AVIATION

C-

2006 Report Card for Pennsylvania's Infrastructure

Philadelphia International Airport (PHL) is currently one of the fastest growing airports in the world. It is also one of the most delay-prone airports nationwide. Passenger travel is increasing rapidly at PHL and, because of the severe delays at the airport, the FAA has made PHL a national priority.

Although it is a newer airport, Pittsburgh International (PIT) has faced challenges due to decreased operations by US Airways, but low-cost carriers have now entered their market.

Some of the remaining commercial service airports in the Commonwealth require significant investment to satisfy stricter FAA requirements for minimum safety and security standards. The FAA has identified these needs and has planned for the necessary capital to accommodate the improvements.

PennDOT's Bureau of Aviation utilizes the Statewide Airport System Plan as a tool to address the needs of general aviation airports, along with a four-year program that prioritizes the funding requirements at these facilities. If the proposed budget cut to the Airport Improvement Program for FY 2007 becomes a reality, adjustments to PennDOT's general aviation airport funding program would be required to accommodate identified shortfalls.

BACKGROUND

In 2005, nationwide airline passenger travel increased by 49 million passengers, to a record 739 million passengers. Commercial air carrier domestic enplanements rose almost 7 percent and were 4.5 percent higher than pre-9/11 levels. Domestic US commercial aviation is estimated to reach *one billion passengers* by 2015.

Though airport funding has increased in the last decade, annual increases for airport infrastructure grants lag behind inflation. The proposed 2007 fiscal year budget of $2.75 billion for the nationwide Airport Improvement Program (AIP) is $950 million less than the authorized level of $3.7 billion. In 2005, the PADOT Bureau of Aviation (BOA) allocated more than $16 million in federal funds for projects to maintain airport infrastructure and to fund capital improvements at the state's 43 Block Grant airports. In addition, PennDOT BOA allocated $13 million for airport projects from the two state-funded grant programs.

The Commonwealth of Pennsylvania is served by 15 commercial service airports, more than 120 general aviation airports and heliports. General aviation airports serve mostly air taxis and business, charter and private planes.

The September 11, 2001 terrorist attacks on our nation continue to have a significant impact on the aviation industry in the Commonwealth. Recent increases in fuel costs due to both the war in Iraq and natural disasters have further weakened the stability of the airlines. However, air travel is on the rebound and adequate funding is vital to ensure that existing infrastructure is properly maintained. Funding is also critical to enhance airport capacity to meet new demands, primarily at Philadelphia International Airport, thus allowing airports to achieve their full economic potential.

In 2002, the Commonwealth's Department of Transportation (PennDOT) published the *Pennsylvania Statewide Airport System Plan (SASP)*. A component of the SASP is the Recommended Infrastructure Development Plan, which includes facility recommendations and the associated costs needed both to maintain existing airport infrastructure and to improve airports to meet future local and system needs.

Another important effort completed by the BOA is the *Pennsylvania Statewide Pavement Evaluation Report* for airports. This exercise analyzed existing airport pavements statewide and provided important recommendations after evaluating the condition of airfield pavements at 93 public-use airports and heliports. Philadelphia and Pittsburgh International Airports were not inspected for the report, but information provided by both airports was included. Both PHL and PIT maintain independent pavement management systems.

The BOA Pavement Evaluation was implemented in 2001, establishing an Airport Pavement Management System (APMS). The APMS is a tool for the BOA to use in identifying, prioritizing and scheduling projects to maintain and rehabilitate pavements at the Commonwealth's airports. The APMS analysis was updated in April 2005. The Pavement Evaluation findings were also incorporated into the SASP Infrastructure Plan recommendations.

Philadelphia International Airport (PHL) is one of the most delay-prone airports in the nation. FAA guidelines dictate that an airport is considered congested when delay exceeds an average of 5 minutes per operation. The average delay at PHL was 10 minutes in 2000 and is expected to increase to nearly 20 minutes by 2010 with the current airfield configuration. Significant infrastructure modifications and improvements are underway to reduce delays. In order to develop a more efficient airfield infrastructure, the PHL staff is currently preparing a Master Plan Update, which is known as the Capacity Enhancement Program or CEP. The FAA is also conducting an Environmental Impact Statement (EIS) for the CEP. The US Secretary of Transportation has recognized the urgency of this work by listing the PHL CEP as one of 13 high priority transportation projects in the nation. Executive Order 13274 assigned the project for expedited environmental review (streamlining).

Pittsburgh International Airport (PIT) is undergoing a period of transition in the wake of the dominant carrier, US Airways, significantly reducing its connecting hub operations at the facility. Although US Airways still maintains a significant presence, several low-cost carriers have entered the market, fares to top destinations have been reduced and PIT is experiencing record passenger volume for trips originating at the airport.

CONDITIONS

Demand for air travel service at the commercial service airports in the Commonwealth increased by 8% from the third quarter of 2004 to the same period in 2005. This increase exceeds the national average of 5.5%. Of the top 35 US airports, PHL is ranked seventh for increased operations since the year 2000.

The 2005 update of the Commonwealth's Statewide Pavement Evaluation identified nearly 143,500,000 square feet of airfield pavement. That area includes 55,765,000 square feet for general aviation facilities and 87,715,000 SF at commercial service airports. The overall, area-weighted Pavement Condition Index (PCI) was measured at 80, where the scale ranges from 0 (failed) to 100 (excellent condition). The area-weighted age of the pavement at general aviation airports is 15 years, while the average pavement age at commercial service airports is 12 years. A typical service life for airfield pavement is 15 to 20 years. The study findings noted that almost twenty million square feet of pavement currently require reconstruction or rehabilitation at Commonwealth service airports.

The Infrastructure Development Plan developed by the Commonwealth's SASP process outlined a twenty-year program for airport maintenance and improvement. The Plan identified the following improvement categories and their associated costs:

Runway Paving	$27.8 million	Lengthening and widening
Runway and Taxiway Overlay	$41.9 million	For strengthening
Taxiway Paving	$15.3 million	Lengthening and widening
Apron Paving	$26.3 million	
Pavement Management	$373.9 million	
Navigational Aids	$13 million	
Approach Lighting Aids	$9.7 million	
Airfield Lighting	$9.9 million	
Weather Reporting Systems	$1.8 million	
Terminals and Hangars	$120.4 million	GA terminals, corporate and T-hangars
Airport Facilities	$2.0 million	Parking, Fuel Farms, etc.
Planning Projects	$41.9 million	To prepare master plans, layout plans, action plans, and updates
Total System Needs	**$662.2 million**	**Based on 2002 dollars**

Almost 55% of the needs are generated by the Pavement Management category alone. The above noted costs cover a 20-year planning period, thus the annual system need is more than $33 million (in 2002 dollars) for Commonwealth airports excluding PHL and PIT. PennDOT BOA currently has roughly $16 million available for Block Grant allocation under the AIP program, and another $13 million to allocate from the Commonwealth's Aviation Development and Capital Budget Programs. With the additional funding provided by FAA, PennDOT anticipates that adequate funding is currently available to meet infrastructure needs. Any reductions in AIP funding for FY 2007 would require adjustment to PennDOT's general aviation airport program.

Philadelphia International Airport (PHL) and Pittsburgh International Airport (PIT) are not examined in detail in the *SASP* or the Statewide Pavement Evaluation. Because of the operational and administrative complexities, PHL and PIT conduct more thorough planning, pavement management and funding program administration. The 2002-2007 development

program for PHL is valued at approximately $260 million, while PIT will perform about $144 million in improvements from 2002 to 2006.

The key issue at Philadelphia International Airport is capacity. PHL experienced record operations and passengers in 2005. Although terminal development has advanced, airfield capacity is needed to sufficiently and efficiently move aircraft. The largest handicap to the current airfield infrastructure is the significant capacity decrease during instrument flight conditions. Inclement weather severely limits the arrival efficiency due to existing runway geometry and available navigational aid technology. This significance of this concern is demonstrated by the fact that the PHL development program is included with the FAA's Operational Evolution Plan (OEP) for immediate capacity improvements. PHL's improvement is also designated by USDOT as one of the 13 most critical projects in the nation for environmental streamlining, as dictated by Executive Order 13274.

Total FAA funding for the Commonwealth's aviation infrastructure was about $106.7 million in FY 2005 per FAA records. This equates to about 3% of the $3.4 billion spent nationwide. The Commonwealth is ranked 7th among states for allotted FAA funding.

POLICY OPTIONS

Solutions that would ensure the increasing demands on Pennsylvania's aviation system are met are multi-faceted. The Commonwealth must continue to work to implement the development recommended by the *SASP*. A key to both meeting current needs and preparing for the future is to increase aviation infrastructure investment at all levels of government. Full funding of the AIP program will ensure PHL and PIT receive funding for their short-term maintenance and improvements, and will provide the expected allocations for the PADOT Bureau of Aviation Block Grant Program. For PHL, the Runway 17-35 extension construction and the CEP planning/environmental streamlining must stay on schedule, which will require funding the necessary components. For PIT, innovative funding and development programs to encourage alternate revenue-generating functions at the airport will ensure its long-term survival. For the one hundred airports located throughout the Commonwealth, adequate funding will ensure the preservation of this important aviation infrastructure.

RECOMMENDATIONS

ASCE's Pennsylvania Sections recommend:

- Full funding for the Airport Improvement Program (AIP) at authorized levels
- Full funding for the PADOT Bureau of Aviation Block Grant Program, allowing all infrastructure projects ready for local implementation to proceed
- Removal of the Airport Trust Fund from the federal budget
- An increase in the cap on the Passenger Facility Charge (PFC)
- Full implementation of the environmental streamlining process, both for future projects and to keep the PHL Capacity Enhancement Program on schedule

- Full implementation of the Infrastructure Development Plan referenced in the Commonwealth Bureau of Aviation's Statewide Airport System Plan (SASP)

SOURCES

Aviation Daily, "FAA Again Targets Airport Grants in Fiscal 2007 Budget Request," February 7, 2006

Congressional Research Service (CRS), The Library of Congress, Issue Brief for Congress, Airport Improvement Program, Updated March 3, 2003

Pennsylvania Department of Transportation, Bureau of Aviation (PennDOT BOA)
- Pennsylvania Air Service Monitor, Issue 9, February/March 2006
- Pennsylvania Statewide Aviation System Plan (SASP), 1999
- Pennsylvania Statewide Pavement Evaluation Report, April 2005

US Department of Transportation, Bureau of Transportation Statistics, Airline On-Time Statistics and Delay Causes

US Department of Transportation, Federal Aviation Administration
- Environmental Impact Statement, Capacity Enhancement Program, Philadelphia International Airport
- Final Environmental Impact Statement, Runway 17-35 Extension Project, Philadelphia International Airport, March 2005
- Office of Policy & Plans, FAA Aerospace Forecasts, Fiscal Years 2006-2017
- "Trust Fund Taxes set to Expire in 2007"

ASCE Policy Statements
- 149, "Inter-modal Transportation Systems," 2002
- 299, "Infrastructure Improvement Policy," 2003
- 382, "Transportation Funding," 2004
- 434, "Transportation Trust Funds," 2002
- 445, "Airport Improvement Program," 2004
- 453, "Federal Capital Budgeting," 2003
- 471, "Aviation Infrastructure Research," 2003
- 495, "Operations and Maintenance of Transportation Systems," 2002
- 496, "Innovative Financing for Public Transportation Projects," 2004

BRIDGES

C

2006 Report Card for Pennsylvania's Infrastructure

Of Pennsylvania's 22,276 bridges, 25% are considered structurally deficient and 18% are considered functionally obsolete. This may be a contributing factor to traffic congestion and may also put local communities at risk – forcing ambulances and fire trucks to take lengthy detours because of speed and/or weight limitations. In its 2006-2007 budget, the state has taken a step in the right direction, allotting an additional $20 million for bridge preservation and $10 million for emergency highway and bridge repairs.

BACKGROUND

All bridges in Pennsylvania are inspected using the same criteria, and numeric ratings are assigned to various parts of the structure. All inspectors are required to attend inspection training to assure all inspection conditions are properly coded and recorded. These numeric codes are used to develop the structure's federal sufficiency rating (SR) which indicates the overall condition of the structure and how critical it is in relation to other structures throughout the country[1] (the higher the number - the more sufficient the bridge).

CONDITIONS

Based on 2004 statistics from the National Bridge Inventory[2], out of Pennsylvania's 22,276 bridges, 44% of bridges (9,902) have a sufficiency rating greater than 80, 38% (8,360) have a sufficiency rating between 50 and 80, and 18% (4,014) have a sufficiency rating lower than 50. The national statistics are 56% (346,638) for SR>80, 29% (178,539) with a SR between 50 and 80, and 16% (97,460) with a SR lower than 50. Pennsylvania has more bridges in the middle grade area compared to the national average, but less in the highest rated category.

Two categories typically used to determine the SR are structurally deficient and functionally obsolete. A structurally deficient bridge is closed or restricted to lighter vehicles because of at least one deteriorating structural component. While not necessarily unsafe, these bridges may have limits for speed and weight. A functionally obsolete bridge has older design features, and, while it is not unsafe for all vehicles, it may not adequately accommodate current traffic volumes, and vehicle sizes and weights. These restrictions are one contributing element to traffic congestion. They also pose inconveniences as school busses or emergency vehicles taking lengthy detours[3]. Twenty-five percent (25%)[4] of the bridges in Pennsylvania are

[1] http://www.mcc.co.mercer.pa.us/engr/featured_bridge.htm
[2] National Bridge Inventory (NBI): U.S. Department of Transportation, Federal Highway Administration, National Bridge Inventory: Deficient Bridges by State and Highway System, Washington, DC: 2005, as reported by the National Bridge Inventory Study http://www.nationalbridgeinventory.com/
[3] ASCE National Report Card

structurally deficient while the national percentage for structurally deficient bridges is 13%. Eighteen percent (18%) of the state's bridges are functionally obsolete while the national percentage for functionally obsolete bridges is also 13%.

The statistics indicate the discrepancy between the national average and Pennsylvania's bridges; however, a few items to consider are the following:

- Pennsylvania has some of the oldest highways in the nation (I-76 is advertised as the first interstate.)

- Pennsylvania has nearly the most lane miles of any other state that must deal with severe winters. Bridges are susceptible to cracking and expanding due to the temperature and weather changes (freeze/thaw cycles) in the state. Also, the salt used during snow/icy conditions decreases the life of a structure compared to a southern state.

Deterioration of the bridges is expected, but it can be monitored. Proactive response is necessary to decrease the number of structurally deficient and functionally obsolete bridges for the state.

POLICY OPTIONS

The key to a successful infrastructure program is to have funds to support bridge construction, rehabilitation and emergency situations. These three key aspects make possible the goals of accessibility, structural integrity, and safety that are needed for Pennsylvania's bridges.

The following table summarizes the highway funding for the State of Pennsylvania since 2000-01[5].

Transportation – Key to Pennsylvania Growth and Opportunity

	Total Pennsylvania Highway Funding (Dollar Amounts in Millions)					Flexed Funds for Transit (Dollar Amounts In Millions)	
	State Funding	Federal Funding	Total Funding	Dollar Change	Percent Change	Standard Federal	"Crisis" Federal
2000-01	$2,943	$1,112	$4,055	–	–	$46	–
2001-02	$2,940	$1,272	$4,212	$157	3.9%	$36	–
2002-03	$2,949	$1,265	$4,214	$2	0.0%	$31	–
2003-04	$2,966	$1,205	$4,171	($43)	–1.0%	$59	–
2004-05	$3,124	$1,081	$4,205	$34	0.8%	$48	$74
2005-06	$3,518	$1,424	$4,942	$737	17.5%	$25	$202
2006-07	$3,758	$1,436	$5,194	$252	5.1%	$25	$138

Even after "flexing" some additional federal transportation funds to keep the state's 13 transit agencies operating, Pennsylvania highway spending is still growing substantially, with an anticipated $252 million increase in total funds in 2006-07. Part of that increase is an additional $130 million in state funds for the Commonwealth's highway and bridge infrastructure, including $100 million for the Smoother Roads and Bridges program, $20 million for the Bridge Preservation program and $10 million for the Emergency Highway and Bridge Maintenance Repair program. Pennsylvania highway spending in 2006-07 is 23 percent, or $980 million, higher than when Governor Rendell took office.

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[4] U.S. Department of Transportation, Federal Highway Administration, National Bridge Inventory: Deficient Bridges by State and Highway System, Washington, DC: 2005, available at http://www.fhwa.dot.gov/bridge/britab.htm as of Oct. 13, 2005.

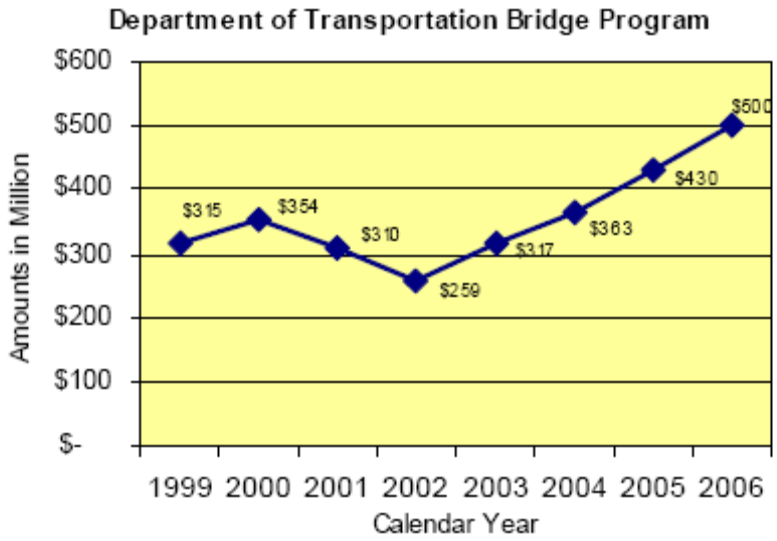
[5] PA State Budget 2006-07. "Transportation: Key to Pennsylvania Growth and Opportunity." Pp. 23-24.

Accessibility, structural integrity and safety are priorities set forth for the roads and bridges in the state of Pennsylvania. The Safe, Accountable, Flexible, Efficient Transportation Act, A legacy for Users (SAFETEA-LU) program is a federal law that created a dedicated funding source for states' highway safety improvement programs. ASCE's Pennsylvania Sections recommend that the Highway Maintenance Safety Projects appropriation be increased by $5 million as a state match for a projected $34 million grant from this federal program.

In order to meet the priorities listed above, $130 million of additional new investment has already been allotted within the state's 2006-2007 budget, for smoother roads and safer bridges. The money will be spent in the following ways[6]:

- **Smooth Roads and Bridge Priority.** $100 million, which is a 200% increase in the budget, will allow for highway maintenance and resurfacing of 550 miles of roadway in 2006 and 530 miles in 2007.

- **Bridge Preservation.** $20 million, to repair 200-250 additional bridges and to further increase the bridge restoration program. The following diagram shows PennDOT's annual spending on the bridge program from 1995-2006.



- **Emergency Highway and Bridge Repair.** $10 million, which is a 54% increase in the budget, will be set aside to have the capability to handle 20-25 emergency repair situations such as sink holes, storm repair and slide conditions.

[6] PA State Budget 2006-07. "Transportation: Key to Pennsylvania Growth and Opportunity." Pp. 23-24.

RECOMMENDATIONS

ASCE's Pennsylvania Sections support the following recommendations:

- Set a state goal that only 10% of the state's bridges be classified as structurally deficient by 2016.
- Set a state goal that only 10% (or the national average whichever is less) of the state's bridges be classified as functionally obsolete by 2016.
- Continue to increase dedicated funds for bridge maintenance/replacement.
- Encourage the use of life-cycle cost analysis principles to evaluate the total cost of projects.

SOURCES

ASCE *Report Card for America's Infrastructure*, 2005

Mercer County Engineer's Office website

Pennsylvania State Budget 2006-07, "Transportation: Key to Pennsylvania Growth and Opportunity"

U.S. Department of Transportation, Federal Highway Administration, National Bridge Inventory: Deficient Bridges by State and Highway System, 2005

DAMS

C-

2006 Report Card for Pennsylvania's Infrastructure

Due to the establishment of the Pennsylvania Department of Environmental Protection's Bureau of Dams and Waterways Management in the late 1970s, Pennsylvania has remained ahead of most other states in the area of dam safety. However, about 35% (266) of the state's "high hazard" dams – dams whose failure would cause probable loss of human life and substantial property damage – are considered deficient. The estimated cost to repair all 725 deficient dams statewide over the next five years is more than $1 billion.

BACKGROUND

Man-made reservoirs provide substantial benefits to the American public, including water supply for drinking, irrigation and industrial uses, flood control, hydroelectric power, recreation and navigation. However, the dams that impound these reservoirs also represent a significant risk to public safety, local and regional economies, and the environment.

Historically, some of the worst disasters in the United States have resulted from dam failures. In 1889, more than 2200 lives were lost when the South Fork Dam failed above Johnstown, Pennsylvania. The 1928 St. Francis Dam failure killed 450 people. During the 1970's, the failures of the Buffalo Creek Dam in West Virginia, Teton Dam in Idaho, and the Toccoa Falls Dam in Georgia resulted in a combined loss of 175 lives and more than $1 billion in damages.

Several of these dam failures in the early 1970's spurred the federal government into action and led to the enactment of the National Dam Inspection Act of 1972. Following the Teton Dam and Toccoa Falls Dam failures, as well as the Laurel Creek Dam failure in Pennsylvania in 1976/1977, the statute was implemented, and Phase I inspection of all non-federal dams listed in the national inventory began in 1978 under the direction of the U.S. Army Corps of Engineers. An inspection report was prepared for each of the dams and the reports categorized the condition of the dams as either Good (green cover), Fair (yellow cover), Seriously Inadequate Spillway (white cover) or Poor (red cover). The dams were also classified as High, Significant, or Low Hazard depending on the impact that a dam failure would have on downstream residences and infrastructure. The inspections were conducted over a period of about 4 years and the reports were distributed to the owners of the dams and the state agencies regulating dam safety.

Upon completion of this phase of the program, the state dam safety agencies assumed responsibility for the next phase, which involved more detailed investigations of the deficient dams and implementation of the recommended repairs and other upgrades. However, one of the underlying national problems at this time was that many states did not have an established group with regulatory authority for dam safety issues or staff with experience in dam design, construction and maintenance issues.

In Pennsylvania, the Dam Safety and Encroachments Act was enacted in 1978, and the Department of Environmental Resources (predecessor to the Department of Environmental Protection) shortly thereafter established the Bureau of Dams and Waterway Management.

After the National Dam Inspection Program Phase I inspections were completed, the Commonwealth's Dam Safety Program moved forward quickly, requiring from owners more detailed investigations (Phase 2 Studies) and rehabilitation of the state's most deficient high hazard dams. Approximately $100 million in funding for repairs was made available by low interest loans through PENNVEST and its predecessor, the Water Facilities Loan Board, with an additional $140 million in upgrades financed through other sources. As a result, Pennsylvania's Dam Safety Program made significant progress earlier than most states. However, the absence of a dam rehabilitation grant or loan program for dams other than those that impounded reservoirs for public water supply limited the pace at which the PADEP Dam Safety Division could address dam safety issues through the 1980's and early 1990's.

The C- reflects:

- Positive impact of dam safety and inspection programs
- Dam conditions above the national D average
- $1 billion in need for deficient dams
- Threat a failure would pose to public health, the environment and the economy

The federal government provided some assistance with program improvements through the National Dam Safety Act of 1996. This Act, which was re-authorized as the National Dam Safety and Security Act of 2002, provides funding through grants of up to $8 million for distribution among the state dam safety programs. However, to date, the funding levels have remained at pre-authorization amounts of only $5.5 million per year (approximately $22 million distributed to date) and no federal funding is available for dam owners to make the necessary repairs and upgrades.

Although Pennsylvania has not suffered any major dam failures in recent years, there are constant reminders of the economic devastation that such a failure can cause. In May 2003, the failure of the Silver Lake Dam in Michigan resulted in more than $100 million in damages, including flooding of 20 homes and three businesses, evacuation of more than 1800 people and layoff of approximately 1,100 mine workers for several weeks due to the flooding of two mines. In March 2004, the Big Bay Lake Dam in Mississippi failed, causing damage or destruction of more than 100 homes, two churches, three businesses and a fire station. Also in 2004, heavy storms in Burlington County, New Jersey resulted in the failure of 18 dams, damage to 28 other dams, evacuation of 1,000 residents, closure of more than 30 roads/highways and nearly $17 million in total damages. And, just last year, the economic and social impact of the tragedy in New Orleans was exacerbated by the failure of portions of the levee system.

Although the New Orleans disaster will help bring the importance of the safety and integrity of dam and levee-type structures to the public forefront, it may actually delay the national dam safety process by diverting a significant amount of the funding that could have gone to dam safety programs into the investigation and remediation of the New Orleans levee system.

CONDITIONS

With its early start on the investigation and rehabilitation of its seriously deficient dams, Pennsylvania has remained ahead of most other states in terms of condition of dams statewide. A large number of the Commonwealth's high hazard dams (those whose failure could result in loss of life and/or substantial property damage) have been upgraded to current dam safety criteria, and regular inspection programs have been in place for some time. Pennsylvania ranks second nationally, behind only California, in terms of annual funding for dam safety ($2.04 million in 2004) and number of full-time equivalents (24) in the Dam Safety Program. For these reasons, the PADEP had assigned a grade of C- for the condition of its dams when ASCE's national *Report Card* was updated in 2005, as compared to the grade of D assigned for dams nationwide.

Despite this relative success, the grade was only a C-, because PADEP recognizes that there is still a great deal of work that must be done. Of Pennsylvania's 3,089 total identified dams, approximately 725 are still considered deficient in some respect. This includes 266 deficient dams, or about 35%, of the 768 dams that are classified as high hazard and another 43 significant hazard dams.

At an estimated average repair cost of $1.3 million per dam, the total current cost for upgrading the deficient and high hazard Pennsylvania dams would be about $400 million. In addition, many of the dams that were upgraded in the early to mid-1980's may soon reach a point where additional upgrades and/or repairs are necessary. PADEP projects that the number of deficient significant and high hazard dams will increase to about 543 by 2010 if needed upgrades are not completed, with an associated repair cost of more than $700 million over the next 5 years.

POLICY OPTIONS

The main issue preventing the PADEP Dam Safety Division from achieving its goals and many dam owners from improving their dams is a lack of funding for dam rehabilitation projects. The Association of State Dam Safety Officials (ASDSO) estimates that $36.2 billion is needed to rehabilitate dams across the nation, based on the current national inventory of non-federally owned dams. This statistic highlights the need for a national dam rehabilitation program, a goal that is the driving force behind the formation of the Dam Safety Coalition.

This coalition is comprised of a number of national agencies, including the American Society of Civil Engineers, ASDSO, the National Society of Professional Engineers, the National Watershed Coalition and the U.S. Society on Dams. The Dam Safety Coalition supports the creation of a federal funding program to repair the nation's unsafe dams, addressing the critical issue of deteriorating dam structures that pose a severe threat to many communities throughout the country. The coalition has been a strong supporter of the Dam Repair and Rehabilitation Act, which was introduced in the 108th Congress by Representative Sue Kelly and would provide $350 million over 4 years for the repair, rehabilitation or removal of non-federal, high hazard, publicly owned dams. Although the bill was not passed in 2005, the recent failure of the Kaloko Reservoir Dam in Hawaii spurred Hawaiian Senators Daniel Akaka and Daniel Inouye to re-introduce the bill in mid-March as the Dam Repair and Rehabilitation Act of 2006, and Congress followed suit by introducing legislation to re-authorize the National Dam Safety Program.

In addition to federal funding, the Council for Safe Dams (a committee of the Northeast Region of ASDSO) has been pursuing a funding program for Pennsylvania dam owners to rehabilitate their dams. Several other states, including New Jersey and New York, have such programs, which increase the number of owners that are financially capable of undertaking these rehabilitation projects. Separate bills that would provide funding for dam safety were introduced in the State House of Representatives and the State Senate in 2005, but neither of these bills has progressed to the point of creating optimism for the dam safety community.

RECOMMENDATIONS

As a member of the Dam Safety Coalition, ASCE recommends that the following measures be taken to promote dam safety within Pennsylvania:

- Passage of state legislation to provide funding for rehabilitation of Pennsylvania dams, which will be needed for leverage of any federal funding programs that may be enacted
- Introduction and passage of federal legislation to create a loan fund for the repair, rehabilitation and maintenance of non-federal dams (Dam Repair and Rehabilitation Act of 2006)
- Re-authorization of the National Dam Safety Program Act

SOURCES

American Society of Civil Engineers, *Report Card for America's Infrastructure*, 2005

Association of State Dam Safety Officials, Annual Report, 2004-2005

Northeast Region Council for Safe Dams, Funding for Dam Rehabilitation – Pennsylvania Dams "Needs Statement"

Pennsylvania Department of Environmental Protection (PADEP), Dam Safety and Encroachments Act, 1978

PADEP, The Inspection, Maintenance and Operation of Dams in Pennsylvania, 1999

DRINKING WATER

D+

2006 Report Card for Pennsylvania's Infrastructure

Pennsylvania faces a required investment of $12 billion over the next 20 years to replace aging facilities and comply with safe drinking water regulations. Although waterborne outbreaks are currently near zero, the number of drinking water systems in violation of regulations is on the rise. The ASCE Sections assert that a deficit-neutral, guaranteed source of federal-state-local shared investment is needed for the construction and repair of drinking water facilities. If funding needs are not met, the state risks reversing the public health, environmental and economic gains that have been made over the past three decades.

BACKGROUND

In 1900, the average residential usage of potable water in Pennsylvania was five gallons per day per person; today that number is 62 gallons per day per person. One million Pennsylvania households rely on 450,000 individual wells, and more than nine million people rely on the 323 largest community drinking water systems alone. The Pennsylvania Department of Environmental Protection (PADEP) regulates nearly 10,000 community drinking water systems which serve more than 10 million people. While numerically the majority of the public water systems draw their water from ground water sources, the 568 public water systems that use surface water as their source serve more than 76% of the 11.8 million residents of the Commonwealth.

Currently, for many households, water remains relatively inexpensive, comprising less than one percent of household income. Because most water systems do not adequately account for investment needs, residents are receiving water at rates that are below cost, and the systems are not generating sufficient revenue to finance investment.

CONDITIONS

Although improved water quality regulations that were enacted under the 1984 Safe Drinking Water Act have reduced the occurrence of waterborne outbreaks to nearly zero, the number of community drinking water systems in violation of the regulations is trending upwards. According to PADEP's 2003 Annual State Public Water Systems Compliance Report, 2,479 systems were cited for a total of 10,782 violations.

In 2002, the U.S. Environmental Protection Agency (EPA) released a national survey of drinking water infrastructure needs on a state-by-state basis. The survey results concluded that approximately $10.99 billion would be needed over 20 years to repair, replace and upgrade the Commonwealth's 333 largest community drinking water systems. An additional $1.1 billion would be needed over 20 years to bring these same systems into compliance with current regulations and protect public health.

The Funding Gap

Federal assistance has not kept pace with demand. Since the 1997 fiscal year, Congress has appropriated only between $700 million and $850 million annually for the Safe Drinking Water Act's State Revolving Loan Fund (SRF) program, enacted in 1987. The funding level for FY 2005 was $850 million, less than 10% of the total national requirements. The Bush Administration proposed an appropriation of $850 million for FY 2006.

The D+ reflects:

- A $12 billion+ funding gap
- Incomplete data at the state level
- Increasing violations
- Potential threat to public health, the environment and the economy

In 2002, the EPA issued *The Clean Water and Drinking Water Infrastructure Gap Analysis*, which identified potential funding gaps between projected needs and spending from 2000 through 2019. This analysis estimated a potential 20-year funding gap for drinking water capital, and operations and maintenance, ranging from $45 billion to $263 billion – depending on spending levels. Capital needs alone were pegged at $161 billion, a $10 billion increase from the 2001 estimate.[1]

The Congressional Budget Office (CBO) concluded in 2003 that "current funding from all levels of government and current revenues generated from ratepayers will not be sufficient to meet the nation's future demand for water infrastructure." The CBO estimated the nation's needs for drinking water investments at between $10 billion and $20 billion per year over the next 20 years.[2]

In the EPA's study, Pennsylvania's funding gap was estimated at *$12 billion* for just the 333 largest community drinking water systems alone. Information regarding the investment needs of the state's 9,700 smaller systems was not available. One should note that the funding gap between projected water investment needs and current spending levels is dependant upon the growth of user rates. Therefore, the gap largely disappears if municipalities increase water spending at a rate of 3% over the rate of inflation.

The gap analysis provides a starting point for the magnitude of the drinking water infrastructure funding issues. While the data available represents a reasonable effort to quantify the funding gap, more detailed statewide data would further assist in more accurately quantifying the problem and projecting the impact of potential remedies.

Bridging the Gap

In 1988, Pennsylvania created the Pennsylvania Infrastructure Investment Authority (PENNVEST) to help communities finance infrastructure investments. PENNVEST serves as the financing agency for the federal drinking water SRF authorized by the 1996 Safe Drinking Water Act Amendments. Since 1988, PENNVEST has funded more than $1.25 billion in water supply infrastructure improvement projects.

[1] Operation and maintenance (O&M) costs are paid for by the local water utilities, not the federal government.
[2] The CBO approximation does *not* include the $178 billion to $331 billion in anticipated pipe replacement costs over the same 20-year period.

In May 2004, Pennsylvania voters approved a $250 million bond issue on water and wastewater infrastructure. $50 million was directed to PENNVEST, with another $125 million and $75 million issued for grants and loans respectively to fund water and sewer projects. These investments directly impact economic development, providing the infrastructure necessary to promote community growth, attract new businesses, and create and preserve jobs in the Commonwealth.

Increased federal subsidies for drinking water needs would help finance required investment, but federal support cannot address the entire need. Operation and maintenance costs are not eligible for federal funding and must be borne entirely by local utilities. Therefore, water system customers will be forced to pay for the vast majority of the investments, those not funded by the federal government or the state.

Clean and safe water is a public good, therefore the central question becomes to what extent can and will ratepayers pay for needed investment. While rate increases will not adversely affect most households, many low-income families will not be able to afford the added expense.

POLICY OPTIONS

Clean and safe water is no less a state priority than are adequate roadway systems and a safe and efficient aviation. The latter infrastructure programs enjoy sustainable, long-term federal grant programs; under current policy, water and wastewater infrastructure do not.

New solutions are needed for what amounts to more than $12 billion dollars in critical drinking water investments that Pennsylvania will require over the next two decades. If investment needs are not met, the state risks reversing the public health, environmental and economic gains that have been made over the past three decades.

Without a significantly enhanced federal role in providing assistance to drinking water infrastructure, the role of critical investments will fall to Pennsylvania. The case for state assistance to address the unprecedented needs is compelling. In many locations, public water systems cannot be expected to meet this challenge alone, or these communities face losing competitive economic advantage to neighboring communities, other regions and states due to inordinately high utility rates. Additionally, because source waters are shared across local boundaries, the benefits of state help will accrue to entire regions of Pennsylvania.

Equally compelling is the case for flexibility in the forms of state investment, including grants, loans and other forms of assistance. Increasingly, grants will be needed for many communities that simply cannot afford to support the cost to meet public health, environmental and/or service-level requirements. Loans and credit enhancements may be sufficient for public water systems in communities with greater economies of scale, wealthier populations and/or fewer assets per capita to replace. Other possible investment solutions include trust funds and incentives for private investment.

Pennsylvania can stretch assistance dollars further by encouraging public water systems to:

1. **Proactively maintain infrastructure.** In many cases, the approach towards public infrastructure is reactive. Systems are built and operated with minimal maintenance until they wear out. Water systems need to conduct a full accounting of the costs to manage their assets both for current operations and future infrastructure needs. By appropriately managing its assets, a system may be able to reduce the overall investment required.

2. **Adopt new technology.** Regulators, engineers and drinking water operators tend to be conservative when it comes to adopting new technologies. New technologies exist to clean and repair old pipes, providing low-cost alternatives to replacement of distribution mains. New pipe materials can also reduce water leaks, thereby reducing demand. In order to gain acceptance by the drinking water industry, these new technologies must be supported by full-scale demonstrations.

RECOMMENDATIONS

The Pennsylvania Sections of the American Society of Civil Engineers encourage the Commonwealth to support the Water Infrastructure Trust Fund Act of 2005 (H.R. 4560). This act would provide a deficit-neutral, guaranteed source of federal-state-local shared investment for the construction and repair of drinking water facilities, and would enable the state to reduce the enormous funding gap.

In addition, the Sections support the following recommendations:

- **Issue state bonds.** With decreasing federal funding for the State Revolving Loan Fund (SRF) program, Pennsylvania should leverage the remaining federal dollars as collateral for the issuance of state bonds — effectively doubling the amount of capital available for infrastructure investments.

- **Create an infrastructure needs inventory.** ASCE supports the establishment of a statewide infrastructure needs inventory to be administered by the state's municipal planning organizations. This inventory would serve as a mechanism to differentiate between expenditures for current consumption and long-term investment, and would reduce major inefficiencies in the planning, design and construction process for long-term investments. An infrastructure needs inventory would also help to increase public awareness of the problems and needs facing the state's physical infrastructure, and would help the state legislature focus on programs devoted to long-term growth and productivity.

- **Focus on technology.** State government can play an essential role in promoting research, development, testing and evaluation of new technologies and the dissemination of information about proven technologies. ASCE supports state-funded research into wastewater treatment technology, which may reduce capital expenditures as well as operation and maintenance costs. By creating research partnerships with universities throughout the state, Pennsylvania may reap additional economic benefits through public-private partnerships and licensing of new technologies.

- **Promote sustainable infrastructure initiatives.** In order to close the funding gap, support programs that will make infrastructure more sustainable. Promote better asset management techniques that will reduce long-term costs and improve performance. Encourage strides in water efficiency, which will reduce drinking water consumption and the volume of wastewater to be treated. Advocate for full-cost pricing of water and wastewater treatment, and support reduction of non-point source pollution of water sources.

- **Provide reduced rates to the disadvantaged.** In order to cushion the impact of rate increases on low-income households, the State should either a) encourage municipalities to use lifeline rates for low-income households or b) develop a rate reduction program similar to the federal low-income Energy Assistance Program.

- **Protect water sources in farming communities.** Continue to fund low-interest loans to farmers, so that they may implement best management practices for land management and manure handling and storage to protect drinking water sources.

SOURCES

EPA, “The Clean Water and Drinking Water Infrastructure Gap Analysis,” 2002

EPA, Clean Watersheds Needs Survey, 2000

EPA, Summary of Water Infrastructure Forum from the Closing the Gap: Innovative Solutions for America’s Water Infrastructure Forum, 2003

Joint Legislative Air and Water Pollution Control and Conservation Committee, Report on Combined Sewer Overflows in Pennsylvania, 2001

National Research Council, Report on Regional Cooperation for Water Quality Improvement in Southwest Pennsylvania, 2005

PADEP, Pennsylvania Integrated Water Quality Monitoring and Assessment Report, 2004

PADEP, Pennsylvania Public Water System Compliance Report, 2004

ASCE Policy Statements:

- 299, "Infrastructure Improvement Policy," 2003
- 420, "Clean Water Act Reauthorization," 2004
- 422, "Watershed Management," 2003
- 453, "Federal Capital Budgeting," 2000
- 480, "Water Infrastructure Funding," 2005

NAVIGABLE WATERWAYS

D-

2006 Report Card for Pennsylvania's Infrastructure

A typical Ohio River tow of 15 barges can move the same amount of cargo as 225 rail cars or 900 semi-trucks—reducing highway congestion and saving money. Commercial shipping is big business along the Allegheny, Ohio and Monongahela Rivers and the navigation channel that connects Philadelphia to the Delaware Bay. However, future viability of the state's waterway infrastructure has been threatened due to an unreliable lock and dam system, less than optimal funding and delays to the Delaware River Deepening Project.

BACKGROUND

Inland waterway transportation is generally the least costly transportation mode. The average cost of moving cargo by barge in the Port of Pittsburgh district ranges between $.005 and $.01 per ton mile of cargo moved, compared to $.05 for rail and $.10 for trucking. Barge transportation is also more energy efficient and environmentally friendly than rail or truck, and reduces overland congestion, accidents and noxious pollutant emissions.

A typical Ohio River 15 barge tow has a 22,500 ton load capacity, which is the equivalent of 225 rail cars or 900 tractor trailer trucks. To move these 22,500 tons one mile would require 44 gallons of diesel fuel by barge, 111 gallons by rail and 381 gallons by truck.

Western Pennsylvania

The U.S. Army Corps of Engineers owns, operates and maintains approximately 200 miles of navigable waterways and 17 navigation locks and dams on the Ohio, Allegheny and Monongahela Rivers in western Pennsylvania.

The Port of Pittsburgh is the second busiest inland port in the nation and the 13th busiest port of any kind. At 52 million tons of cargo per year, it is larger in tonnage than Baltimore, Philadelphia and St. Louis. The port district encompasses an eleven county area in southwestern Pennsylvania and supports more than 200 river terminals and barge industry service suppliers. On an annual basis, the port moves approximately $8 billion worth of goods, which equates to 53,000 jobs and more than $2 billion in income to the region. While its contributions to our economy are undeniable, the port's life and success is directly dependent on the efficient operation of the navigable waterway transportation system.

In 2005, waterway traffic increased by 13 percent on the Ohio River and 16 percent on the Monongahela River, and this upward trend is expected to continue.

Eastern Pennsylvania

The U.S. Army Corps of Engineers also maintains a 40-foot deep navigation channel that extends from Allegheny Avenue in Philadelphia, 96.5 miles in a southerly direction to deep water in the Delaware Bay. This channel is part of the "Philadelphia-to-the-Sea" navigation project, which serves three states – Pennsylvania, New Jersey and Delaware – and ties into other navigable waterways such as the Chesapeake and Delaware Canal (DE, MD), Christina River (Port of Wilmington, DE) and the Schuylkill River (Philadelphia, PA). The channel width varies from 400 feet in the harbor to 1200 feet in some of the bends.

The ports of Philadelphia, Pennsylvania; Camden, New Jersey; and Wilmington, Delaware are the second largest deep water ports on the U.S. East Coast, in terms of international waterborne cargo tonnage (82.4 million tons of cargo in 2004, 29.9% of North Atlantic Ports' market share). The cargo is generally petroleum, with a mix of container and bulk products.

The D- reflects:

- 29% acceptable reliability of locks
- Aging infrastructure
- Increased demand
- Inadequate funding
- Possibility of missed revenue opportunities due to delays in dredging
- Impact of failure on the local economy – millions per day

CONDITIONS

Western Pennsylvania

The Corps of Engineers has developed a rating system to measure reliability for the navigation system structures, as unscheduled maintenance closures of the locks are most detrimental to the shipping industry and economic success of the port. Of the 17 locks in western Pennsylvania, only 29 percent (five) meet the Corps' Acceptable Level of Performance Reliability. The overall system is at 61 percent of the reliability goal, and 50 percent of the most critical locks, in terms of economic value, operate at only 20 percent of the reliability goal. Constrained funding for maintenance of navigation projects over several decades has caused this decline in the reliability of older locks in the system, some of which are 85 years old.

The Corps' Ohio River & Tributaries Navigation System Five Year Development Perspective details the maintenance, construction and planning optimum actions in the 2006-2011 fiscal years, which will contribute to reducing risk, improving reliability and increasing efficiency. This paper defines specific projects and funding levels for General Investigations and Assessments, which include studies and engineering design (GI), Construction General (CG) and Operations and Maintenance (O&M). For the entire Ohio River system, FY06 O&M actual funding is at 95 percent of optimum; however FY06 actual funding for GI and CG is at 43 percent and 87 percent of optimum funding levels, respectively. While the O&M funding level has improved and is close to optimum, funding remains below optimum levels especially for GI.

Eastern Pennsylvania

The Delaware River was last deepened to its present depth of 40 feet in 1942, a project which was authorized by Congress in 1938. Maintenance dredging in the project is performed through the use of dredging contracts and the Philadelphia District-owned Dredge McFarland. Approximately 3 million cubic yards of material are removed annually and placed into confined disposal facilities, most of which are located in New Jersey.

In 1981, a group of maritime representatives – including refineries, terminal operators, port authorities, railroads, the Pilot's Association and the Maritime Exchange, initiated a project to deepen the navigation channel to 45 feet. The Delaware River Port Authority (DRPA) expressed support of the Federal Feasibility Study to deepen the channel in 1983 and, by 1989, had agreed to act as the local sponsor. Congress authorized the project in the Water Resource Development Act of 1992, at which time the Corps completed its Feasibility Report.

In 1998, Congress approved $1.5 million for due diligence and construction for FY 1999 and has continued to provide funding for its eventual construction. This project supports shipping traffic, carrying more than 120 million tons of products per year. The economic impact on the Port of Philadelphia and Camden, New Jersey region would include 54,000 jobs (80% of the jobs are non-refinery related), $1.2 billion in business revenue, $90 million in state and local taxes, and 75 percent of U.S. East Coast oil refining capacity, processing 1.1 million barrels of oil per day.

In addition to the increase in jobs and revenue, the deepening of the channel would have a positive environmental impact. It would reduce the lightering operations in Delaware Bay, improve security by reducing the amount of time that tankers are in the Delaware Bay, and would provide a more efficient movement of crude oil, container petroleum product, steel and slag.

Most East Coast ports have deepened or are in the process of deepening their channels to more than 40 feet, which will make the Delaware River Channel the shallowest channel among competitive ports — a major competitive disadvantage.

The Delaware River Deepening Project has been delayed for a variety of environmental, economic and political issues. While numerous and exhaustive studies have been conducted by the Corps, environmental groups fear that the dredging to the native river bottom will re-suspend contaminants into the water column and that it will puncture an aquifer contaminating the groundwater in Pennsylvania and New Jersey. There is also concern that a majority of the 33 million cubic yards of material to be dredged would be deposited in upland disposal areas in New Jersey.

Based on the current poor condition of the system and lack of reliability, actual funding levels less than optimum in FY06 as defined by the Corps of Engineers, and the prediction of increased traffic and demand on the system, the Navigable Waterways in Pennsylvania are assigned the grade of **D-**.

POLICY OPTIONS

The current federal budget process does not differentiate between expenditures for current operations/maintenance and long-term capital investment. This causes major inefficiencies in the planning, design and construction process for long-term investments. Funding for capital projects needs to be budgeted and predictable, as opposed to the current system of constrained funding which is determined on a yearly basis.

The American Society of Civil Engineers (ASCE) supports the creation of a federal capital budget, which would serve as a funding mechanism to help reduce the constant conflict between short-term and long-term maintenance needs. This would help to increase public awareness of the problems and needs facing this country's physical infrastructure, and would help Congress to focus on specific programs devoted to long-term growth and productivity.

In the interim, Congress must appropriate the full amount in the Inland Waterway Trust Fund to improve the reliability of the most critical projects to acceptable performance levels and begin reducing the maintenance backlog.

RECOMMENDATIONS

- **Amend the Inland Waterways Trust Fund Act.** Congress should amend the Inland Waterways Trust Fund Act of 1978 to allow all funds collected to be used for repair and construction of dams and locks. Congress should then appropriate the full fund balance each year to pay for the cost of rehabilitating the nation's oldest locks.

- **Revisit the Delaware River Dredging Project.** ASCE encourages the State of New Jersey to revisit all of the investigations and legislative policies performed on the Delaware River Dredging Project. ASCE's Pennsylvania Sections strongly support the proposed agreement between the States of New Jersey and Delaware and the Commonwealth of Pennsylvania concerning the Delaware River Dredging Project, and recommend that all states strive for a speedy approval.

SOURCES

Port of Pittsburgh Commission website, March 2006

U.S. Army Corps of Engineers, Philadelphia District

U.S. Army Corps of Engineers, Pittsburgh District

U.S. Army Corps of Engineers
- *The U.S. Waterway System,* December 2004
- *The U.S. Inland Waterway Transport System,* March 2003

U.S. Army Corps of Engineers, Great Lakes and Ohio River Division, Ohio River & Tributaries Navigation System Five Year Development Perspective, Draft Revision 7, February 23, 2006

U.S. Department of Transportation, Environmental Advantages on Inland Barge Transportation: Final Report, August 1994

U.S. Office of Management and Budget

- *Budget of the United States Government, Fiscal Year 2005,* February 2004
- *Budget of the United States Government, Fiscal Year 2006,* February 2005

ASCE Policy Statements

- 218, "Improvement and Management of Ports, Harbors, and Waterways," 2004
- 299, "Infrastructure Improvement Policy," 2003
- 453, "Federal Capital Budgeting," 2003

RAIL (FREIGHT)

B

2006 Report Card for Pennsylvania's Infrastructure

In 1998, 919 million tons of freight passed through the Commonwealth. In 2020, that value is expected to be 1,397 million tons. Railroad freight demand is growing at a much faster rate than the general population, and railroad traffic is steadily approaching World War II levels. Projects that could be undertaken to address the Commonwealth's infrastructure needs total some $280 million. Annual state of good repair track and bridge expenditures for all railroad classes within the state are projected to be approximately $560 million. Class I and larger railroads are more poised to cover their own financial needs. Smaller railroads are not as fortunate and need the most assistance to remain competitive.

BACKGROUND

A number of benefits result from supporting rail freight: congestion mitigation, air quality improvement, improving transportation safety, curtailing truck traffic growth on highways, job growth and economic development. Railroads also remain the safest and most viable mode for transporting hazardous materials, coal, industrial raw materials and large quantities of goods.

Since the mid-1800's, rail transportation has been the centerpiece of industrial production and energy generation. Specifically, in light of September 11th and from a national security point of view, railroads are one of most secure options for transporting dangerous or hazardous products. In fact, the majority of spent nuclear fuel rods will likely be sent via rail to the newly established federal depository. Surely, many of these shipments will pass through the Keystone State. By further improving the rail infrastructure, railroad operation can become even safer and more difficult to disrupt by any terrorist group.

CONDITIONS

Pennsylvania is one of the nation's leaders in freight assessment, planning and investment. This level of support stems from the state's rich historical and industrial heritage. Most railroads are privately owned. Class I and mid-sized railroads operating within the Commonwealth's borders are generally able to finance capital improvements on their own. Problems arise with short line railroads, which have difficulty in making infrastructure investments to remain viable and competitive. The regional and short line railroads are the feeders and supporting players in Pennsylvania's overall transportation network, and the network is only as strong as its weakest link.

Pennsylvania has 5,145 route-miles of freight railroad operating and 69 freight railroads, more than any other state. Commodities, which originate and terminate in Pennsylvania and are carried by rail, are dominated by coal (62 percent of originating tons, and 39 percent of terminating tons) and also include primary metal products, petroleum, chemicals and food

products. Railroads are a vital component of the Commonwealth's transportation system and are very important to the state's economy.

Pennsylvania's core, or strategic, rail lines connect Philadelphia, Harrisburg, Pittsburgh and Chicago, and include some of the highest volume in the nation, such as the former Pennsylvania Railroad main line – now Norfolk Southern. This line carries more than 120 million gross tons (MGT) annually. Other very highly-trafficked rail lines in the Keystone State include CSX's east-west line through Erie, at 113 MGT; CSX's line through Connellsville, Pittsburgh and New Castle, at 100 MGT; and Norfolk Southern's Reading-Bethlehem-Easton-New Jersey line, at 100 MGT. Another important trunk line is Amtrak's Northeast Corridor, a portion of which passes through southeast Pennsylvania, including Philadelphia. Some freight is moved on this predominantly passenger rail corridor.

The B reflects:

- Low-density railroads at risk of abandonment
- Short line, "feeder" rail in need of investment
- Needed capacity enhancements
- Positive impact of larger rail funding its own improvements
- Success of public-private and innovative financing for new investment

At the other end of the spectrum, there are a number of rail lines in Pennsylvania considered "at risk" because of low traffic density (1). The term "at risk" means that these lines may be abandoned because traffic revenue may not be sufficient to maintain the line. These low density lines are normally the object of publicly-funded rail preservation efforts when it is deemed that the rail line is capable of growth and development, and where continuation of rail service provides public benefits. With annual traffic less than five MGT, 124 Pennsylvania rail lines are considered somewhat at risk of abandonment. Of these, 96 rail lines are considered especially at risk, because they carry annual traffic of less than one MGT.

To get a sense of how freight traffic is increasing in Pennsylvania, the following statistics can be supported:

- One modest forecast for the movement of freight by the Federal Highway Administration indicates that increases of up to 70% can be expected in the Northeast from 2003-2013.
- Another forecast by the United States Department of Transportation predicts an approximate doubling of surface transportation over the next two decades, 2000-2020.
- Extrapolation of trends which characterize highway traffic over the past twenty-five years indicates an alarming increase of vehicle miles traveled – at a rate of four times population growth.
- In 1998, 919 million tons of freight passed through the Commonwealth. In 2020, that number is expected to be 1,397 million tons (2nd and 3rd respectively nationwide).

Pennsylvania has funded rail freight infrastructure by means of the Rail Freight Assistance Program (RFAP), Capital Budget Grants and double-stack clearance projects. The double-stack

projects were completed and funded between 1991 and 1996. RFAP was created by the Commonwealth's Rail Freight Preservation and Improvement Act of 1984, No. 119, which provides funds to preserve essential rail freight service and stimulate employment through generation of new or expanded rail freight service. Capital Budget Grants have also been funded annually to help pay for freight infrastructure improvements. RFAP grant authorization increased from $4.25 million to $8.5 million in 2004. The Capital Budget grant allocation for rail also increased in 2004 from $10 million to $20 million.

PennDOT also established the Pennsylvania Infrastructure Bank (PIB) for rail freight and provided $500,000 in initial seed capital to kick-start a program that provides low-interest loans to railroads and shippers for their use on railroad infrastructure projects. The Agency periodically adds funds to this. As payments are made they are recycled and re-loaned.

Additionally, Pennsylvania's Department of Community and Economic Development administers several economic development loan and grant programs that assist rail infrastructure expansions, including the Infrastructure and Facilities Improvement Program, the Tax Increment Financing Guarantee Program, the Business in Our Site Program and the Infrastructure Development Program.

PennDOT is also beginning to utilize other funding programs to complement their RFAP and Capital Budget Programs. These include: Congestion Mitigation Air Quality (CMAQ), Local Tax Increment Financing (TIF) and federal Railroad Rehabilitation and Improvement Financing (RRIF) program.

In the most recent Capital Budget Act (Act 40), which was passed by the Pennsylvania Legislature, $560,932,000 in State Capital Budget dollars were requested for statewide rail freight industry infrastructure needs.

In another study, annual track and bridge expenditures for all railroad classes within the state are projected to be approximately $136 million. As stated earlier, the larger railroads are more able to cover their financial needs. Smaller railroads are not as fortunate and need the most assistance. Clearly, increased state funding would be most helpful and a sound investment.

Indicators of the health of the Commonwealth's existing rail freight infrastructure are as follows:

- **Physical plant needs.** 60% of the short line and regional railroad physical plant is in need of extensive rehabilitation, including 170 bridges. Bridge repairs are anticipated to be > $ 1 million a piece.

- **Ability to handle heavy loads.** Excluding the Bessemer & Lake Erie (CN) and Delaware & Hudson Railroads (CP Rail) – both of which have heavy load infrastructures, short line and regional railroads are capable of handling the heavier, 286,000-pound loads on only 70% of their infrastructure. In contrast, almost all new freight rail cars being manufactured today are 286K capable — the exception being cars that are manufactured for use in the transport of Powder River Basin coal, many of which are the latest generation 315,000-pound capacity rail cars.

- **Derailments.** Over the period from 2001 to 2005, there was an annual average of 80.4 derailments in Pennsylvania. In 2005, total derailments in the state were down 30.3% over the previous year (2004). It is estimated that more than 540,000 carloads of hazardous materials cross Pennsylvania's rail system each year.

- **Choke points.** There are some forty-five rail traffic choke points throughout the state. Most notable of locations needing capacity improvements include Philadelphia's "Phil" and "Zoo" Interlockings, Norfolk Southern's Port Perry Branch and its Lemoyne Connector, which links NS's Lurgan Branch with its Port Road / Enola Branch at Lemoyne on the west bank of the Susquehanna River near Harrisburg.

Regarding new investment, much success has and can be accomplished with public/private innovative financing. Numerous public-private and/or innovative funding plans have assisted maintenance and improvement of rail infrastructure. Following are some examples.

Use of public funds to leverage private funding, a public-private participation project, is one method of funding where there are both public and private benefits. Pennsylvania's Conrail double-stack project of the 1990's is a prime example, wherein the state participated in the $100 million project to the extent of $35.8 million. As of 2002, other Pennsylvania projects that are now under consideration or which have been recently completed include:

1. **Advanced Warning Timing Devices with Norfolk Southern, Bessemer & Lake Erie and Union railroads.** This project is a $10 million State Capital Budget item to improve safety at 97 crossings between 2003 and 2006. The total project cost of $8.67 million is to be shared, with 80 percent state funds and 20 percent railroad funds.

2. **Norfolk Southern's** new construction of the Shelocta line to the Keystone Power Plant in Indiana County. Project funding included $10 million in Congestion Mitigation Air Quality (CMAQ) funds through the Southwest Pennsylvania Commission (SPC). Currently there are no state funds committed, however, an additional $3.2 million in a SAFETEA-LU earmark and $2 million in an ISTEA earmark remain available to this project.

3. **Restoration of Buffalo and Pittsburgh Railroad's Homer City Branch in Indiana County.** The project restored rail service for coal delivery to EME Homer City Generation L.P.'s Homer City Electric Generating Station. Total investment in the project was $8.62 million, including $4 million in state grant funds, $2.3 million in federal grants and $2.32 million in private matching funds. The project involved the installation of 16 miles of continuous welded rail, 41,000 ties and 10 new switches. In addition, 34 public and private road crossings were rehabilitated, five new bridge decks were installed and 30,000 tons of ballast was distributed over the line. The plant burns approximately 6 million tons of coal annually, which is largely delivered by truck over local roads. The line will have the capacity to deliver up to 2 million tons of coal annually, which would remove up to 80,000 loaded trucks from local highways each year.

Rail Freight Assistance Benefits 2002-2005

Fiscal Year	Grant Type	State Investment	Total Project Cost	Number of Projects Funded	*Jobs Created*	*Jobs Maintained*	Trucks Off Highway
2002	RFAP	$4,250,000	$6,300,000	31	675	31,897	202,923
2002	Capital Budget	$10,000,000	$13,300,000	14	498	34,250	216,490
Total 2002		**$14,250,000**	**$19,600,000**	**45**	**1,173**	**66,147**	**419,413**
2003	RFAP	$4,250,000	$6,500,000	30	1,002	18,348	216,070
2003	Capital Budget	$18,000,000	$24,000,000	20	185	30,980	367,011
Total 2003		**$22,250,000**	**$30,500,000**	**50**	**1,187**	**49,328**	**583,081**
2004	RFAP	$8,500,000	$11,800,000	43	1,709	10,211	166,799
2004	Capital Budget	$20,000,000	$26,700,000	25	1,217	12,768	873,909
Total 2004		**$28,500,000**	**$38,500,000**	**68**	**2,926**	**22,979**	**1,040,708**
2005	RFAP	$8,500,000	$11,700,000	52	2,375	29,065	836,306
2005	Capital Budget	$20,000,000	$28,500,000	20	2,033	60,880	2,949,768
Total 2005		**$28,500,000**	**$40,200,000**	**72**	**4,408**	**89,945**	**3,786,074**
Grand Total:		**$93,500,000**	**$128,800,000**	**235**	**9,694**	**228,399**	**5,829,276**

Please Note: The total project cost is estimated for the 2002 and 2003 Fiscal Years.

A widely-held and strongly-felt opinion, recorded in a recent survey of Pennsylvania's Metropolitan Planning Organizations (MPOs) and public rail authorities, indicated that there is widespread appreciation of Pennsylvania's funding of rail freight programs and that more RFAP and Capital Budget funding is required.

POLICY OPTIONS

Solutions that would ease the increasing demands on Pennsylvania's heavy rail transportation system and improve freight conditions, capacity and safety are multi-faceted.

ASCE urges the legislature to:

- **Continue its model of excellence.** The Commonwealth must continue to build on its excellent model, increase transportation investment at all levels of government and make use of the latest technology.

- **Support multi-modal transportation.** Cities and communities should not be shortsighted concerning freight planning and should also look at statewide planning and connectivity to maximize their own inter-modal options. Freight planning in the Commonwealth should include consideration of all transportation modes and should be developed as an outgrowth of the new Mobility Plan.

- **Link planning efforts.** The Commonwealth's freight planning effort should dove-tail with both the new National Freight Plan and the freight plans of Pennsylvania's neighbor states, including New Jersey, New York, Ohio, Maryland, Delaware, Virginia and West Virginia.

- **Recognize the connection between railroads and highways.** There needs to be awareness at the national and state levels that diverting freight movements from our highways can best be accomplished by expanding the rail infrastructure and by mitigating or eliminating existing choke points. Government entities must be able to accept the rationale that allocating more public funds for rail will help reduce pressure on highways.

RECOMMENDATIONS

- Provide additional state and national rail funding, above current levels. This includes being able to fund larger projects that can be supported over multiple contract years.

- Upgrade small railroads to 286,000-pound railcar capability where merited.

- Promote more double-stack, inter-modal clearance projects, where required.

- Support other projects facilitating inter-modal growth, including transfer facilities.

- Eliminate choke points.

- Support innovative, public-private financing agreements for freight projects.

- Continue to advance the efforts to promote freight planning at the local/MPO level. Continue to improve coordination between local levels and the state planning agency, and add to the noteworthy inroads that have already been made in freight planning at many of Pennsylvania's MPOs/RPOs.

- Seek new, innovative sources of federal and state funding for rail freight investment to specifically reduce highway congestion and improve the overall level of transportation safety in the Commonwealth.

SOURCES

American Short Line and Regional Railroad Association, “Short Line Infrastructure Funding, We Aren’t Chicken Waste”

North Carolina Forum on Freight Mobility and Economic Prosperity, Summary of Freight Planning and Policies – Selected States: A “White Paper,” JUNE 21, 2004

Pennsylvania Department of Transportation (PennDOT), Comprehensive Rail Freight Study and 2003 Pennsylvania State Rail Plan

PennDOT Bureau of Rail Freight, Ports and Waterways

Senate Congressional Record, 11/15/2001, Specter & Santorum

ASCE Policy Statement 149 “Inter-modal Transportation Systems,” 2002

ASCE Policy Statement 496 “Innovative Financing for Transportation Projects” 2004

ROADS

D

2006 Report Card for Pennsylvania's Infrastructure

Pennsylvania is required to report road conditions to the Federal Highway Administration based on a roughness index. These statistics show that 27% of Pennsylvania's roads are rated mediocre or poor. For the nation as a whole, that number is 18%. An inevitable increase in number of trucks and axle loads will continue to degrade the roads more rapidly.

BACKGROUND

Road condition ratings are derived from the International Roughness Index (IRI) and the Present Serviceability Rating (PSR). States are required to report to the Federal Highway Administration (FHWA) IRI data for the Interstate system, other principal arterials, rural minor arterials and the National Highway System. Pavement rating data is not reported for local or rural minor collector functional systems. The IRI is calculated from the cumulative vertical vibrations along a smooth surface in inches per mile[1]. The PSR is a subjective rating system based on a scale of 0 to 5 and is described in Table 1.

Table 1- Pavement Rating System[2]

PRS	DESCRIPTION
4.0-5.0	Only new (or nearly new) superior pavements are likely to be smooth enough and distress free (sufficiently free of cracks and patches) to qualify for this category. Most pavements constructed or resurfaced during the data year would normally be rated in this category.
3.0-4.0	Pavements in this category, although not quite as smooth as those described above, give a first-class ride and exhibit few, if any, visible signs of surface deterioration. Flexible pavements may be beginning to show evidence of rutting and fine random cracks. Rigid pavements may be beginning to show evidence of slight surface deterioration, such as minor cracking and spalls.
2.0-3.0	The riding qualities of pavements in this category are noticeably inferior to those of new pavements and may be barely tolerable for high-speed traffic. Surface defects of flexible pavements may include rutting, map cracking and extensive patching. Rigid pavements may have a few joint fractures, faulting and/or cracking, and some pumping.
1.0-2.0	Pavements have deteriorated to such an extent that they affect the speed of free-flow traffic. Flexible pavement may have large potholes and deep cracks. Distress includes raveling, cracking and rutting, and occurs over 50 percent or more of the surface. Rigid pavement distress includes joint spalling, faulting, patching, cracking and scaling, and may include pumping and faulting.
0.0-1.0	Pavements are in extremely deteriorated conditions. The facility is passable only at reduced speed and considerable ride discomfort. Large potholes and deep cracks exist. Distress occurs over 75 percent or more of the surface.

[1] M W Sayers. "On the Calculation of International Roughness Index from Longitudinal Road Profile." Transportation Research Record, Transportation Research Board (TRB), Washington, DC, No 1501, pp.1-12.
[2] FHWA. (2006). "Status of the Nation's Highways, Bridges, and Transit: 2004 Conditions and Performance"

Prior to 1993, all pavement conditions were evaluated using PSR values. The road conditions for Pennsylvania are based on the ratings of very good, good, fair, mediocre and poor. FHWA ranks "poor" roads as those in need of immediate improvement. "Mediocre" roads need improvement in the near future to preserve usability. "Fair" roads will likely need improvement. "Good" roads are in decent condition and will not require improvement in the near future. "Very good" roads have new or almost-new pavement. Table 2 defines these ratings with the relationship between PSP and IRI values.

Table 2 - Relationship Between IRI and PSR [3]

Condition Term	PSR RATING		IRI RATING (inches/mile)	
Categories	**Interstate**	**Other**	**Interstate**	**Other**
Very Good	≥ 4.0	≥ 4.0	< 60	< 60
Good	3.5 - 3.9	3.5 - 3.9	60 - 94	60 – 94
Fair	3.1 - 3.4	2.6 - 3.4	95 - 119	95 – 170
Mediocre	2.6 - 3.0	2.1 - 2.5	120 - 170	171 – 220
Poor	≤ 2.5	≤ 2.0	> 170	> 220

CONDITIONS

Based on the IRI and PSR data from 2004, Pennsylvania has the following percentages for the road condition categories: 3% (722 miles) very good, 20% (5,525 miles) good, 50% (14,138 miles) fair, 15% (4,295) mediocre, and 12% (3,306 miles) poor.[4] The national percentages for these condition categories are as follows: 13% (115,637 miles) very good, 27% (249,259 miles) good, 41% (382,547 miles) fair, 11% (102,643) mediocre, 7% (68,354) poor.[5]

The statistics indicate the discrepancy between the national average and Pennsylvania's roads; however, one should consider the following:

- Pennsylvania has some of the oldest highways in the nation (I-76 is advertised as the first interstate.)

- Pennsylvania has nearly the most lane miles of any other state that must deal with severe winters. Pavements are susceptible to cracking and expanding due to the temperature and weather changes (freeze/thaw cycles) in the state. Also, the salt used during snow/icy conditions decreases the life of a pavement compared to a southern state.

Inevitable increases in the number of trucks and axle loads on the roads will continue to degrade the roads more rapidly. Deterioration of the pavements is to be expected, but it can be monitored. Proactive response is necessary to improve the riding quality of the pavements in the state.

[3] FHWA. (2006). "Pavement terminology and Measurements." Conditions and Performance Report.
[4] less than 1% not reported for interstate roads
[5] less than 1% not reported for interstate roads

POLICY OPTIONS

The key to a successful infrastructure program is to have funds to support roadway construction, rehabilitation and emergency situations. These three key aspects make possible the goals of accessibility, structural integrity and safety that are needed for Pennsylvania's roads.

The following table summarizes the highway funding for the state of Pennsylvania since 2000-01[6].

Transportation – Key to Pennsylvania Growth and Opportunity

	Total Pennsylvania Highway Funding (Dollar Amounts in Millions)					Flexed Funds for Transit (Dollar Amounts In Millions)	
	State Funding	Federal Funding	Total Funding	Dollar Change	Percent Change	Standard Federal	"Crisis" Federal
2000-01	$2,943	$1,112	$4,055	–	–	$46	–
2001-02	$2,940	$1,272	$4,212	$157	3.9%	$36	–
2002-03	$2,949	$1,265	$4,214	$2	0.0%	$31	–
2003-04	$2,966	$1,205	$4,171	($43)	–1.0%	$59	–
2004-05	$3,124	$1,081	$4,205	$34	0.8%	$48	$74
2005-06	$3,518	$1,424	$4,942	$737	17.5%	$25	$202
2006-07	$3,758	$1,436	$5,194	$252	5.1%	$25	$138

Even after "flexing" some additional federal transportation funds to keep the state's 13 transit agencies operating, Pennsylvania highway spending is still growing substantially, with an anticipated $252 million increase in total funds in 2006-07. Part of that increase is an additional $130 million in state funds for the Commonwealth's highway and bridge infrastructure, including $100 million for the Smoother Roads and Bridges program, $20 million for the Bridge Preservation program and $10 million for the Emergency Highway and Bridge Maintenance Repair program. Pennsylvania highway spending in 2006-07 is 23 percent, or $980 million, higher than when Governor Rendell took office.

Additional Funding for 2006-2007

Accessibility, structural integrity and safety are priorities set forth for the roads and bridges in the state of Pennsylvania. The Safe, Accountable, Flexible, Efficient Transportation Act, A legacy for Users (SAFETEA-LU) program is a federal law that created a dedicated funding source for states' highway safety improvement programs. It is recommended to increase the Highway Maintenance Safety Projects appropriation by $5 million as a state match for a projected $34 million grant from this federal program.

In order to meet the priorities listed above, the 2006-2007 budget for the state of Pennsylvania allots $130 million of additional new investment into smoother roads and safer bridges. The money will be spent in the following ways[7]:

- **Smooth Roads and Bridge Priority.** $100 million, which is a 200% increase in the budget, will allow for highway maintenance and resurfacing of 550 miles of roadway in 2006 and 530 miles in 2007.

- **Bridge Preservation.** $20 million, to repair 200-250 additional bridges and to further increase the bridge restoration program.

[6] PA State Budget 2006-07. "Transportation: Key to Pennsylvania Growth and Opportunity." Pp. 23-24.
[7] PA State Budget 2006-07. "Transportation: Key to Pennsylvania Growth and Opportunity." Pp. 23-24.

- **Emergency Highway and Bridge Repair.** $10 million, which is a 54% increase in the budget, will be set aside to have the capability to handle 20-25 emergency repair situations such as sink holes, storm repair and slide conditions.

RECOMMENDATIONS

ASCE's Pennsylvania Sections offers the following recommendations:

- Set a state goal that only 10% of the state's roads be classified as "mediocre" by 2016.
- Set a state goal that only 5% of the state's roads be classified as "poor" by 2016.
- Continue to increase dedicated funds for road maintenance/replacement.
- Encourage the use of life-cycle cost analysis principles to evaluate the total cost of projects.
- Encourage the use of cost-benefit analysis principles in evaluating projects.
- Support environmental streamlining of transportation projects.
- Develop creative financing strategies for high priority projects.

SOURCES

Federal Highway Administration (FHWA)
- "Status of the Nation's Highways, Bridges, and Transit: 2004 Conditions and Performance," 2006
- "Pavement terminology and Measurements," Conditions and Performance Report, 2006

Pennsylvania State Budget 2006-07, "Transportation: Key to Pennsylvania Growth and Opportunity"

Transportation Research Board (TRB), Transportation Research Record, "On the Calculation of International Roughness Index from Longitudinal Road Profile," No 1501

TRANSIT

D+

2006 Report Card for Pennsylvania's Infrastructure

In recent years, transit use has increased faster than any other mode of transportation. More than one million Pennsylvanians use public transit on a daily basis, and transit throughout the state directly employs more than 15,000 men and women. On an annual basis, Pennsylvania's transit agencies spend more than $1.1 billion for provision of services and approximately $500 million for capital improvements. However, the statewide need for additional resources is tremendous: more than $500 million annually to stabilize operations, fund "state of good repair" capital projects and allow for major capital investments to expand and improve existing systems.

BACKGROUND

In 2005, there were seventy-four transit agencies in the Commonwealth, serving all sixty-seven counties. The transit agencies are divided into five classes, based on the number of vehicles and the size of the service area. The largest is the Southeastern Pennsylvania Transportation Authority (SEPTA), which serves the Philadelphia region. Other systems range in size from the Port Authority of Allegheny County, down to small urban and rural systems, and then to class 5 systems, which carry predominantly social service clients in Paratransit vehicles. These systems operate more than two billion vehicle miles on some 6,500 vehicles.

Last year, transit spent almost $1.1 billion on materials and services contracts with more than 2,000 Pennsylvania businesses.

While transit spending has increased over the years, a large spending shortfall remains, and funding growth lags behind inflation. The statewide need for additional resources is tremendous: more than $500 million annually to stabilize operations, fund state of good repair capital projects, and allow for major capital investments to expand and improve existing systems. Meanwhile, many urban and rural transit agencies are borrowing funds to maintain operations, even as they are significantly raising fares and cutting back service.

CONDITIONS

The cost of oil, environmental concerns and traffic congestion are never-ending, quality of life problems that continue to justify support for transit. While new investment brings badly needed transit service to more Pennsylvanians, existing systems continue to require reinvestment to replace aging infrastructure; thus, the revenue that is available is spread more thinly. These conditions, together with an uncertain federal funding future, raise serious concerns for transit.

In recent years, transit use has increased faster than any other mode of transportation. In the Commonwealth, transit use by all modes increased by an average of five percent between 2004 and 2005. In fact, more than one million Pennsylvanians use public transit on a daily basis – that's more than 300,000,000 rides annually.

The following statistics provide a sense of how ridership is increasing in Pennsylvania:

Third Quarter 2005 Statistics (as compared to year 2004)

Commuter Rail (Philadelphia)	+9.9%
Subway (Philadelphia)	+7.6%
Bus (Johnstown)	+7.1%
Bus (Lancaster County)	+3.0%
All Modes (Pittsburgh)	+2.0%
Bus (State College)	+1.7%

These increases in ridership have put an added strain on the Commonwealth's aging transit vehicle fleet and physical plant infrastructure.

While SEPTA is in the process of updating its commuter rail, diesel bus and electric bus fleets, the average age of Pennsylvania's transit vehicles breaks down as follows:

- Bus – 8.7 years old
- Heavy Rail – 8.8 years old
- Light Rail – 18.3 years old
- Commuter Rail – 25.9 years old
- Inclined Plane – 72.2 years old

All agencies are also struggling to maintain workable, physical plant infrastructure such as buildings, track, tunnels and stations. Very little improvements have been made in all facility categories.

Funding

State funding comes from the following sources: General Fund, dedicated funds from the Public Transportation Assistance Fund (PTAF – established as part of Act 26) and Act 3 Revenue Enhancement Initiative, lottery funds, TANF jobs access funds and general obligation bond proceeds. The state has a constitutional restriction prohibiting the use of highway funds for public transportation. Federal highway funds can be flexed, however.

Total state funding increased from $791.8 million in FY 2002 to $828.8 million in FY 2003. Per capita investment was $64 in FY 2002 and $67 in FY 2003. The average percent change in total funding and per capita funding was 4 percent. Based on these figures, Pennsylvania ranks 4th and 7th respectively nationwide.

Between 1985 and 2005, general funds for transit increased by an average of only 2.7 percent a year, while inflation averaged 2.9 percent a year. Thus support for transit decreased by .2 percent a year. In the last ten years, the situation has worsened. General Funds for transit have increased by an average of 1 percent a year, while inflation has averaged 2.3 percent a year for a net decrease of 1.3 percent per year.

There are two other important measures of support for public transit:

1. The percentage of the operating budget that comes from dedicated funds
    - 26.7 percent for the Port Authority
    - 22.7 percent for SEPTA

2. The percentage of operating expenditures that is paid for by state and local governments or by regional taxes, which are collected by the transit organization itself.

    - 65 percent for the Port Authority
    - 46 percent for SEPTA

Public transportation riders in Pennsylvania's largest urbanized areas cover a substantially larger share of their rides through fares (approximately 50%) that the national average (approximately 30%).

Clearly, these two agencies have to continuously struggle to find ways to pay for the remainder of their budgets.

Capital funds have not grown sufficiently to match 100% federal growth under TEA-21or most recently SAFETEA. Port Authority and SEPTA have had to spend federal funds in advance of state share for approved capital projects, with the total state shortfall currently at $180 million. These agencies cannot match Federal New Starts Funds at the required 40-50% non-federal share in order to expand Pennsylvania's systems. SEPTA is the only major system in the country that does not receive any funding from this source, and the Port Authority projects are at risk of halting due to lack of match.

The D+ for Transit reflects:

- An additional $500 million in funding required annually
- Aging vehicles and physical plant infrastructure
- Capacity falling short of needs
- Cuts in service and rate increases
- Shortage of new development
- Inadequate match for federal funds

Recent Investments

Since 2003, SEPTA and the Port Authority have constructed less than twenty miles of new track.

In Pittsburgh, the five-mile, West Busway was the only significant large-scale project to be completed since 2000, and the only significant large-scale project completed in Philadelphia since 2003 was the re-construction of the Frankford Transportation Center. SEPTA is currently working on the re-construction of the West Market Elevated, with an anticipated completion between 2008 and 2010. On this line, SEPTA just recently opened the 56th Street Station.

There are two, large-scale projects for which some preliminary engineering has taken place: 1) the Schuylkill Valley Metro in the Philadelphia-Reading region, which is estimated at $2 billion, and 2) the North Shore Connector LRT in Pittsburgh, which is estimated at $500 million. However, the future of these projects is unclear.

POLICY OPTIONS

Solutions that would ease the increasing demands on Pennsylvania's transportation system and improve transit conditions, capacity and safety are multi-faceted. The Commonwealth must change its transportation behavior, increase transportation investment at all levels of government and make use of the latest technology. Cities and communities should be better planned in order to reduce dependence on personal vehicles for errands and work commutes, and businesses must encourage more flexible schedules and telecommuting.

RECOMMENDATIONS

ASCE's Pennsylvania Sections support the following recommendations:

- Support the state's recent efforts to convene a Transportation Funding and Reform Commission during 2006. These statewide meetings will generate recommendations for possible, additional state funding for transit agencies.
- Restore the cut in General Fund operating assistance — raising the funding level back to $270 million
- Obtain additional dedicated operating and capital aid from the state, which is sufficient to stabilize service and meet anticipated physical plant needs for at least the next five years
- Obtain sufficient state capital assistance to fund state of good repair projects — including infrastructure, safety and renewal projects; vehicle replacements and overhaul; environmental mitigation; and routine capital improvements
- Obtain new state capital funds for major capital initiatives, including funds to match the Federal New Starts program at a level sufficient to successfully compete for those funds (i.e., at least at a 60/40, federal/state match ratio)
- Establish a mechanism to fund new rural transit systems and provisions to ensure use of all available rural funds
- Eliminate the $75 million cap on sales tax revenue directed to transit, which was put on Act 3 in 1997
- Increase bondable funds for capital purposes
- Revise the mechanism for providing funds to PennDOT
- Earmark funds for intercity passenger rail services
- Fund existing and proposed programs with sales and use tax; return current funding sources to the state (except sales).

SOURCES

American Association of State Highway and Transportation Officials and American Public Transportation Association, Expanded State and National Transit Investment Analysis, June 2002

American Public Transportation Association
- Public Transportation Fact Book, 56th Edition, April 2005
- Transit News, "Transit Ridership Showed Increases in All Modes in 2005 Third Quarter," January 18, 2006

Department of Transportation Bureau of Transportation Statistics, Survey of State Funding for Public Transportation, 2003

National Transit Database 2001

Pennsylvania Public Transportation Association (PPTA)
- History of Mass Transit Funding in Pennsylvania
- Public Transportation Drives Pennsylvania – A Study of the Economic Benefits of Public Transportation
- Transit Drives Pennsylvania Mobility Fact Sheet

ASCE Policy Statements
- 149, "Intermodal Transportation Systems," 2002
- 382, "Transportation Funding," 2004
- 494, "Public Transportation," 2002
- 495, "Operations and Maintenance of Transportation Systems," 2002
- 496, "Innovative Financing for Public Transportation Projects," 2004

WASTEWATER

D-

2006 Report Card for Pennsylvania's Infrastructure

Aging wastewater management systems discharge billions of gallons of untreated sewage into Pennsylvania's surface waters each year. The EPA estimates that the state must invest $12.7 billion over the next 20 years to replace existing systems and build new ones to meet increasing demands. In 2005, the federal government cut funding for wastewater management for the first time in eight years. The Bush administration again proposed a further 33% reduction, to $730 million, for FY06, with the majority reduction coming from a proposed cut of $200 million to the Clean Water State Revolving Fund. Federal assistance cannot be expected to meet Pennsylvania's needs alone.

BACKGROUND

Water is life. Clean and safe water is critical for human health, ecological health, and maintaining local and national economies. Advances in wastewater treatment, which were initially made at the turn of the 20th century and greatly expanded in the 1970's, helped alleviate epidemics of typhoid, cholera and other waterborne diseases and improved environmental health — increasing fish and shellfish populations in the waters of the Commonwealth.

"Without increased investment in wastewater infrastructure, in less than a generation, the U.S. could lose much of the gains it made thus far in improving water quality, and wind up with dirtier water than existed prior to the enactment of the 1972 Clean Water Act."

—House Transportation and Infrastructure Committee

When sewers were first installed in Pennsylvania, combined sewage systems were used to convey sewage to the nearest waterway. These systems provided a great convenience to cities and towns. Sewage and industrial waste were commonly disposed of into waterways as a matter of course. At the time, streams and rivers were not thought of as recreational areas but instead were used for transport and waste removal. It is only relatively recently that the public perception of waterways has changed to conceptualize waterways as recreation, conservation and preservation areas.

The nation's current wastewater infrastructure and Pennsylvania's combined sewer systems represent nearly a century of investment, substantially funded by local taxpayers. The federal government has directly invested more than $72 billion in the construction of publicly owned sewage treatment works (POTWs) and their related facilities since passage of the Clean Water Act in 1972. Nevertheless, the physical condition of many of the state's wastewater treatment systems is poor, due to a lack of investment in plant, equipment and other capital improvements over the years.

In 1988, Pennsylvania created the Pennsylvania Infrastructure Investment Authority (PENNVEST) to help communities finance such infrastructure investments. PENNVEST serves as the financing agency for the clean water state revolving loan funds authorized by the Clean Water Act. In May 2004, Pennsylvania voters approved a $250 million bond issue on water and wastewater infrastructure. $50 million was directed to PENNVEST, with another $125 million and $75 million issued for grants and loans respectively to fund water and sewer projects which are directly related to economic development and involve the investment of capital in Pennsylvania enterprises and communities or result in the creation or preservation of jobs in the Commonwealth.

The U.S. Environmental Protection Agency (EPA) indicates that research and development expenditures on more efficient and affordable technologies in water and wastewater treatment have decreased by half since the early 1970's.

For the past decade, federal funding under the Clean Water Act State Revolving Loan Fund (SRF) program has remained relatively flat. From 1995 to 2004, Congress appropriated between $1.2 billion and $1.35 billion.[1] But in FY 2005, Congress cut wastewater SRF funding for the first time in eight years, reducing the total investment to $1.1 billion. The Bush administration proposed further cuts for FY 2006, with a budget submittal calling for an appropriation of only $730 million, a reduction of 33% from the FY 2005-enacted level.

The D- reflects:

- A $12.7 billion funding gap
- Ending life spans for all aspects of infrastructure
- Existing pollution of lakes and streams
- Impending threats to public health, the environment and the economy

Back in September 2002, the EPA released a detailed gap analysis, which assessed the difference between spending for wastewater infrastructure and total funding needs. In the study, Pennsylvania's funding gap was estimated at *$12.7 billion*. It is important to note that the funding gap between projected wastewater investment needs and current spending levels is dependant upon the growth of user rates. The gap largely disappears if municipalities increase wastewater spending at a rate of 3% over the rate of inflation.

The EPA's gap analysis provides a starting point for the magnitude of the clean water infrastructure funding issues. While the data available represents a reasonable effort to quantify the funding gap, more detailed statewide data would further assist in more accurately defining the problem and projecting the impact of potential remedies.

[1] The appropriation for state SRF programs was reduced to $625 million in FY 1997.

CONDITIONS

The useful life of Pennsylvania's wastewater infrastructure is about to expire. Treatment plants typically have an expected useful life of 20-50 years before they have to be expanded or rehabilitated. Pipes have life cycles ranging from 15 to 100 years, with actual pipe life varying depending on soil conditions, pipe material and capacity requirements. And, in some Pennsylvania cities, a number of pipes are approaching 200 years old.

Failed Pipe

According to the 2002 Needs Survey conducted by the EPA, Pennsylvania's wastewater infrastructure will require a total of $12.7 billion in investment over the next 20 years, including:

- $1.7 billion for secondary and advanced treatment
- $151 million for sewer replacement and rehabilitation
- $967 million for new collection sewers and interceptors
- $4.638 billion to address combined sewer overflows
- $5.849 billion to address non-point source wastewater discharges

Without adequate spending on the state's water infrastructure, we risk reversing the public health, environmental and economic gains of the past three decades. To truly understand the urgency, we must examine how failing infrastructure has already affected Pennsylvania's waterways.

Over the past several years, the Pennsylvania Department of Environmental Protection has been studying the health of our lakes and streams. By the end of 2004, the PADEP had assessed 83,161 miles or 82% of the total stream miles in the state. 10,762 stream miles, representing 18% of the assessed and 13% of total stream miles, and 60% of lake area in Pennsylvania were classified as impacted due to on-lot sewer systems, storm water runoff, agricultural activities, acid mine drainage and wastewater discharges.

- **On-site systems failures have impaired 149 stream miles and 6,110 lake-acres.** More than one-third of Pennsylvanians use on-lot sewer disposal, which equates to 1.2 million homes. National failure rates for on-site sewage treatment and disposal systems are reported at 10% annually by the EPA. However, estimates of failure rates range upwards of 20% in Pennsylvania, due to the frequent occurrences of soil conditions unsuitable for on-lot systems. Contamination of groundwater and surface water by failing or substandard septic systems is a considerable risk in much of Pennsylvania, due to the state's geology, soils, land development patterns and large number of aging systems.

- **Runoff has impacted 3,007 stream miles and 97 lake-acres.** Runoff includes urban runoff and storm sewers, road runoff and small residential runoff.

- **Acid mine drainage has impacted 4,040 stream miles.**

- **Non-point source discharges have impaired of 3,903 stream miles.** Concentrated animal feed operations are growing in size and number. Economies of scale and modern technologies are driving the establishment of these new concentrated livestock and poultry operations. The increased efficiencies are necessary for Pennsylvania's agriculture industry to stay competitive in America and abroad.

Fortunately, the PADEP has adopted policies to address the pollution these facilities may produce. In order to encourage the protection of water sources, low interest loans have been made available to farmers, so that they can implement best management practices for manure handling and storage and for land management. In addition, Pennsylvania took part in a multi-state attempt to stop the drastic decline in the ecological health of the Chesapeake Bay, implementing a watershed-based total maximum daily load nutrient discharge limit program in the Susquehanna River watershed.

- **Wastewater handling and treatment has damaged 744 stream miles.** Wastewater handling and treatment includes municipal point source discharges, on-site wastewater treatment and combined sewer overflows.

Sewage Overflow

Nationwide, there are 9,471 combined sewer outfalls (CSO) in 32 states, 1,569 of which are in Pennsylvania — making it the state with the most CSO's. The PADEP has identified 152 communities in the Commonwealth that are currently operating with CSO discharges. Recently, the EPA and the PADEP have placed regulatory and fiscal pressure on communities throughout the Commonwealth to upgrade, repair and replace aging CSO systems — demands that have often exceeded the financial abilities of many municipalities.

The PADEP's findings are alarming. A recent report from the staff of the House Transportation and Infrastructure Committee stated the issue bluntly: "Without increased investment in wastewater infrastructure, in less than a generation, the U.S. could lose much of the gains it made thus far in improving water quality, and wind up with dirtier water than existed prior to the enactment of the 1972 Clean Water Act."

While increased federal subsidies for wastewater needs would help finance required investments, federal support cannot address the entire need. Operation and maintenance costs are not eligible for federal funding and must be borne entirely by local utilities. Therefore, sewage system customers will be forced to pay for the vast majority of the investments, those not funded by the federal government or the state.

Clean and safe water is a public good, therefore the central question becomes to what extent can and will ratepayers pay for needed investment.

Currently, sewage treatment remains relatively inexpensive for many households, comprising less than one percent of household income. Because most water systems do not adequately account for investment needs, residents are paying for sewage treatment at rates that are below cost, and the systems are not generating sufficient revenue to finance investment. While rate increases would generate much needed funding, many low-income families will not be able to afford the added expense.

POLICY OPTIONS

Clean and safe water is no less a national priority than is national defense, an adequate system of interstate highways, and a safe and efficient aviation system. Many other highly important infrastructure programs enjoy sustainable, long-term sources of federal backing, often through the use of dedicated trust funds; under current policy, water and wastewater infrastructure do not.

The case for increased federal investment to assist Pennsylvania and the other states is compelling. Needs are large and unprecedented. In many locations, local sources cannot be expected to meet this challenge alone, and, because receiving waters are shared across local and state boundaries, the benefits of federal help will accrue to the entire nation.

- **Adequately fund PADEP to maximize regulatory flexibility.** Many of the national clean water regulations have included opportunities for states to reduce costs by tailoring requirements to the conditions actually experienced by their wastewater systems. States can only make use of this flexibility if they have adequate staff and administrative support to make case-by-case determination necessary to grant variances and exceptions available under the EPA's rules.

- **Use the best technology for the job.** Funding short falls in state budgets are magnified at the local level by a rigid one-size-fits-all prescription that often results in inefficient expenditures of capital, when more affordable or new innovatively efficient technologies could have been used.

- **Proactively maintain infrastructure.** In many cases, the approach towards public infrastructure is reactive. Systems are built and operated with minimal maintenance until they wear out. Wastewater systems need to conduct a full accounting of the costs to manage their assets both for current operations and future infrastructure needs. By appropriately managing its assets, a system may be able to reduce the overall investment required.

- **Adopt new technology.** Regulators, engineers, and wastewater operators tend to be conservative when it comes to adopting new technologies. New technologies exist to clean and repair old pipes that provide low cost alternatives to replacement of collection mains and sewers. New pipe materials can reduce ground water infiltration into sewers and new high efficiency fixture can reduce water demand. These new technologies must be supported by full-scale demonstrations to gain acceptance by the clean water industry.

RECOMMENDATIONS

The Pennsylvania Sections of the American Society of Civil Engineers encourage the Commonwealth to support the Water Infrastructure Trust Fund Act of 2005 (H.R. 4560). This act would provide a deficit-neutral, guaranteed source of federal-state-local shared investment for the construction and repair of drinking water facilities, and would enable the state to reduce the enormous funding gap.

In addition, the Sections support the following recommendations:

- **Issue state bonds.** With decreasing federal funding for the State Revolving Loan Fund (SRF) program, Pennsylvania should leverage the remaining federal dollars as collateral for the issuance of state bonds — effectively doubling the amount of capital available for infrastructure investments.

- **Create an infrastructure needs inventory.** ASCE supports the establishment of a statewide infrastructure needs inventory to be administered by the state's municipal planning organizations. This inventory would serve as a mechanism to differentiate between expenditures for current consumption and long-term investment, and would reduce major inefficiencies in the planning, design and construction process for long-term investments. An infrastructure needs inventory would also help to increase public awareness of the problems and needs facing the state's physical infrastructure, and would help the state legislature focus on programs devoted to long-term growth and productivity.

- **Focus on technology.** State government can play an essential role in promoting research, development, testing and evaluation of new technologies and the dissemination of information about proven technologies. ASCE supports state-funded research into wastewater treatment technology, which may reduce capital expenditures as well as operation and maintenance costs. By creating research partnerships with universities throughout the state, Pennsylvania may reap additional economic benefits through public-private partnerships and licensing of new technologies.

- **Promote sustainable infrastructure initiatives.** In order to close the funding gap, support programs that will make infrastructure more sustainable. Promote better asset management techniques that will reduce long-term costs and improve performance. Encourage strides in water efficiency, which will reduce drinking water consumption and the volume of wastewater to be treated. Advocate for full-cost pricing of water and wastewater treatment, and support reduction of non-point source pollution of water sources.

- **Provide reduced rates to the disadvantaged.** In order to cushion the impact of rate increases on low-income households, the state should either a) encourage municipalities to use lifeline rates for low-income households or b) develop a rate reduction program similar to the federal low-income Energy Assistance Program.

- **Protect water sources in farming communities.** Continue to fund low-interest loans to farmers, so that they may implement best management practices for land management and manure handling and storage.

- **Reduce the burden on sanitary sewers.** Wastewater rate calculations are typically based on water consumption. Encourage municipalities to incorporate wastewater flows into rate calculations, providing an incentive to municipalities to reduce inflow to sanitary sewers. If this practice is adopted, care must be taken to account for combined sewer overflow communities – which are typically low-moderate income, so that they do not receive too much of the burden.

SOURCES

EPA, Clean Water and Drinking Water Infrastructure Gap Analysis, 2002

EPA, Clean Watersheds Needs Survey, 2000

EPA, Summary of Water Infrastructure Forum from Closing the Gap: Innovative Solutions for America's Water Infrastructure Forum, 2003

Joint Legislative Air and Water Pollution Control and Conservation Committee, Report on Combined Sewer Overflows in Pennsylvania, 2001

National Research Council, Report on Regional Cooperation for Water Quality Improvement in Southwest Pennsylvania, 2005

PADEP, Pennsylvania Public Water System Compliance Report, 2004

PADEP, Strategy for Meeting Federal Requirements for Controlling the Water Quality Impacts of Concentrated Animal Feeding Operations, 1999

ASCE Policy Statements:

- 299, "Infrastructure Improvement Policy," 2003
- 326, "Waste Water Facilities Construction Funding," 2003
- 395, "Control of Combined Sewer Discharges," 2003
- 420, "Clean Water Act Reauthorization," 2004
- 453, "Federal Capital Budgeting," 2000
- 480, "Water Infrastructure Funding," 2005