net Revenue
\$400,000,000	8%	\$368,000,000
	12%	\$352,000,000
	19%	\$324,000,000

\$0.07/mile passenger cars and \$0.21/mile trucks

Gross Revenue	Diversion & Evasion	Net Revenue
\$467,000,000	8%	\$429,640,000
	12%	\$410,960,000
	19%	\$378,270,000

\$0.08/mile passenger cars and \$0.24/mile trucks

Gross Revenue	Diversion & Evasion	Net Revenue
\$533,000,000	8%	\$490,360,000
	12%	\$469,040,000
	19%	\$431,730,000

selected as a base year for this analysis, and 2010 was selected as the projected implementation year for the first section between the Ohio .

## **Cash Flow Analysis**

Three scenarios were analyzed for the conversion of I-80 to a toll road, with the variance being the toll rate and date of implementation. All three scenarios assumed toll conversion to be completed in a phased manner, west to east, as the only feasible alternative. Further detail on the three scenarios is included in Appendix C.

A cash flow analysis was developed for a 35 year period in order to cover the period for implementation of capital improvements and bonding. Due to the proposed staged conversion schedule, repayment of debt service is delayed until the first section is opened in approximately six years. Bond funds of \$500 million are applied in the second year to fund toll conversion until Section 1 opens. Significant additional bond funds are required in later years.

Conversion costs were applied between years 2 and 10, with opening of Section 1 assumed in year 6 and opening of the other three sections assumed in 9, 10 and 11. Improvements that are currently part of the Twelve Year Program were assumed to be completed under that program with regular state and federal funding. Other capital costs were phased in between years 6 and 18. Ongoing resurfacing and reconstruction costs were applied throughout the bonding period. All costs were adjusted for inflation throughout the analysis period.

All scenarios generated positive cash flow by the end of the analysis period. However, the first two scenarios were determined not to be feasible based on negative cash flow in several early years. The 3<sup>rd</sup> Scenario generates the greatest revenue and the least negative cumulative cash flow. Some limited shifting of capital costs would be required to maintain positive annual cumulative cash flow. Based on this analysis, the toll rates selected for this analysis were \$0.08/mile for autos and \$0.24/mile for an 80,000 pound truck. Figure 5 shows the expected revenue by each of the sections, based on the recommended toll rates.

The cash flow analysis is included in Appendix D, with further explanation of the spreadsheet.

**Figure 5**

**Projected I-80 Revenue Per Section  
(Based Upon 2010 Traffic and Selected Option)**

(Selected Option: \$0.08/mile passenger cars, \$0.24/mile trucks and 19% Diversion and Evasion)

<b>Section 1</b>	<b>Gross Revenue</b>	<b>Diversion &amp; Evasion</b>	<b>Net Revenue/Year</b>
<b>Ohio State Line to US 219 (Milepost 0 to milepost 97)</b>	<b>\$167,000,000</b>	<b>19%</b>	<b>\$135,270,000</b>
<b>Section 2</b>	<b>Gross Revenue</b>	<b>Diversion &amp; Evasion</b>	<b>Net Revenue/Year</b>
<b>US 219 to I-180 (Milepost 97 to milepost 212)</b>	<b>\$181,000,000</b>	<b>19%</b>	<b>\$146,610,000</b>
<b>Section 3</b>	<b>Gross Revenue</b>	<b>Diversion &amp; Evasion</b>	<b>Net Revenue/Year</b>
<b>I-180 to PA 115 (Milepost 212 to milepost 284)</b>	<b>\$126,000,000</b>	<b>19%</b>	<b>\$102,060,000</b>
<b>Section 4</b>	<b>Gross Revenue</b>	<b>Diversion &amp; Evasion</b>	<b>Net Revenue/Year</b>
<b>PA 115 to New Jersey State Line (Milepost 284 to milepost 311)</b>	<b>\$60,000,000</b>	<b>19%</b>	<b>\$48,600,000</b>

## Conclusions

This report shows that the conversion of I-80 to a toll road is financially feasible over the long-term. The most practical alternative appears to be placing 10 mainline toll barriers through a staged conversion process.

The required toll rates are \$0.08 for autos and \$0.24 for trucks. Toll barriers could be strategically located along the highway which could lessen the impact on local trips by Pennsylvania residents. However, each time a motorist crosses a toll barrier, a fee of approximately \$2.50 for a passenger car or \$7.50 for an 80,000 pound truck would be collected.

There are a number of benefits and challenges to implementing tolls on I-80.

Benefits identified for this proposal include:

- It would provide a dedicated, new revenue source for I-80.
- It would allow for the redirection of state and federal dollars currently being spent on I-80 to other state highways.
- There would be an upgraded level of road design (particularly in the east) and dedicated police patrols and maintenance.

Some of the drawbacks to moving forward with the tolling proposal include:

- Following a decision to move forward, state enabling legislation and federal approval would be required. It could take several years to receive federal approval under the pilot program due to the need to develop a two-staged application and receive environmental clearances. It is projected that toll conversion of all 311 miles would take nine years after initial approval is secured.
- The cost to construct the toll collection infrastructure is significant (approximately \$665 million in 2004 dollars).
- There are significant improvements necessary to bring I-80 to an acceptable condition. These improvements are greatest in the eastern portion of the corridor. Design and construction of all identified improvements is estimated to take 14 to 17 years. The total cost of these improvements, in 2004 dollars, is estimated at over \$2 billion.
- There would be no significant reduction in congestion, except in the east.
- There would be no significant increase in smoothness.
- Much of the road would remain the same.
- The toll rates required to yield positive cash flow are somewhat higher than existing rates on the Pennsylvania Turnpike.
- It would be at least 20 years before toll revenues would begin to exceed the debt service requirements.

## I-80 Tolling Study

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- The condition of I-80 is no longer the concern it once was. The condition of I-80 has been significantly improved over the past 20+ years, and PennDOT has I-80 on a manageable preservation cycle.
- It could be expected that there would be some traffic diversion to other roads.
- Opposition to tolling would be expected to this proposal from the trucking industry and the communities and residents along I-80.

As this analysis looked at the various benefits and challenges to implementing tolls on I-80, there are significant issues with imposing tolls on this currently free highway. Based on the long timetable to realize benefits, the high cost of converting the road to toll, and the fact that a financial break-even point is decades away, it is recommended that converting I-80 to a toll road not be pursued at this time.

# **Appendix**

## **A**

### **Historical Capital and Maintenance Costs**

**I-80 Capital Cost History**  
**SFY 1980-1981 through 2003-2004**

<b>Year</b>	<b>Total Cost (\$000)</b>
1980-81	\$42,867
1981-82	\$23,401
1982-83	\$1,839
1983-84	\$8,408
1984-85	\$65,588
1985-86	\$105,433
1986-87	\$1,173
1987-88	\$112,352
1988-89	\$69,846
1989-90	\$39,057
1990-91	\$94,694
1991-92	\$50,424
1992-93	\$74,965
1993-94	\$97,452
1994-95	\$4,949
1995-96	\$16,851
1996-97	\$2,654
1997-98	\$59,508
1998-99	\$21,459
1999-2000	\$85,693
2000-01	\$7,526
2001-02	\$26,930
2002-03	\$20,505
2003-04	\$79,390

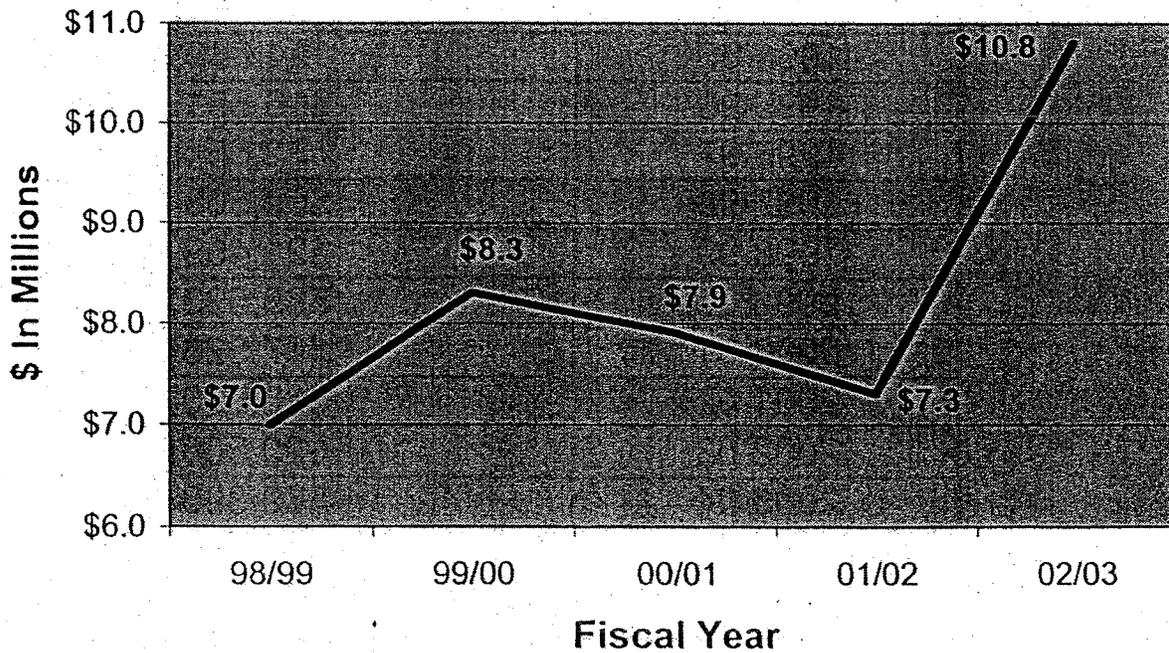
<b>SFY 1980-1981 through 2003-2004</b>	
<b>Total Cost</b>	\$1,112,964
<b>Annual Averages</b>	\$46,374

# I-80 Annual Maintenance Cost Summary

SFY 1998-99 through SFY 2002-03

General Maintenance	\$1,191,312
Winter Operations	\$1,900,885
Signs & Markings	\$2,453,501
Roadside Vegetation Management	\$208,330
Rest Area Operations	\$2,538,472
<b>Total Annual Average</b>	<b>\$8,292,500</b>

### 5 Year Trend Data



**Appendix  
B**

**Capital Improvements**

TABLE 16.1A  
I-80 IMPROVEMENTS  
ESTIMATED IMPROVEMENTS

SEGMENT 1<sup>1</sup>

Item	Unit	PHASE 1 <sup>2</sup> Quantity	PHASE 2 <sup>3</sup> Quantity	Unit Cost (low)	Unit Cost (high)	PHASE 1 Low Range (\$1,000) <sup>4</sup>	PHASE 1 High Range (\$1,000) <sup>4</sup>	PHASE 2 Low Range (\$1,000) <sup>4</sup>	PHASE 2 High Range (\$1,000) <sup>4</sup>
1 Additional Lanes	Mile	5.2	0	\$1,450,000.00	\$2,000,000.00	\$7,540	\$10,400	\$0	\$0
2 Accel/Decel Lane Extension	Int.	10	0	3,500,000.00	5,000,000.00	35,000	50,000	0	0
3 Mainline Reconstruction	Mile	0	0	10,000,000.00	12,000,000.00	0	0	0	0
4 Resurfacing	SY	44,815	36,250	30.00	40.00	1,344	1,793	1,088	1,450
5 Bridges (Replace)	SF	5,300	0	130.00	170.00	899	901	0	0
6 Bridges (Rehabilitation) <sup>1</sup>	SF	80,371	319,053	70.00	100.00	5,626	8,037	22,334	31,905
7 Interchanges (Replace)	Each	0	0	17,000,000.00	25,000,000.00	0	0	0	0
8 Major Drainage (> 60")	LF	80	0	150.00	180.00	9	11	0	0
9 Noise Barrier (20 ft. height)	LF	0	0	400.00	500.00	0	0	0	0
Subtotal						\$50,208	\$71,142	\$23,421	\$33,355
Other Items (15-20%)				15%	20%	7,531	14,228	3,513	6,671
Traffic Control	LS			4%	6%	2,008	4,288	937	2,001
Erosion and Sedimentation	LS			1%	2%	502	1,423	234	667
Engineering/Environmental	LS			15%	20%	9,038	18,212	4,216	8,530
Right-of-Way	SF	823,680	0	\$0.50	\$1.00	412	824	234	667
Utilities (% of Construction Cost)	LS			1%	2%	502	1,423	234	667
Subtotal						\$70,202	\$111,520	\$32,855	\$51,901
Contingencies (20%)						14,040	22,304	6,511	10,300
Total cost						\$84,242	\$133,824	\$39,067	\$62,201

<sup>1</sup> Segment 1 includes Mercer, Venango, Butler, Clarion and Jefferson Counties  
<sup>2</sup> PHASE 1: Truck Cmb. Lanes, Br. Rehab. w/ Surf. Raising between 51 and 65, Restur. IRI > 1.30, Accel./Decel. Lanes, Interchanges, Br. Repl., PVI, Reconstruct., Major Drainage, R/W, Noise Walls and PENNDOT Programmed Projects  
<sup>3</sup> PHASE 2: Br. Rehab. w/ Surf. Raising between 66 and 80  
<sup>4</sup> In 2003 \$

TABLE 16.2A  
I-80 IMPROVEMENTS  
ESTIMATED IMPROVEMENTS

SEGMENT 2<sup>1</sup>

Item	Unit	PHASE 1 <sup>2</sup> Quantity	PHASE 2 <sup>3</sup> Quantity	Unit Cost (low)	Unit Cost (high)	PHASE 1 Low Range (\$1,000) <sup>4</sup>	PHASE 1 High Range (\$1,000) <sup>4</sup>	PHASE 2 Low Range (\$1,000) <sup>4</sup>	PHASE 2 High Range (\$1,000) <sup>4</sup>
1 Additional Lanes	Mile	20.2	0	\$1,450,000.00	\$2,000,000.00	\$29,290	\$40,400	\$0	\$0
2 Accel/Decel Lane Extension	Int.	13	0	3,500,000.00	5,000,000.00	45,500	65,000	0	0
3 Mainline Reconstruction	Mile	0	0	10,000,000.00	12,000,000.00	0	0	0	0
4 Resurfacing	SF	181,024	0	30.00	40.00	5,431	7,241	0	0
5 Bridges (Replace)	SF	227,465	0	130.00	170.00	29,570	38,669	0	0
6 Bridges (Rehabilitation)	SF	38,640	189,041	70.00	100.00	2,705	3,864	0	18,904
7 Interchanges (Replace)	Each	0	0	17,000,000.00	25,000,000.00	0	0	0	0
8 Major Drainage (> 60')	LF	180	0	150.00	180.00	27	32	0	0
9 Noise Barrier (20 ft. height)	LF	0	0	400.00	500.00	0	0	0	0
Subtotal						\$112,523	\$155,206	\$13,233	\$18,904
Other Items (15-20%)				15%	20%	16,878	31,041	1,965	3,781
Traffic Control	LS			4%	6%	4,501	9,312	529	1,134
Erosion and Sedimentation	LS			1%	2%	1,125	3,104	132	378
Engineering/Environmental	LS			15%	20%	20,254	39,733	2,382	4,839
Right-of-Way	SF	3,199,680	0	\$0.50	\$1.00	1,600	3,200	0	0
Utilities (% of Construction Cost)	LS			1%	2%	1,125	3,104	132	378
Subtotal						\$158,007	\$244,701	\$18,394	\$29,415
Contingencies (20%)						31,601	48,940	3,679	5,863
Total cost						\$189,608	\$293,641	\$22,072	\$35,298

<sup>1</sup> Segment 2 includes Clearfield, Centre, Clinton, Union and Northumberland County through East of I-80

<sup>2</sup> PHASE 1: Truck Climb, Lanes, Br. Rehab. w/ Surf. Rating between 51 and 65, Resurf. IRI > 130, Accel/Decel, Lanes, Interchanges, Br. Repl., Pk, Reconstruct, Major Drainage, RW, Noise Walls and PENNDOT Programmed Projects

<sup>3</sup> PHASE 2: Br. Rehab. w/ Surf. Rating between 66 and 80

<sup>4</sup> In 2003 \$

TABLE 16.3A  
I-80 IMPROVEMENTS  
ESTIMATED IMPROVEMENTS

SEGMENT 3<sup>1</sup>

Item	Unit	PHASE 1 <sup>2</sup> Quantity	PHASE 2 <sup>1</sup> Quantity	Unit Cost (low)	Unit Cost (high)	PHASE 1 Low Range (\$1,000) <sup>4</sup>	PHASE 1 High Range (\$1,000) <sup>4</sup>	PHASE 2 Low Range (\$1,000) <sup>4</sup>	PHASE 2 High Range (\$1,000) <sup>4</sup>
1 Additional Lanes	Mile	2.1	0	\$1,450,000.00	\$2,000,000.00	\$3,045	\$1,200	\$0	\$0
2 Accel/Decel Lane Extension	Mile	5	0	3,500,000.00	5,000,000.00	17,500	25,000	0	0
3 Mainline Reconstruction	Mile	0	0	10,000,000.00	12,000,000.00	0	889	6,275	8,387
4 Resurfacing	SF	22,230	209,178	30.00	40.00	667	11,289	0	0
5 Bridges (Replace)	SF	66,403	0	130.00	170.00	8,632	3,325	16,847	24,068
6 Bridges (Rehabilitation)	SF	33,248	240,678	70.00	100.00	2,327	0	0	0
7 Interchanges (Replace)	Each	0	0	17,000,000.00	25,000,000.00	0	0	0	0
8 Major Drainage (> 60')	LF	0	0	150.00	180.00	0	0	0	0
9 Noise Barrier (20 ft. height)	LF	0	0	400.00	500.00	0	\$44,703	\$23,123	\$32,435
Subtotal						\$32,172	\$44,703	\$23,123	\$32,435
Other Items (15-20%)				15%	20%	4,826	8,911	3,468	6,487
Traffic Control				6%	6%	1,287	2,682	925	1,946
Erosion and Sedimentation				1%	1%	322	894	231	649
Engineering/Environmental				2%	2%	5,791	11,444	4,162	8,303
Right-of-Way				15%	20%	166	333	0	649
Utilities (% of Construction Cost)				\$0.50	\$1.00	322	894	231	649
Utilities (% of Construction Cost)				1%	2%	\$44,885	\$69,890	\$32,141	\$50,469
Subtotal Contingencies (20%)						8,977	13,978	6,428	10,094
Total cost						\$53,862	\$83,662	\$38,569	\$60,562

<sup>1</sup> Segment 3 includes Northumberland County East of I-190, Monroeville, Columbia, Luzerne and Carbon Counties

<sup>2</sup> PHASE 1: Truck Clim. Lanes, Br. Rehab. w/ Surf Raising between 51 and 65, Resurf. IRI > 130, Accel/Decel. Lanes, Interchanges, Br. Rep.

<sup>3</sup> PHASE 2: Br. Rehab. w/ Surf. Raising between 66 and 80

<sup>4</sup> In 2003 \$

TABLE 16.4A  
I-80 IMPROVEMENTS  
ESTIMATED IMPROVEMENTS

SEGMENT 4<sup>1</sup>

Item	Unit	PHASE 1 <sup>2</sup> Quantity	PHASE 2 <sup>3</sup> Quantity	Unit Cost (low)	Unit Cost (high)	PHASE 1 Low Range (\$1,000) <sup>4</sup>	PHASE 1 High Range (\$1,000) <sup>4</sup>	PHASE 2 Low Range (\$1,000) <sup>4</sup>	PHASE 2 High Range (\$1,000) <sup>4</sup>
1 Additional Lanes	Mile	0	0	\$1,450,000.00	\$2,000,000.00	\$0	\$0	\$0	\$0
2 Accel/Decel Lane Extension	lin.	1	0	3,500,000.00	5,000,000.00	3,500	5,000	0	0
3 Mainline Reconstruction	Mile	18.2	0	10,000,000.00	12,000,000.00	182,000	218,400	0	0
4 Resurfacing	SY	59,715	0	30.00	40.00	1,791	2,389	0	0
5 Bridges (Replace)	SF	216,631	0	130.00	170.00	28,162	36,827	0	0
6 Bridges (Rehabilitation)	SF	0	0	70.00	100.00	0	0	0	0
7 Interchanges (Replace)	Each	7	0	17,000,000.00	25,000,000.00	119,000	175,000	0	0
8 Major Drainage (> 60")	LF	480	0	150.00	180.00	72	86	0	0
9 Noise Barrier (20 ft. height)	LF	93,200	0	400.00	500.00	37,280	48,600	0	0
Subtotal						\$371,805	\$484,302	\$0	\$0
Other Items (15-20%)				15%	20%	55,771	96,860	0	0
Traffic Control	LS			4%	6%	14,872	29,058	0	0
Erosion and Sedimentation	LS			1%	2%	3,718	9,886	0	0
Engineering/Environmental	LS			20%	25%	89,233	154,977	0	0
Right-of-Way	AC			\$60,000.00	\$80,000.00	3,120	4,160	0	0
Utilities (% of Construction Cost)	LS			3%	6%	11,154	24,215	0	0
Subtotal						\$549,874	\$803,259	\$0	\$0
Contingencies (20%)						109,935	160,652	0	0
Total cost						\$659,809	\$963,910	\$0	\$0

<sup>1</sup> Segment 4 includes Monroe County

<sup>2</sup> PHASE 1: Truck Clim. Lanes, Br. Rehab. w/ Surf. Raising between 51 and 65, Resurf. IRI > 130, Accel/Decel. Lanes, Interchanges, Br. Rep., PM, Reconstruct., Major Drainage, RM, Noise Walls and PENNDOT Programmed Projects

<sup>3</sup> PHASE 2: Br. Rehab. w/ Surf. Raising between 66 and 80

<sup>4</sup> in 2003 \$

**Appendix  
C**

**Tolling Scenarios**

## Tolling Scenarios

Three scenarios were analyzed for the conversion of I-80 to a toll road:

**1<sup>st</sup> Scenario** – a toll rate of \$.06/mile cars and \$.18/mile trucks was assumed, resulting in tolls of \$2/car and \$5.75/truck at each toll barrier. Total bond funds of \$2.7 billion are applied over the duration of the analysis period. Overall negative cash flow results for many years, even with the resurfacing costs removed. Even with shifting of capital costs, this scenario appears to be infeasible.

**2<sup>nd</sup> Scenario** – a toll rate of \$.06/mile cars and \$.18/mile trucks was assumed until work on Section 4 begins (Year 8). A toll rate of \$.08/mile cars and \$.24/mile trucks was assumed for the duration of the analysis period thereafter. Total bond funds of \$2.5 billion are applied over the duration of the analysis period. Overall negative cash flow results for many years. An adjustment of capital costs would be required to reduce or eliminate the negative cash flow.

**3<sup>rd</sup> Scenario** – a toll rate of \$.08/mile cars and \$.24/mile trucks is assumed, resulting in tolls of \$2.50/car and \$7.50/truck at each toll barrier. Total bond funds of \$2.5 billion are applied over the duration of the analysis period. Overall negative cumulative cash flow occurs in Years 7-9, but in lesser amounts than the first two scenarios. Adjustment of capital costs would be required to reduce/eliminate the negative cash flow.

**Conclusion** - all scenarios generate positive cash flow by the end of the analysis period. Shifting of costs would be required, to varying degrees, to make the annual cumulative cash flows positive. The 3<sup>rd</sup> Scenario generates the greatest revenue and the least negative cumulative cash flow. As noted above, shifting of capital costs would be required to make the annual cumulative cash flow positive.

# **Appendix D**

## **Cash Flow Analysis**

## **Cash Flow Analysis**

The spreadsheet provides a financial analysis of the I-80 tolling scenario by projecting revenue versus costs and performing a cash flow analysis. The following is a description of the components of the spreadsheet.

**Net Revenue** – The first set of revenue figures represent an estimate of revenue produced by section based on a base traffic year of 2002 and a toll rate of \$.08/mile cars and \$.24/mile trucks. A growth rate in traffic was applied based on historical growth. The first section was assumed to open in Year 6, with other sections following in later years.

**Operating Costs** – Operating costs are based on similar costs on the Pennsylvania Turnpike and are estimated for each section based on the facilities located within that section. Costs are estimated at \$100 million and escalated/prorated based upon opening of each section.

**Net Cash Available** – Net cash available is computed by reducing the net revenue by the operating costs.

**Conversion Costs** – Includes design and construction of toll, maintenance, police, ITS and communications infrastructure. Costs are applied based on a staged conversion schedule of four sections from west to east.

**Bond Funds and Debt Service** – Bond funds are applied in several draws based on capital needs. Annual debt service is assumed at \$6.9 million per \$100 million for 30 years. Debt service is deferred until Section 1 opens.

**Cash Flow** – Annual and cumulative cash flow is computed by adding bond funds and reducing those by the conversion costs.

**Capital Improvements** – Includes programmed and estimated improvements required to bring the entire highway to acceptable standards. Resurfacing and reconstruction costs are included over the period from Year 2 to Year 36 based on assumptions that following construction, a reconstruction would be done every 40 years with resurfacings every 10 years. All costs are escalated.

**Federal Funds** – Assumes funds included for I-80 on Commonwealth's Twelve Year Program.

**Cash Flow & Cumulative Cash Flow** – Shows total net annual and cumulative cash flow.