

**For Whom the Road Tolls:  
Corporate Asset or Public Good**

**An Analysis of  
Financial and Strategic  
Alternatives for  
The Pennsylvania Turnpike**

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**This study was commissioned by the  
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of the  
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# **For Whom the Road Tolls: Corporate Asset or Public Good**

## **An Analysis of Financial and Strategic Alternatives for The Pennsylvania Turnpike**

### **Executive Summary**

A November 2006 study by the bipartisan Pennsylvania Transportation Funding and Reform Commission (PTFRC) noted the critical need for more funding for Pennsylvania's transportation infrastructure. The study recommended that the Commonwealth invest an additional \$1.725 billion per year for highway and transit funding.

In response to the PTFRC Study, the Administration and the Legislature crafted and passed Act 44—signed into law by Governor Rendell on July 18, 2007. A principal purpose of Act 44 is to provide funding for transportation infrastructure in Pennsylvania. Act 44 authorizes PennDOT to lease the in-state portion of Interstate 80 to the Pennsylvania Turnpike Commission (PTC or Commission) for conversion to a toll road, and requires the PTC to make payments of \$83.3 billion over the 50-year term ending in 2057. In accordance with Act 44, the PTC has already made payments totaling \$521.4 million in fiscal year 2008.

In his February 5, 2008 budget message, Governor Rendell states that the administration is reconsidering the policy alternative first proposed in late 2006 of leasing the Turnpike to a corporate entity. He refers to a study in which Morgan Stanley “advised the Commonwealth that a long-term lease could fund the entire estimated \$1.725 billion in annual highway and transit needs, significantly more funding than provided by Act 44” (Budget Message slide 104).

In this report the authors examine possible lease and monetization transactions involving the Pennsylvania Turnpike and compare them to the current funding program of Act 44. We examine key aspects of similar financings that have been completed or are currently being proposed in order to provide the Democratic Caucus of the Pennsylvania House of Representatives with objective information to answer the following two questions:

- *Financially*, does it make sense for the Commonwealth to lease the Pennsylvania Turnpike to a for-profit corporate entity, as compared to a tax-exempt monetization or other leveraging approach that can be undertaken by the Pennsylvania Turnpike Commission under Act 44?
- *Strategically*, and as a matter of public policy, does it make sense for the Commonwealth to lease the Pennsylvania Turnpike to a for-profit corporate entity, or to a 63-20 non-profit Public Benefit Corporation, as compared to the public-public partnership created under Act 44?

To answer these questions we address a number of related issues upon which we base our findings. First, with regard to the *financial* aspects of either leasing or monetizing the Turnpike:

- The PTC can issue tax-exempt municipal bonds at a yield that is considerably lower than the cost of capital for a concessionaire that would lease the Turnpike (See Relative Cost of Capital Section).
- Given identical future toll revenue schedules, the present value of toll revenues is highest for the toll road operator with the lowest cost of capital (See Appendix).
- Any financial transaction related to privatizing the Turnpike can be replicated more efficiently by a Staged or Full Public Monetization by the PTC itself.
- In the analysis of Act 44 payments, the present values are as follows:
  - Under the current PTC Act 44 program, the present value is \$26.5 billion.
  - For the Corporate Lease, the present value is \$14.8 billion.
  - For the PTC under the Full Public Monetization, the present value is \$22.8 billion.
- For a given upfront sum to be raised, tolls levied in a Full Public Monetization may require only 71.5% of the tolls charged under a Corporate Lease (See Appendix).
- A Corporate Lease with a multi-billion dollar upfront payment entails major risks which include:
  - Reinvestment Risk—the investment may not be able to generate the returns assumed by proponents of privatization (See Permitted Investments Section).
  - Redirection Risk—a future legislature may decide to appropriate the invested sum away from the original intended transportation uses (See Exhibit 4).
  - Financial Risk—by immediately placing billions of dollars in new debt on the Turnpike enterprise, a privatization increases the likelihood of financial distress.

The Commonwealth is also considering the creation of a “63-20” not-for-profit public benefit corporation to implement a Full Public Monetization of the Turnpike. While preferable to privatization, a 63-20 Full Public Monetization has the following shortcomings:

- The PTC has extensive operational experience, established financing documents, and high investment grade bond ratings that would be wasted if a new entity were established to operate, maintain and finance the Turnpike.
- Start-up expenses for a 63-20 will unnecessarily add multi-millions of dollars to create and rate a financing plan and documents, discharge outstanding Turnpike debt, and terminate interest rate swaps.
- A large upfront borrowing under Public Monetization raises the same concerns of Reinvestment Risk, Redirection Risk and Financial Risk as does a Corporate Lease.

While it is unknown whether USDOT ultimately will approve converting I-80 to a toll road, a Corporate Lease of the Turnpike would be a far less efficient funding alternative than retaining the PTC and authorizing a Full Public Monetization.

In addition to the financial considerations, there are also important *strategic public policy* implications of either leasing or monetizing the Turnpike:

- Structuring the concession to maximize the upfront payment requires a longer lease term, an aggressive toll schedule, and operational latitude (e.g. labor agreements) on the part of the concessionaire.
- Aggressive toll increases will place an ever greater burden of funding the Commonwealth's statewide transportation needs solely on the users of the Turnpike.
- Under the control of a private concessionaire, the Turnpike will be operated with a singular focus on the bottom line. The Turnpike will cease to be an asset that the state government can use to promote economic development and other social objectives in the Commonwealth and will no longer be part of a larger transportation network to be managed in a coordinated manner.

A summary of our main findings are:

- Given comparable toll schedules and operating expenses, the cost of capital becomes the most significant value driver for the operator of the Turnpike.
- A long-term Corporate Lease is likely to be a far less efficient strategy for generating funding than the current Act 44 payment stream, or a Full Public Monetization by the PTC.
- The Act 44 payments have a present value that is nearly 80% higher than the expected one-time payment under a Corporate Lease.
- In raising an enormous sum of cash through a *one-shot* Corporate Lease or Full Public Monetization, the risks—reinvestment, redirection and financial—are far greater than the risk of funding under Act 44 on a *pay-as-you-go* basis by the PTC. The PTC enjoys a high investment grade credit rating.
- Finally, this is not “just about the money.” There are important policy advantages to retaining governmental control of the Turnpike as a strategic asset rather than ceding it to the private sector for decades to come. This is the case regardless of whether or not I-80 is converted to a toll road.

For the reasons listed above, we believe that the Commonwealth is best served by staying the course with Act 44. If the federal government fails to approve tolling on I-80, additional revenues can be generated for transportation purposes through a Full Public Monetization of the Turnpike, by identifying other supplemental revenue sources, or by some combination of these approaches.

# **For Whom the Road Tolls: Corporate Asset or Public Good**

## **Executive Summary**

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## **For Whom the Road Tolls: Corporate Asset or Public Good**

### **An Analysis of Financial and Strategic Alternatives for The Pennsylvania Turnpike**

#### **Introduction**

The Pennsylvania Turnpike is a vitally important strategic asset of the Commonwealth, and confusion reigns in Harrisburg about the fate of the Turnpike. Should the main line of the Turnpike be leased for a big upfront fee? Should I-80 be tolled? Should the Turnpike be split into three pieces? Should the Turnpike Commission fully *monetize* its toll revenues through a massive bond issue, or instead pursue a more conservative, multi-staged financing strategy as contemplated by Act 44? The list goes on.

A November 2006 study by the Pennsylvania Transportation Funding and Reform Commission (PTFRC) noted the critical need for more funding for Pennsylvania's transportation infrastructure. The report recommended that the Commonwealth invest an additional \$1.725 billion per year for highway and transit funding.

Governor Edward G. Rendell signed Act 44 into law on July 18, 2007. Act 44 created a partnership between the Pennsylvania Department of Transportation ("PennDot") and the PTC. A principal purpose of Act 44 is to provide funding for transportation infrastructure throughout the Commonwealth. Act 44 requires that the PTC make payments of \$750 million, \$850 million, and \$900 million per year in the fiscal years ending in 2008, 2009, and 2010, respectively. After 2010, payments shall increase by 2.5% for each fiscal year. The Act 44 expected payments total \$83.3 billion over the 50-year term ending in 2057.

In accordance with Act 44, the PTC has already made three quarterly payments to PennDot totaling \$521.4 million in fiscal year 2008—the most recent payment was on January 30, 2008.

In the February 5, 2008 budget message, Governor Rendell notes that in creating Act 44 "the Administration, the Turnpike Commission and the legislature crafted a funding solution that protects the public and turnpike workers and generates an historic level of transportation funding" (Budget Message slide 93).

Governor Rendell also states in his budget message that the administration is reconsidering the policy alternative of leasing the Turnpike. He refers to a study in which Morgan Stanley "advised the Commonwealth that a long-term lease could fund the entire

estimated \$1.725 billion in annual highway and transit needs, significantly more funding than provided by Act 44” (Budget Message slide 104).

In this report we evaluate proposed lease and monetization transactions involving the Pennsylvania Turnpike. We examine key aspects of similar financings in other states that have been completed or currently are being proposed in order to provide the Democratic Caucus of the Pennsylvania House of Representatives with objective information to answer the following two questions:

- *Financially*, does it make sense for the Commonwealth to lease the Pennsylvania Turnpike to a for-profit corporate entity as compared to a tax-exempt monetization or other leveraging approach that can be undertaken by the Pennsylvania Turnpike Commission under Act 44?
- *Strategically and as a matter of public policy*, does it make sense for the Commonwealth to lease the Pennsylvania Turnpike to a for-profit corporate entity, or to a 63-20 non-profit Public Benefit Corporation, as compared to the public-public partnership created under Act 44?

To answer these overriding questions we have examined a number of basic issues related to the proposed transactions that are the cause of concerns and questions of various members of the Democratic Caucus of the House of Representatives and their staff.

The issues that we examine and upon which we present our findings are:

**Capital Structure of the Typical Concessionaire:** How do private concessionaires finance their bid prices for sales/leases of assets such as toll roads? What is the typical capital structure of debt and equity? Does this ratio change over time?

**Toll Rate Setting Strategy for the Concessionaire:** Assuming that a toll adjustment formula similar to Chicago Skyway and Indiana Toll Road is used for a concession involving the Turnpike, what would be the likely rate-setting strategy for a private concession operator?

**Major Value Drivers that Determine Bid Price:** What are the major value drivers (traffic levels, permitted toll hikes, term of agreement, operating efficiencies, cost of capital, etc.) that determine the bid price for the Turnpike? How might the bid price be expected to change as these factors vary? What is the expected range of an upfront payment from a concessionaire if the major terms of a proposed concession agreement mirror those of Act 44 (e.g. 50 year term, assumed annual toll increases of 3%, etc.)?

**Current Conditions in the Financial Markets:** Do recent developments in the financial markets affect the revenue potential of a lease or similar transaction?

**Relative Cost of Capital Comparison:** What are the respective weighted costs of capital of a public agency (such as the Commission) and a typical concessionaire? How would the bond ratings compare? How would a concessionaire's financial plan differ from that being implemented by the Commission under Act 44?

**Investment Strategy and Permitted Investments of the Concession Payments:**

If a large up-front concession payment on a lease were obtained from a concessionaire, what investment strategy that is permitted by the Pennsylvania Constitution, especially considering the restrictions of Article VIII Section 8, would likely yield the greatest return and what is the likely range of returns that could be expected over a long-term (50 year) period? What are the risks?

**The Morgan Stanley Report for Funding Transportation:** We critique a May, 2007 report prepared by Morgan Stanley (the "Report") for the Commonwealth of Pennsylvania in which Morgan Stanley attempts to "...analyze a range of strategic alternatives for funding the Commonwealth transportation needs." The Report assesses three potential funding strategies: a Long-Term Lease, a Public Corporation/Leverage, and a PTC Proposal. We discuss the strengths and weaknesses of their model along with their choice of discounting and compounding rates and other important assumptions.

**What about Tolling Route 80?** What is the importance of tolling I-80 to the revenue potential of the Turnpike?

**Event of Default by the Concessionaire:** Certain proponents of leasing the Turnpike have claimed that the best thing that could happen would be a default by the concessionaire on its debt obligations. In their view the Commonwealth would have received its lease payment upfront and would then get the road back. What are the implications if a concessionaire defaulted on payments to its creditors?

**Discounting and Monetizing the Act 44 Payment Stream:** Act 44 requires the Turnpike Commission to pay an aggregate amount of \$83.3 billion over 50 years pursuant to a specified schedule. What is the appropriate rate, from the Commonwealth's perspective, to discount this stream of payments, and what is its net present value, as compared to a concession payment?

**Public Policy Factors in the Decision to Lease Turnpike:** What are the non-financial, public policy factors that should be considered in comparing Act 44 to a proposed concession agreement with a private entity or a public benefit corporation; in particular what may be the effect on existing labor agreements, design-build contracts, and other employment considerations?

We address each of these issues sequentially in this report—the first three are discussed in the Background section, and the rest are discussed in turn.

## Background

### Introduction to Toll Road Concessions

There is growing interest in the United States in transportation public-private partnerships (P3's). This interest has been spurred by the desire of public officials to harness the capital and expertise of the private sector as a way of funding shortfalls and to enhance efficiency and innovation. While P3's are new to the U.S., they have been an oft-used mechanism, particularly in Europe, in the funding and operation of the roads. Most of the motorways in Spain, Italy and France represent various types of P3's.

P3's can be grouped into one of two categories; *greenfield* P3's which involve new roads, and *brownfield* P3's which involve existing roads. Brownfield P3's can take various forms ranging from fee-based management contracts with private firms, to concession agreements in which the private partner takes full operating control of the road and runs it as a profit-making business.

There have been several transactions in the United States in the last four years that fall into the latter category, i.e. concessions. Most notable (because of their relevancy to the Pennsylvania Turnpike situation) are the Chicago Skyway and Indiana Toll Road (ITR) concessions. In both of these cases the public owner (the City of Chicago and the State of Indiana, respectively) entered into a long-term lease agreements with private companies referred to as the *concessionaire*. The lease, or concession, agreement sets forth the business and legal arrangements between the public owner and the concessionaire. It is also the regulatory device that, among other things, establishes the maximum allowable tolls that can be charged over the entire term of concession period, the operating and maintenance standards, and capital expenditures with which the concessionaire must comply.

These concessions are also referred to as leases since the concession does not constitute an outright sale of the road. The public owner maintains title to the road. The concessionaire's rights to use the road (i.e. operate the road and collect tolls) are subject to the public owner monitoring the concessionaire's compliance with the concession agreement.

From a financial perspective, the concessionaire is buying a future stream of income not unlike when an investor purchases a bond. This type of transaction is sometimes referred to as a *monetization* or *securitization*.

A variant of above concession model involves a public benefit corporation (established pursuant to Internal Revenue Service Rule 63-20) in place of private concessionaire. The "63-20 concession" has many of the same characteristics as a private concession, although there is the argument that the 63-20 approach better protects the long term interests of the public. This is the approach currently being proposed in New Jersey by Governor Corzine in order to monetize the New Jersey Turnpike, the Garden State Parkway and the Atlantic City Expressway.

## **Risk Transfer and The Private Sector**

Proponents of P3's favorably comment on the success of P3 concessionaire financing in Canada, France, Spain or in other countries throughout the world. Often, foreign governments provide significant subsidies for construction projects. However, in the countries that have embraced P3's, no financial market exists that is the equivalent of the tax-exempt municipal bond market in the United States. The municipal bond market provides low interest rate financing for the construction, management and operation of projects that benefit broad segments of the population of a municipality. The ability to issue tax-exempt bonds gives publicly financed and owned projects, through its lower cost of capital, a tremendous edge over even the best and strongest concessionaire.

There is a very real role for the private sector in P3 transactions in the United States, and this role relates primarily to greenfield projects. Real risks, such as financing risk, completion risk, construction cost risk, risk in estimating traffic flow and revenue, environmental permitting risk, and others are associated more with greenfield, as opposed to brownfield, transportation projects. Greenfield projects may be more appropriate for the financing provided by P3 investors seeking higher returns on investment, and with concessionaires that have a high degree of operating expertise. The current PTC brownfield financing has a much lower level of risk transfer. The Turnpike has been built, the environmental issues have been solved, the financing is in place and has a high investment grade debt rating, and the Turnpike enterprise has an extensive operating history and predictable traffic levels and cash flows. In the case of the Turnpike and other brownfield projects, a P3 financing brings less to the table.

## **Description of the Skyway and ITR Concessions**

Both Governor Rendell and the Commonwealth's transaction advisor (Morgan Stanley) have referenced the Skyway and ITR as possible models for a lease involving the Pennsylvania Turnpike. It is therefore useful to describe the salient features of these concessions.

### ***Concession Transaction History of the Skyway and ITR***

- A. The Chicago Skyway—The Chicago Skyway was originally financed and constructed by the City of Chicago in the mid-1950's and was opened for traffic in 1958. The Skyway is a 7.8 mile long road and bridge facility that connects the western end of the Indiana Toll Road with the Dan Ryan Expressway (a free road) that provides access to downtown Chicago. From its opening to January 2005, the Skyway had been operated by the City.

In March 2004, the City issued a Request for Concessionaire Qualifications as the initial step in leasing the Skyway to a private operator. The City's motivation was to shed a non-core municipal operation and, in the process, raise cash (in the form of an upfront concession rent) to be used by the City to fund various municipal needs. Offers from bidders deemed by the City to have the requisite operating

and financial qualifications were submitted on October, 2004. Skyway Concession Company LLC (SCC), a partnership of Macquarie Investment Holdings and Cintra Concesiones de Infraestructuras de Transporte S.A., was declared the winning bidder with a bid of \$1.83 billion. The concession transaction was completed in January 2005.

- B. The Indiana Toll Road—ITR was financed and constructed by the State of Indiana during the 1950's and was opened for traffic in 1956. It is 157 miles in length and runs along the northern part of Indiana from the Illinois to the Ohio borders. The Indiana Toll Road Commission operated the road during the period 1956 to 1981 when management responsibility passed to the Indiana Department of Transportation.

In September of 2005, the State of Indiana issued a Request for Toll Road Concessionaire Proposals. The motivation for the State in taking this action was to generate an upfront payment that could be used to partially fund a ten year statewide transportation improvement program. After a qualification process, five groups were invited to bid on the concession. Four offers were received by the State in January, 2006, and ITR Concession Company LLC (a partnership of the same companies as the Skyway concessionaire, i.e. Macquarie Infrastructure Group and Cintra Concesiones de Infraestructuras de Transporte S.A.), was declared the winning bidder with a bid of \$3.85 billion. In June 2006, the concession transaction was completed with full operating responsibility for the Toll Road being transferred to the concessionaire.

Table 1 summarizes the financial metrics of the Skyway and ITR concessions.

**Table 1:**  
**Summary of Financial**  
**Metrics for Skyway and ITR Concessions.**

	<b>Skyway (2004)</b>	<b>Indiana Toll Road (2005)</b>
Gross Revenues	\$ 41 million	\$ 99 million
EBITDA*	29 million	64 million
Concession Price	1,830 million	3,850 million
Term of Concession	99 years	75 years
Price as Multiple of EBITDA	63	60
Date of Concession Agreement	January 24, 2005	June 29, 2006

\* Earnings before interest, depreciation and taxes.

*Capital Structure of the Concessionaires*

The Skyway and ITR concession payments (plus costs associated with the transactions) were financed initially with a combination of equity and bank loans, as show in Table 2.

**Table 2**  
**Initial Capitalizations**  
**for Skyway and ITR Concessions**

	<b>Skyway</b>	<b>Indiana Toll Road</b>
Equity	\$ 900 million (47%)	\$770 million (19%)
Bank loans	1,000 million (53%)	3,278 million (81%)

Approximately six months after the Skyway concession was completed, the concessionaire refinanced the concession with a private placement of floating rate bonds in the amount of \$1.4 billion (swapped into a fixed interest rate obligation). These bonds are insured by Financial Security Assurance Inc. (FSA) which “guarantees the timely payment of scheduled installments of principal of, and accrued and unpaid interest on” the bonds. The issuance of the \$1.4 billion of bonds in the capital markets lowered SCC’s borrowing costs and allowed SCC to reduce the amount of shareholder funds invested in the deal to about \$650 million (including a loan from the partners), as shown in Table 3.

At the time these two transactions were done, the concessionaires’ expected return on equity in both transactions was in the range of 12.5% to 13.5% per annum and the return to the lenders was in the range of 6% to 7%.

**Table 3**  
**Current Capitalization**  
**for Skyway and ITR Concessions**

	<b>Skyway</b>	<b>Indiana Toll Road</b>
Equity	\$ 650 million (32%)	\$ 770 million (19%)
Bank loans	1,400 million (68%)	3,278 million* (81%)
Weighted Cost of Capital	8.1%-9.1%	7.2%-8.2%

\* Does not include a \$700 million cap ex facility and a \$100 million liquidity facility.

In both the Skyway and ITR concessions the concessionaires expect to pay cash dividends to their equity investors from the cash flow of the concession so that all of the

equity invested will be returned to investors over an initial 15 to 20 year period. Funding these distributions, rather than retiring debt, will likely cause debt to increase as a percentage of total capitalization.

### ***The Concession Agreement***

As mentioned above, the concession agreement sets forth the business and legal arrangements between the public owner and the concessionaire. It is also the regulatory device that, among other things, establishes the maximum allowable tolls that can be charged over the entire term of concession period (discussed below) and the operating and maintenance standards with which the concessionaire must comply. The concession agreement also describes the implications of a concessionaire being declared in default (See Event of Default Section).

### ***Toll Adjustment Formula***

The Skyway and ITR concession agreements give the concessionaire “the right to establish, collect and enforce payment of tolls,” provided such tolls are “less than the applicable maximum levels at its discretion.” In the case of both Skyway and ITR, these maximum levels are specific toll rates set forth in the concession agreements for the first several years of the concessions and then annual adjustments equal to the greater of two percent (2%), the change in the Consumer Price Index, or the change in the Per Capita Nominal GDP. (Note: The Morgan Stanley study uses this “greater of” formula to project the toll rates that the concessionaire will charge. The study assumes that CPI or Per Capital GDP will equal 5.5% for the first 50 years of the concession and 3% thereafter.)

The logic behind the Skyway and ITR toll setting regulations was that tolls, prior to the concessions, had been kept artificially low (i.e. had not kept up with increase in the cost of living) and, in the early years of the concessions, would be restored to a more appropriate level. Once this was accomplished, tolls would be adjusted annually by inflation (CPI) or ability to pay (GDP).

The “greater of” formula is only one possible toll setting formula. For example, Governor Corzine of New Jersey has proposed for the monetization of the New Jersey toll roads toll increases of 50% in 2010, 2014, 2018 and 2022, plus annual increases based on the change in CPI. Several recent concessions in France have allowed tolls to increase by a maximum of 70% of CPI. Which formula is used reflects two factors. First, is the perception of whether the current toll level is low, high or “about right.” The second factor is the motivation of the public owner with respect to the concession transaction; as discussed more fully below, increasing the maximum allowable toll levels results in a higher concession price, all other things being equal.

### ***Toll Rate Setting Strategy for Concessionaire***

It should be emphasized that the Skyway and ITR concession agreements establish the maximum toll the concessionaire can charge each class of user. In other words, the

concessionaire has the opportunity to charge lower tolls and presumably will do so if it believes that it will be able to maximize total toll revenue (which is a function of traffic, i.e. usage, and toll rate). That being said, the traffic and revenue forecasts prepared by the Skyway's concessionaire assume that the maximum tolls allowed will be charged, suggesting that Skyway concessionaire believes it can maximize revenues by charging the maximum toll, due in large part to the low elasticity of demand on the Skyway (See detailed discussion on toll elasticity included in the Tolling I-80 Section).

It is also important to note that Skyway and ITR concession agreements do not require the concessionaires to seek permission to adjust tolls (as long as the tolls are equal to or lower than the maximum levels established in the agreement), but only require that advance notice of such adjustments be given to the public owner and the public.

### **Major Value Drivers that Determine Concession (Bid) Price**

To determine what a concession is “worth” or, more accurately, what an investor will pay, it is necessary to define the parameters of the concession, including:

- The term of the concession;
- A projection of gross toll revenue which is a function of future traffic and tolls;
- Operating costs; and
- Capital expenditures.

These parameters dictate the size of the projected stream of cash flows over the concession period. It is this stream that is the underlying basis of the price an investor is willing to pay for a toll road concession. (Note: Cash flow in a particular year is equal to the gross toll revenue minus operating costs and capital expenditures.)

To determine the concession price, it is necessary to project the annual cash flows over the term of the concession and then to discount these flows, i.e. perform a present value calculation. The appropriate discount rate (See Relative Cost of Capital Section) is the weighted cost of capital used by the concessionaire to finance the concession payment, or Rent, and is a function of the debt and equity rates of return required by investors.

### ***Bidding Parameters***

The concession agreement, which is included with the bid documents provided to prospective bidders, establishes the term of the concession, the toll formula by which tolls can be adjusted, and the minimum capital investments to be made over the term of the concession (collectively, the “Bidding Parameters”).

- Term of the Concession—There is no rule as to how short or long a concession can be. The Chicago Skyway and the Indiana Toll Road concessions were 99 years and 75 years in length, respectively. This is contrasted with similar concessions in Europe and South America where the concessions are usually 20 to

30 years in length. As a consequence of how the US federal tax code is written, however, in order for a lease to be considered a sale for tax purposes, thus allowing the concessionaire to depreciate the asset which in turn shelters income revenue from income taxes, the term of a toll road concession needs to be longer than 50-55 years. As will be illustrated below, a longer concession term results in a higher concession price, albeit with diminishing returns due to discounting.

- The toll formula is a key aspect of the concession agreement. In the Skyway and ITR agreements, the concessionaire was permitted to raise tolls in the first several years by a pre-agreed amount and then adjust tolls annually thereafter by the “greater of CPI, GDP per capita, or 2%.” As will be illustrated below, there is a direct relationship between the rate and the amount by which tolls are increased and the size of the concession price.
- The concession agreement may also set forth capital improvements that the concessionaire is required to make (in addition to normal maintenance of the toll road.) These improvements could be expressed as dollars that need to be invested in the road or specific projects for which the concessionaire will need to estimate the cost. In either event, these scheduled capital investments need to be factored into the projected cash flows. The more capital improvements the concessionaire is required to make, the lower the price it will be willing to pay.

### ***Cash Flow Assumptions***

Developing the projected cash flows to be generated by the toll road requires making certain assumptions. The assumptions that have a significant impact on the magnitude of the cash flows and therefore the concession price are: a) the relevant economic indices (e.g. CPI, GDP) that form the basis of the toll setting formula; b) traffic (i.e. usage) growth that reflects the elasticity of demand as a function of increases in tolls, among other factors; c) operating costs (reflecting usage, efficiencies and inflation); , and d) capital expenditures (if not explicitly set forth in the concession agreement).

Although it does not affect the projected cash flows, the concessionaire’s cost of capital, as reflected in the discount rate which is used to discount the projected cash flows, also impacts the concession price. As the cost of capital increases, the concession price, all other things being equal, will decrease.

### ***Sensitivity of the Concession Price to the Bidding Parameters and Assumptions***

Table 4 illustrates the sensitivity of the concession price to each of the Bidding Parameters and assumptions discussed above. (This analysis should not be construed as an estimate of the absolute value of a bid that might be submitted for a concession involving the Turnpike, but instead shows how a bid is impacted by different parameters and assumptions.)

**Table 4**

**Sensitivity of the Concession Price to the Bidding Parameters** (Note: This analysis is based on the Pennsylvania Turnpike's 2006 financial results. Panel B reflects changing only one of the Base Case bidding parameters and assumptions at a time.)

*Panel A: Base Case Assumptions*

Term of Concession	50 years
Toll Formula	The greater of GDP per capita, CPI or 2%
Capital Expenditures	\$475 million per year over the first 10 years; \$175 million thereafter
Capital Expenditure Spending Efficiency*	75%
GDP per capita	5.5% per year for 50 years and 3% thereafter
CPI	3% per year
Traffic Growth	1% per year
Operating Costs	3% annual growth (CPI)
Weighted Cost of Capital	7%
Concession Price	\$15.4 billion (Base Case)

\*Spending efficiency is the percentage of the nominal value of the required capital expenditures due to a concessionaire's potential to deliver projects more efficiently.

**Panel B: Sensitivity Analysis**

<i>Assumption</i>	<i>Concession Price</i>
<b>Term of Concession</b>	
50 years	\$15.4 billion (Base Case)
75 years	22.6 billion
99 years	26.1 billion
<b>Toll Formula</b>	
3% per year	\$ 5.8 billion
5.5% per year for 50 years, 3% thereafter	15.4 billion (Base Case)
<b>Capital Improvements</b>	
75% Spending Efficiency	15.4 billion (Base Case)
0% Spending Efficiency	14.3 billion
<b>Traffic Growth</b>	
0% per year	\$10.2 billion
1% per year	15.4 billion (Base Case)
2% per year	22.5 billion
<b>Operating Savings in Year 1</b>	
0% savings	\$15.4 billion (Base Case)
10% savings	16.0 billion
20% savings	16.6 billion
<b>Weighted Cost of Capital</b>	
7%	\$15.4 billion (Base Case)
8%	11.7 billion
9%	9.0 billion

Based on the above analysis, the major drivers of the concession price are the length of the concession term, the toll formula, the assumption regarding the growth in traffic, and the concessionaire's cost of capital. The price is relatively insensitive to both operating and capital costs.

Table 5 shows the price a concessionaire would pay using the assumptions that underlie the Act 44 projections.

**Table 5**  
**Act 44 Assumptions**

Term of Concession	50 years
Toll Formula	25 % increase in year one and 3% per year thereafter
Capital Improvements	\$475 million per year for the first 10 years; \$175 million thereafter
Operating Costs	4% annual growth
Operating Savings in Year 1	0%
Traffic Growth	2.5 % for 20 years and 2% thereafter
Weighted Cost of Capital	7.00%
Concession Price	\$13.3 billion

### Current Conditions in the Financial Markets

Do recent developments in the financial markets affect the revenue potential of a lease or similar transaction?

#### The Financial Market's Credit Crunch

At least two conflicting dynamics are influencing today's financial markets for *risky* (not default free) debt. Due to concerns about a possible recession, the Federal Reserve cut the Federal Funds Rate by  $\frac{3}{4}\%$  on 1/22/08, and then by an additional  $\frac{1}{2}\%$  on 1/30/08, to reduce the Fed Funds Rate to 3.0%. These actions have acted to reduce interest rates for risk-free debt. Conversely, markets for risky debt have been pummeled by a significant increase in defaults on mortgage securities and other debt causing a severe credit crunch. The higher default rates have forced the markets to greatly increase their risk premiums and to reject requests for credit from marginal borrowers. These actions act to increase interest rates for risky debt.

Most investors hate uncertainty. When there is a high degree of uncertainty in the financial markets, investors will sell risky securities—reducing demand and decreasing their prices, and buy risk-free US Treasuries—increasing demand and increasing their prices. This effect is known as a *flight to quality*. So, while risk-free Treasury rates are dropping, the *spreads to Treasuries* for risky securities have been increasing more rapidly. All other things being equal, *higher interest rates translate into a higher borrowing cost for the concessionaire and a lower concession price for the Turnpike.*

The most recent crisis in the capital markets was initiated by the sub-prime mortgage disaster. During 2007 a significant increase in the number of defaults occurred on the home mortgages of borrowers with credit histories that were less than *prime*. This increase in defaults has led to large losses at commercial and mortgage banks that originate loans, investment banks that package and securitize mortgage loans, and hedge funds and other large investors that invest in these loans. Concerns are increasing that

credit problems and the risk of increasing defaults are spreading to the markets for car loans, student loans, consumer loans and credit card debt.

Credit problems have driven the stock prices of financial companies into a precipitous decline, due to massive loan losses and write offs. Several commercial and investment banks have found their capital impaired and have sold large equity stakes to sovereign wealth funds in Singapore, Hong Kong, and Dubai, among others. The losses also have led to the departure of many big-name top executives at the banks, and have made financial institutions focus more on risk control—requiring higher yields or greater fees to take on risk. A treasurer of a large municipal issuer has stated that the search for higher fees is evident in the market for floating-rate bonds in which the cost of a liquidity facility has increased by 30% to 50%.

Contagion in the United States markets has spread to the financial markets of other countries. International stock markets, reacting to the problems in the US financial sector, have declined approximately 10% to 15% just in the month of January, 2008; and there has been a large increase in the volatility of the foreign stock markets.

Sometimes the US economy moves very quickly—from an expansion—to a recession—back into an expansion in the space of eight to twelve months. Likewise, financial markets can go from irrational pricing, which lately has been seen when soliciting debt pricing ideas from municipal and corporate bond traders, to normalcy in a short period of time. In the relative cost of capital analysis that follows, yield levels and credit spreads and municipal/corporate interest rate ratios are used that are rational and measured. They are not simply the result of a knee-jerk reaction to the recent schizophrenia in the financial markets.

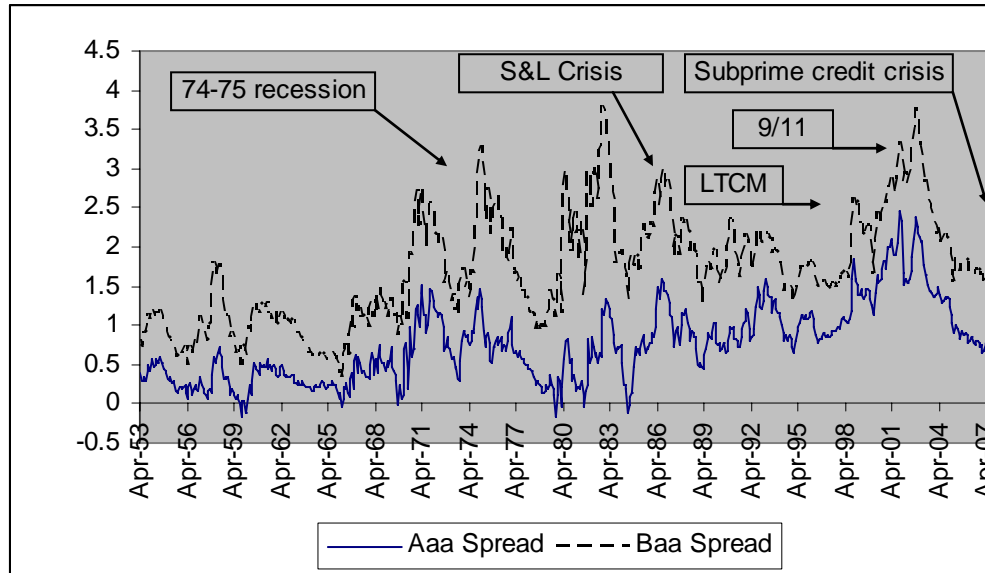
### **Corporate Credit Spreads**

Buyers and sellers of corporate bonds typically quote yields and prices on the bonds as a spread to US Treasury bonds or LIBOR swaps rates. For example, if a 10-year corporate bond has a market yield of 8.00% and 10-year US Treasury bonds (UST's) are yielding 5.00%, the corporate bond would be quoted in the market as trading at 10-year UST's + 3.00%. The spread to Treasuries is a measure of the default and liquidity risk in the market for corporate bonds, and indicates how the bonds are priced and valued relative to market benchmarks.

Corporate credit spreads may be volatile and are affected by major financial market events. When a financial crisis occurs, credit spreads widen and corporate funding costs increase, even if US Treasury interest rates have not risen. Several notable events have caused credit spreads to increase significantly. The fall of the hedge fund, Long-Term Capital Management (LTCM) in the late 1990's, the World Trade Center attack of 9/11/2001, and the current sub-prime mortgage crisis have all led to increased credit spreads.

The credit spreads for Aaa and Baa corporate bonds relative to the 10-year constant maturity US Treasury Note are shown in Figure 1. It is evident that the current sub-prime credit crisis has led to higher credit spreads and higher corporate funding rates. *Since an upfront payment under a lease agreement would be influenced by the amount of and interest rate on debt of the concessionaire, the recent increase in credit spreads would likely have a negative impact on the revenue potential of a lease or similar transaction.*

**Figure 1**  
**Corporate Credit Spreads and Major Financial Market Events**



Data: Aaa and Baa Moody's Industrial Corporate Bond Index minus 10-year Constant Maturity Treasury Note. Source: [www.federalreserve.gov](http://www.federalreserve.gov)

### Recent Credit Concerns with Bond Insurers

Other casualties of the credit crisis are the bond insurance companies that insure the interest and payments on municipal and corporate bonds. Some bond insurers have also insured structured financial products, such as collateralized debt obligations (CDOs) and mortgage-related securities. Several large bond insurers, including AMBAC and MBIA, are in danger of losing their AAA rating because of exposure to severe losses in structured finance products. Many of the structured products that they have insured include sub-prime mortgages. Fitch Investor's Services recently downgraded AMBAC to AA. And both AMBAC and MBIA have been warned by the credit rating agencies that their ratings may be downgraded further, unless they raise additional capital. Currently, there is a large degree of uncertainty overhanging the insured bond market.

Corporate and municipal entities, such as the Chicago Skyway Concession Company and the Pennsylvania Turnpike Commission, purchase bond insurance to achieve the highest bond rating possible—AAA or Aaa. Higher ratings mean lower risk which translates into a lower interest rate, or yield, on the issuer's bonds.

It's a simple analysis to determine if it is cost effective to purchase bond insurance. The issuer estimates the yield required on the issuer's bond based on its underlying bond rating (The PTC's underlying ratings are AA-, Aa3, AA-), e.g. 4.5%. The issuer then researches yields on comparable, insured AAA/Aaa bonds, e.g. 4.4%. The issuer compares the difference in yields ( $4.5\% - 4.4\% = 0.1\%$  per year) with the cost of insurance. If the cost of insurance is lower than the difference in yields, it is economical to purchase the insurance.

Based on information provided by a major investment bank on February 1, 2008, we show a current insured scale (AAA/Aaa-FSA-insured) versus an uninsured scale (AA-/Aa3) for the Pennsylvania Turnpike Commission (See Exhibit 1).

Bond insurers insure both municipal and corporate bonds. Financial Security Assurance Inc. ("FSA") issued a bond insurance policy for the \$1.4 billion Senior A&B Secured Floating Rate Bonds of the Skyway Concession Company LLC. The credit problems associated with bond insurers may also significantly affect the transportation infrastructure sector of the corporate bond markets as well as the municipal bond market.

The effects of a downgrade of bond insurers below AAA would be negative and substantial to the municipal and corporate bond markets. Existing insured bonds would lose value as their yields adjust to the new credit rating of the insurers. New bond issues will be more difficult to insure and insurance may become more costly. While the long-run effects on the municipal and corporate bond markets can not be determined at this time, *the credit crisis has had market-wide implications and has increased credit spreads on risky assets.*

### **Relative Cost of Capital**

What are the respective weighted costs of capital of a public agency (such as the Commission) and a typical concessionaire? How would the bond ratings compare? How would a concessionaire's financial plan differ from that being implemented by the Commission under Act 44?

### **The Interest Rate (Yield) on The Commission's Bonds**

Currently, the PTC finances a portion of its operations by selling tax-exempt bonds to investors. The proceeds from the tax-exempt bonds are used to pay capital improvements and certain of the payment obligations under Act 44. The PTC promises to pay the holders of the tax-exempt bonds semi-annual interest payments and to repay the principal of the bonds at maturity. The interest rates on the PTC's bonds reflect several considerations: the time value of money, the risks associated with the bonds, and the exemption of the interest on the PTC's bonds from Federal income taxation.

### *The Time Value of Money*

The time value of money measures the interest rates or yields associated with different maturities of debt. The key to understanding the time value of money is to recognize that time and the value of money are inversely related. The farther in the future that you expect a payment, the less it is worth today in present value terms. In the United States the time value of money is represented by the yield curve (technically the zero coupon or spot interest rates) on US Treasury Bonds, which are assumed to have zero default risk. Default risk is not a factor in the time value of money.

All debt in the United States is influenced by the term structure of interest rates and the time value of money. As the yield on short-term and long-term US Treasury Bonds goes up and down, the required yield on all debt issued in the US likewise moves up and down, albeit not exactly on a basis point by basis point movement. As US interest rates, in general, move upward due to higher inflation or downward in reaction to a possible recession, the yield sought by investors in the PTC's bonds, likewise, will increase or decrease.

### *Risk Considerations, Ratings and Leverage Options*

The second factor which affects interest rates and yields on the PTC's bonds is risk. There are several types of risk associated with bonds: default risk, interest rate risk, reinvestment rate risk, and prepayment risk are the most obvious. The focus of this subheading will be default risk.

The current bond ratings for the PTC's toll revenue bonds are AA- by Standard & Poor's Corporation, Aa3 by Moody's Investor's Services, and AA- by Fitch. These are high investment grade ratings and reflect the fact that the Pennsylvania Turnpike has a strong operating history and has a conservative financial structure.

However, the Pennsylvania Turnpike is now at a crossroad and must decide which path it will take.

- **Alternative 1: Act 44 Monetization.** Maintain status quo. Assumes the PTC continues to make its scheduled payments to PennDot under Act 44. Such a path will require the tolling of I-80, or finding additional revenue sources to replace expected I-80 revenue. Also assumed is an initial toll rate increase of 25%, and then toll rates increases, on average, of 3% per year. Alternative 1 assumes the Commission will offer new money bond issues every few years.
- **Alternative 2: Corporate Lease.** Assumes Turnpike is leased to for-profit corporation. The concessionaire makes a big upfront payment, the *Rent*, and then operates the Turnpike over the term of the lease. To pay the *Rent*, the concessionaire issues as much debt as possible and funds the remainder with higher cost equity. The toll adjustment formula sets maximum toll rates and is subject to other terms and conditions. Transaction similar to Skyway and ITR.

- **Alternative 3: Full Public Monetization.** Turnpike operated by the PTC or a 63-20 not-for-profit corporation (the “63-20”). The 63-20 or the Commission, itself, may negotiate a payment (the *Public Payment*) with the Commonwealth, or elect to bid in an auction for the right to operate the Turnpike. Because they can issue tax-exempt bonds, both the PTC and the 63-20 have a funding advantage over a corporate concessionaire. This approach is similar to the funding program that currently is being debated for the New Jersey Turnpike.

What are the risks and rating implications of the above alternatives? Due to the turmoil for bond insurers, we assume that none of the three alternatives described above employs bond insurance.

Alternative 1, the Act 44 Monetization, represents the status quo for the Turnpike. It assumes that I-80 eventually is tolled or that another source of funding replaces the amount expected to be contributed by I-80. In a recent conversation between one of the authors of this report and an investment banker familiar with the Turnpike, the investment banker stated that, “...given this measured, conservative, multi-stage funding approach, that would be a positive financing program and in keeping with the Turnpike’s high investment grade rating.” The Turnpike currently has a high debt service coverage ratio in excess of 3.0. He did not think that it was unreasonable to believe that the Turnpike could maintain its AA-/Aa3/AA- ratings, at least in the near to intermediate term.

Under the Corporate Lease of Alternative 2, the goal of the concessionaire is to win the bid to operate the Turnpike. The concessionaire will issue as much lower cost debt as possible, and will fund the remainder of the Rent with equity. Equity is a higher cost source of capital and is usually the last money in and the first money out in a leveraged transaction. The financing will have a high degree of leverage. The rating agencies may view the levered capital structure of the concessionaire as a major concern that negatively affects the financial risk of the Turnpike enterprise. It is assumed that the concessionaire structures a financing with projected revenues and debt service coverage ratios that are worthy of an assignment of BBB/Baa bond ratings.

Under the Full Public Monetization of Alternative 3, the goal of the PTC or the 63-20 will be to win the bid to operate the Turnpike. Assuming that the PTC or the 63-20 is the successful operator, it also will need to issue a large amount of debt to make the Public Payment. The financing will be highly levered. The rating agencies may view this structure as increasing the financial risk of the enterprise. We also assume that the PTC or the 63-20 structures a financing with projected revenues and debt service coverage ratios that are worthy of an assignment of BBB/Baa bond ratings.

### ***Exemption from Federal and PA State Income Taxation***

The bonds that are issued by the PTC are *municipal bonds*. We also assume that the 63-20 can issue municipal bonds. Municipal bonds are debt instruments issued by states, cities, municipal authorities, and other entities. The overwhelming attraction of municipal bonds for investors is the exemption from Federal and certain state and local income taxation of the interest paid on the bonds. Because of this interest income exemption, an investor's decision to invest in tax-exempt bonds is based upon an after-tax interest income comparison with other fixed-income securities, taking into account the investor's marginal income tax bracket.

The PTC generally issues municipal bonds that are exempt from Federal income tax and Pennsylvania income tax. Because of this tax-exempt status, many municipal entities in the United States can issue bonds that have interest rates that are lower than the rates for comparable maturity US Treasury debt. The ability to issue tax-exempt debt at relatively low interest rates allows public agencies in the United States, such as the PTC and a 63-20, to have a financing advantage over corporate entities, including concessionaires.

In a September 2007 study, Citigroup (the Citigroup Study) developed a pro-forma financial model showing the anticipated funding strategy for the payment of the PTC's obligations under Act 44. Over the 50-year term of Act 44, the model indicates that approximately (80%) of the Act 44 payments will be funded with excess toll revenues and (20%) with the proceeds of debt. Although a formal tax analysis of this strategy is beyond the scope of this study, it appears that excess toll revenues from the Turnpike should be sufficient in most years to fully fund the portion of Act 44 payments attributable to transit operating assistance. As a result, it is reasonable to assume that all of the PTC's monetization bonds under Alternative 1 can be issued on a tax-exempt basis for capital purposes.

Under Alternatives 1 and 3, the Commission and/or the 63-20 are able to borrow at a rate lower than the WACC of the concessionaire. This results in a more efficient financing. We show this relationship when we describe the municipal efficiency ratio (MER) in the Appendix.

### ***The Tax-Exempt Discounting Rate***

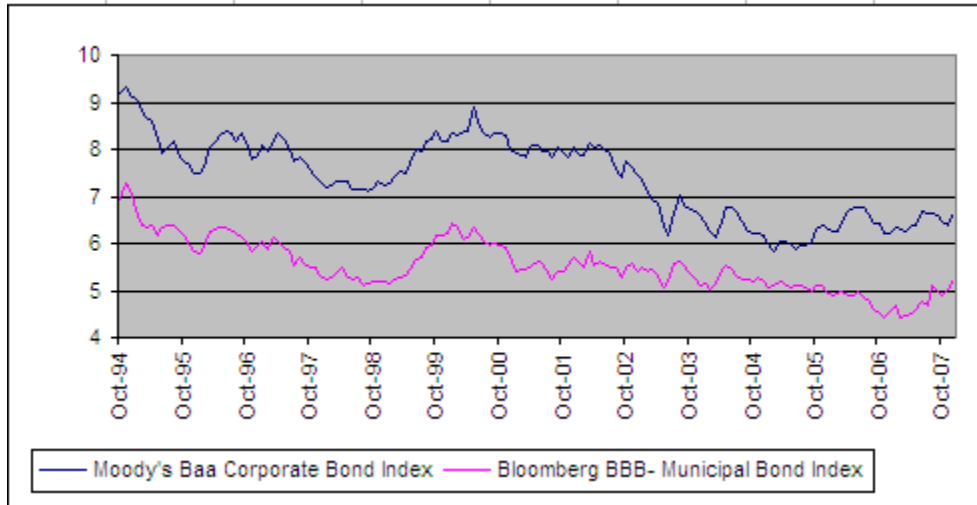
What is the *yield* or *discount rate* that should be used to value the expected future cash flows that will be generated by the concessionaire's toll adjustment formula under the Corporate Lease, or by the PTC under Act 44?

The Act 44 payment stream can be viewed as a promissory note from the PTC, and the appropriate risk adjusted discount rate should be the PTC's cost of debt. The authors have consulted with several investment banks about their estimate of the interest rates for a 20-year PTC bond issue. The estimates of the yield (true interest cost) on the PTC's AA-/Aa3 debt in today's market is approximately 4.5%—see column on extreme right of

Exhibit 1. This 4.5% yield is appropriate for Alternative 1, keeping the status quo Act 44 Monetization in place. A 4.5% yield is not appropriate—it is too low—for the yield on a BBB/Baa assumed rating for Alternative 3, which is based on a Full Public Monetization of the PTC’s revenues.

What discounting rate should be used for Alternative 3, which assumes that the levered financing by the PTC or the 63-20 results in bond ratings of BBB/Baa? A Bloomberg data set shows monthly average yields for a Standard & Poor’s BBB- rated (a lower rating than BBB), 20-year municipal revenue bond index. In Figure 2 below, the 20-year municipal index is compared with a Federal Reserve data set that measures Moody’s Baa rated, 20-year industrial corporate bond index.

**Figure 2**  
**20-Year Corporate and Municipal Bond Yields 1994 – Present**



The figure shows the yields associated with 158 monthly observations, from October 1994 until December 2007, of the 20-year Baa corporate bond index versus the yields on the 20-year BBB- rated municipal bond revenue index. Over the 13-year period, the average monthly BBB- municipal yield is 5.67%, and the average monthly Baa rated corporate bond index yield is 7.38%. Historically, 20-year Baa corporate bonds averaged 1.71% higher than 20-year BBB- municipals, and the ratio of BBB- municipals to Baa corporate bonds was 76.8% = (5.67%/7.38%). As of December 2007, the 20-year municipal BBB- revenue index rate was 5.23% and the Baa corporate index was 6.65%, a difference of 1.42% and a ratio of 78.6% = (5.23/6.65). The ratio of the yields and the absolute difference in yields for the December observations are very close to the long-term averages over the 158 monthly observation periods.

The 5.23 % yield from the December 2007 observation is used to both monetize and discount the cash flows relating to the Full Public Monetization in the debt service schedules shown in the Appendix, and in the Section relating to Act 44.

## Capital Structure and The Concessionaire's WACC

The capital structure of a concessionaire and its weighted average cost of capital are very important components in determining how much it is willing to pay for the concession. When determining a firm's capital structure, its financial managers try to achieve a debt and equity mix that will minimize the firm's weighted average cost of capital (WACC). By minimizing its WACC, a concessionaire maximizes its corporate value, or in the case of concessions, maximizes the concession price or Rent it is willing to pay in a competitive bidding environment.

In the Background Section the transactions for the ITR and the Skyway are described. Both are similar to the Corporate Lease of Alternative 2, which is being contemplated by Governor Rendell for the Pennsylvania Turnpike. In the Background Section it is estimated that the weighted average cost of capital for the Chicago Skyway is between 8.1% and 9.1%, and for the Indiana Toll Road is between 7.2% and 8.2%. It is also estimated that the cost of equity for the transactions is between 12.5% and 13.5%.

In both transactions, the concessionaires—ITR Concession Company LLC and the Skyway Concession Company, LLC—are limited liability companies created solely to finance and operate their respective transportation projects. The investors in each concessionaire are Cintra and Macquarie.

## The Concessionaire's Cost of Debt, Equity and WACC

The corporate rate observation for December 2007 of 6.65% from the Baa rated corporate bond data set that is shown in Graph 2 is used for the cost of debt of the concessionaire. For the cost of equity, the 12.5% rate estimated in the Background Section is used. The cost of equity is based on target returns in other equity investments of similar risk.

To illustrate the calculation of a WACC, the ITR financing is used as a template. The concessionaire, ITR Concession Company LLC, was capitalized with a private placement for \$3.278 billion of floating-rate bank debt with a term of 9 years, and \$770 million of equity.

Four steps are involved in calculating the weighted average cost of capital for the concessionaire:

*Step 1: Compute the market value of debt and equity capital.* The total market value of bank debt (\$3.278 Billion) and equity capital (\$770 Million) for the concessionaire is \$4.048 Billion.

*Step 2: Compute the capitalization ratios.* The capitalization ratios are the proportions of debt and equity capital employed by the firms. Of the concessionaire's total capital of \$4.048 Billion, bank debt represents 80.98% or 0.8098 ( $3.278/4.048$ ) and common equity is 19.02% or 0.1902 ( $.770/4.048$ ).

*Step 3: Compute the weighted debt and equity rates.* The weighted debt and equity rates are computed by multiplying the capitalization ratios times their relevant rates of return. For the concessionaire, these rates are 5.37% ( $.8098 * 6.65\%$ ) for debt and 2.38% ( $0.1902 * 12.5\%$ ) for equity.

*Step 4: Sum the weighted debt and equity rates.* The WACC is calculated by summing up the individual weighted rates of debt (5.37%) plus equity (2.38%) to equal the concessionaire's weighted average cost of capital of 7.75%.

The 7.75% rate is used to both monetize and discount the cash flows relating to the Corporate Lease in the debt service schedules shown in the Appendix, and in the Section relating to Act 44.

### ***A Note on Corporate Taxation and the After-Tax WACC***

A question relating to the use of pre-tax versus after-tax WACCs as the appropriate discounting rate often arises in valuing an investment. Two of the co-authors of this report sponsor a web site, Valuepro.net, which uses a DCF valuation technique to value stocks. The technique first estimates the firm's net operating profit after taxes, adjusts that number for depreciation and investment, and discounts the free cash flows at an *after-tax weighted average cost of capital*. That is the appropriate discount rate to use because an *after-tax cash flow is being discounted by an after-tax WACC*.

In the DCF approach to valuing the Pennsylvania Turnpike, Chicago Skyway, or Indiana Toll Road, earnings before interest, taxes, depreciation and amortization (EBITDA), is calculated and discounted. As you can see from the acronym, EBITDA is a pre-tax calculation. Therefore a *pre-tax WACC should be used to discount the EBITDA*.

The cash flows associated with the Morgan Stanley Report (MS Report-Operating Model) show estimates of operating losses from the transaction from 2008 until 2027. Then net cash flows generate sizeable operating profits (over \$6.5 billion in 2065). There may be a tax benefit associated with the use of capital loss carry forwards that will accrue to the concessionaire, or its owners, and that may act to increase the value of the concession to the concessionaire. The estimation of the amount of tax loss carry forwards and the calculation of their present value are beyond the scope of this report.

### **Maturity Mismatch, Rollover Risk and Interest Rate Risk**

The Skyway concession is for 99 years. The ITR concession is for 75 years. Act 44 assesses annual contractual payments from the Commission for a period of 50 years.

There is a severe mismatch between the term of the financing agreements, such as the length of the concessions and the Act 44 payments, and the maturity of the financing instruments. The terms of the concessions and the Act 44 payments will continue for far longer than the maturities of the bonds that were issued by Skyway Concessions Company LLC and the nine-year bank loan in the ITR transaction, and the bonds that

may be issued by the PTC. This maturity mismatch gives rise to additional risks and costs that will be incurred when the loan or bonds are required to be repaid or remarketed or refunded.

The financial instruments, techniques and markets for long-term infrastructure projects are evolving to accommodate a changing capital structure over time. Gone are the days when an issuer sells forty year bonds at a fixed-rate of interest, and the issuer's CFO kicks off her shoes, leans back in her chair and only makes her semi-annual interest payment. Now, an interest rate on the issuer's bond is being reset or a bond is being remarketed almost every business day.

The Skyway concession was financed originally with bank loans. Six months later it was refinanced by a private placement of 12-year and 22-year floating-rate taxable bonds, which then were swapped through an interest rate swap transaction back into a fixed rate of interest. The Skyway floating-rate bonds were insured by Financial Security Assurance Inc. (FSA). The Indiana concession was financed by a nine-year bank loan and equity and is still awaiting a more permanent financing.

Maturity mismatches also give rise to interest rate risk. When a fixed-rate bond matures and another bond is to be issued, yields may have climbed precipitously and debt service payments may increase greatly.

Clearly, these complex infrastructure financing programs need active review and management. Opportunities to lower interest rates on debt through floating rates and swap transactions come with additional risks, and those risks need to be thoroughly analyzed. And those risks and rewards change over time. Bonds will constantly be remarketed and reissued over the very long life of these transactions—current and relative yields and financing structures will change over time. But you can be certain that risks will remain.

### **Investment Strategy and Permitted Investments for the Concession Payment**

If a large up-front concession payment on a lease were obtained from a concessionaire, what investment strategy that is permitted by the Pennsylvania Constitution, especially considering the restrictions of Article VIII Section 8 (See Exhibit 2), would likely yield the greatest return and what is the likely range of returns that could be expected over a long-term (50 year) period? What are the risks?

### **Investment Assumptions Underlying the Morgan Stanley Report**

In a May 24, 2007 report by Morgan Stanley (See Section on the MS Report), Morgan Stanley analyzed a scenario in which the Commonwealth enters into a long-term lease of the Pennsylvania Turnpike with a concessionaire, under which the concessionaire will make an upfront payment ranging from \$12.0 to \$18.0 billion. Under the MS scenario the

upfront payment, the Rent, would be invested in perpetuity. Morgan Stanley further assumed that the Rent would somehow generate returns of 7%, 8%, or 9% forever—which is a very long time. Based on those investment rates, the returns on the Rent is sufficient to generate enough money annually to pay \$840 million to \$1.62 billion per year to fund a portion of the Commonwealth’s stated transportation infrastructure capital needs.

Morgan Stanley neglected to point out a minor problem with their assumptions—that a 7% to 9% long-term rate of return is extremely difficult to achieve in today’s financial markets. And to have any reasonable chance of consistently receiving that level of return, the Commonwealth would need to invest in risky securities, such as common stock, or low quality corporate bonds, or high-risk hedge funds, or perhaps some high-yield sub-prime housing loans—extremely risky investments for the public’s money.

### **Return Versus Risk: Higher Returns Require Taking More Risk**

Finance theory assumes that a rational investor prefers to receive a higher percentage rate of return on an investment to a lower return. And a rational investor would rather accept less risk than more risk in earning that return. The proverbial free lunch does not exist in the world of finance. A trade-off occurs between a higher expected rate of return and the greater risk of an investment. Safe investments have low returns. High returns require investors to take big risks.

The fact that higher investment returns require an investor to take greater risk is an important principle of finance. What is a reasonable expectation of long-term rates of return for different asset classes? That should give the Commonwealth an idea of what range of rates of return it could reasonably expect to receive from the investment of the Rent.

#### ***The Ibbotson & Sinquefeld Study***

In an extensive study, Professors Roger Ibbotson and Rex Sinquefeld calculated annual percentage rates of returns and examined the distributions of those returns over the 82-year period from 1925 until 2007 for the following classes of investments:

- US Treasury bills with a three-month maturity;
- US Government bonds with an average 20-year maturity;
- High quality corporate bonds with an average 20-year maturity;
- A portfolio of large cap common stocks as represented by 500 of the largest companies in the US; and
- A portfolio of small cap common stocks as represented by the smallest twenty percent of the companies listed on the NYSE.

The results of the study are important and show the direct relationship between the expected return of an asset and the risk associated with receiving that return. Table 6 presents the summary statistics for percentage returns on the five investment classes. The

percentage return is calculated on a compound average return basis. The risk associated with an asset class is measured by how widely the annual returns vary over time, as recorded by the standard deviation of the annual rate of return distribution.

**Table 6-A**  
**Historic Returns by Asset Class from 1925 to 2007**

<b>Asset Class</b>	<b>Compound Annual Return</b>	<b>Standard Deviation of Return</b>
<b>U.S. Treasury Bills</b>	3.70%	3.10%
<b>U.S. Treasury Bonds</b>	5.50%	9.20%
<b>Corporate Bonds</b>	5.90%	8.40%
<b>Large Company Stocks</b>	10.40%	20.00%
<b>Small Company Stocks</b>	12.50%	32.60%

Source: Morningstar, *Stocks, Bonds, Bills and Inflation, SSBI Market Report, December, 2007*

The study above demonstrates the direct trade-off between return and risk. An investment in a Treasury bill with no default risk and very little price volatility has a lower expected average return (3.7%) than a portfolio of large cap stocks (10.4%). The Treasury bill also has a lower risk measure of 3.1% relative to the returns of a portfolio of large company stocks with a standard deviation of 20.0%.

We show in Table 6-A the historic returns by asset class over an 83-year period and find that large company stocks returned, on average, 10.4% per year. How about a more recent history of actual rates of return? What would have been the compound average return if the Commonwealth had invested the Rent at the beginning of the 21<sup>st</sup> Century in a diversified portfolio of large-cap common stocks, such as represented by the S&P 500 Stock Index? Table 6-B shows the ending index levels and the annual returns from investing in the S&P 500 stocks, during the eight-year period beginning on December 31, 1999 and ending on December 31, 2007.

**Table 6-B**  
**21<sup>st</sup> Century History--S&P 500 Index**

<b>Year Ending 31-Dec</b>	<b>Ending Index*</b>	<b>Annual Return</b>
1999	1469.25	
2000	1320.28	-10.14
2001	1148.08	-13.05
2002	879.82	-23.37
2003	1111.92	26.38
2004	1211.92	8.99
2005	1248.29	3.01
2006	1418.31	13.62
2007	1468.36	3.53

\*Adjusted for dividends and splits—Source: Yahoo Finance

The S&P 500 Index closed at 1469.25 on December 31, 1999 and 1468.36 on December 31, 2007. **Over the entire 8-year period of the 21<sup>st</sup> Century, the compound annual return due to capital gains on the portfolio would have averaged slightly less than 0.0%.** Add to that the average dividend yield of 1.64% for the S&P 500 stocks over that 8-year time period and you have a total compound annual return of 1.64%. That type of performance isn't going to pay the Rent!

Likewise, caveats exist today when investing in low-risk fixed income securities such as US Government bonds. As of the date of this writing, the 10-year Treasury yield was at an extremely low rate of 3.6% (See Exhibit 3: Morgan Stanley Swap Weekly Rate Guide, February 4, 2008). A 10-year Treasury rate of 3.6% is not the yield level that will help the Rent to generate the 7% to 9% in annual income that MS assumed in their report.

### ***Investment Restrictions on Commonwealth Funds***

We believe that the reinvestment rate assumptions embedded in the Morgan Stanley proposal are very aggressive and are seriously overestimated. In fact, it is understood that there are certain investment restrictions under the Constitution of the Commonwealth of Pennsylvania, which restricts how the Commonwealth and its related entities may invest their funds. Specifically (See Exhibit 2), Article VIII, Section 8 of the Constitution reads:

“The credit of the Commonwealth shall not be pledged or loaned to any individual, company corporation or association nor shall the Commonwealth become a joint owner or stockholder in any company, corporation or association.”

### **As Far as Risks Are Concerned**

So a major risk associated with the Morgan Stanley option 1, “lease the Turnpike to a corporation, raise a large sum of money today, and invest it at a high yield approach,” is the very real concern that the actual rates of return on the Rent will greatly under perform the 7% to 9% target returns, or that substantial portfolio losses may be incurred due an overly aggressive investing policy that chases yield. ***The more likely rate of return on the Rent over a long period of time (50-year period or longer) is the historical long-term average rates of return for US Treasury Bonds, between 4.5% and 5.5%.***

A second real concern relates to the politics of a large pool (\$12 to \$18 billion) of money being invested in perpetuity. Money that has been raised for transportation may be attractive to subsequent legislative redirection for other purposes. An article from the November 29, 2007 edition of the Centre Daily Times heightens that concern. The article was entitled, “Rendell pulls penny request on gas sales.” The article describes how the state Department of Insurance sought regulatory approval for additional funds after the board of the Underground Storage Tank Indemnification Fund voted for the higher fee as a way to keep the fund solvent. Governor Rendell withdrew that request due to budget concerns. The last paragraph of the article, which is included as Exhibit 4-A, reads:

**“Adding to the fund’s financial uncertainty is the fact that, in 2002, legislators and then-Gov. Mark S. Schweiker borrowed \$100 million from the fund to plug a hole in the state budget. Less than a third of that amount has been repaid.”**

Legislative redirection relating to transportation funds of the Commonwealth occurred in 2004. Vroman (2005) describes how in March of 2004, the sum of \$300 million was borrowed from the Motor License Fund to make unemployment insurance benefit payments. The loan was repaid in May of 2004. House Bill 471 was introduced in May of 2006 to limit, among other things, the ability of the Commonwealth to divert gasoline taxes and motor license fees from their intended uses.

Governor Rendell vetoed House Bill 471 on November 29, 2006. In his Notice of Veto (See Exhibit 4-B), he states that the bill, “...places unreasonable and unnecessary restrictions on the transfer of appropriations and on inter-fund transfers and loans that are just not good policy. The General Assembly in several statutes has already recognized the need for this flexibility and the Pennsylvania Constitution acknowledges that loans from the Motor License Fund may be necessary from time to time.”

Absent an amendment to the Pennsylvania Constitution, we are aware of no authorization or ability for the Commonwealth to create an effective *lockbox* which would protect such funds from the enticing temptation of future legislative invasion and usurpation for non-transportation purposes. *We believe that there is a very real risk of legislative redirection of a \$12 to \$18 billion pool for other seemingly worthy purposes that may be quite compelling at budget crunch time.*

## **The Morgan Stanley Report for Funding Transportation**

We critique a report (the “Report”) of Morgan Stanley (“MS”) to the Commonwealth of Pennsylvania in which Morgan Stanley attempts to “...analyze a range of strategic alternatives for funding the Commonwealth transportation needs.” The Report assesses three potential funding strategies: a Long-Term Lease, a Public Corporation/Leverage, and a PTC Proposal. We discuss the strengths and weaknesses of their model along with their choice of discounting and compounding rates and other important assumptions.

### **Overview of the Morgan Stanley Report**

On March 26, 2007, Morgan Stanley was retained by the Commonwealth of Pennsylvania to analyze three transportation funding options. The three funding options are described in the Report as follow:

- Long-Term Lease (Option 1): The Commonwealth enters into a long-term lease with a private operator to maintain and operate the Turnpike (Similar to Skyway and Indiana).
- Public Corporation/Leveraging (Option 2): The Commonwealth partners separately with private operators and contractors to manage the Turnpike over

- shorter time periods and leverages the asset using tax-exempt debt (Similar to Proposed New Jersey toll road financing).
- PTC Proposal (Option 3): The Pennsylvania Turnpike Commission's transportation funding proposal (We assume MS means the Pennsylvania Act 44 transportation funding program that is currently being implemented.) is compared against the other two alternatives.

The Report does note that “all value estimates are highly preliminary and dependent on available data, further due diligence and certain Commonwealth assumptions.” So there is no way of telling whether the assumptions in the Report were provided by Morgan Stanley or the Commonwealth.

### **The Operating Model**

The critique and analysis that follows is based upon the use of the discounted cash flow (DCF) approach to value the Pennsylvania Turnpike (See Appendix). A PDF print-out of the Report's EBITDA operating model (the “Model”) was provided to the authors, and much of the discussion that follows is based upon the assumptions underlying the Model.

### **Assumptions Underlying the Long-Term Lease Analysis**

#### ***The Investment Rate Is Assumed to Be 7%, 8%, or 9%***

In Option 1, the Report estimates that the proceeds from a long-term lease will be between \$12 billion and \$18 billion. The Report then shows *potential annual interest proceeds* based on the assumption that, “Assumes \$12.0-\$18.0 Bn in upfront proceeds invested at a rate of 7.0% - 9.0% in perpetuity” (Report dated May 24, 2007, footnote page 3).

The risk and return tradeoff in the financial markets has been well-documented. Over the last 82 years, low risk investments, such as US Treasury Bills and Bonds, have averaged annual returns of about 3.70% and 5.50%, respectively. Riskier investments, such as large company stocks, have averaged annual returns 10.40%. (See *The Ibbotson & Sinquefeld Study* in Investment Strategy and Permitted Investments Section).

Given historic investment returns, to obtain the 7% to 9% level of return ***forever*** would require investing in risky securities such as common stock, lower quality corporate bonds, hedge funds or sub-prime housing loans—investments that are inappropriate for the Commonwealth and its entities.

The investment losses suffered by Orange County (California), Tyrone Area School District (Pennsylvania), and the Wisconsin Investment Board, as well as the recent massive losses by Springfield, Massachusetts on housing-related securities, serve as examples of the penalties for investing public funds in risky investments. ***The investment assumptions in the Report lead to a significant overestimate of the annual interest amounts expected to be earned on the upfront payment of the Rent.***

### ***Cost of Capital for the Concessionaire is Understated***

In a DCF valuation, if a concessionaire is discounting EBITDA, the appropriate discount rate to use is the pre-tax weighted average cost of capital because it discounts Earnings Before Interest payments, Taxes, Depreciation and Amortization. Present value adjustments may then be made to account for the value of the debt shield provided by interest payments and depreciation.

The concessionaires in the Skyway and Indiana transactions were limited liability corporations, the sole purpose of which are to finance and operate their respective facilities. They have no other sources of income and are expected to have operating losses for a very long time. They expect to pay no taxes for a long period of time and will have a marginal tax rate of 0%. The projections of the Model show that the operations of the Turnpike under a lease will have negative earnings before taxes (EBT) for the next 20 years—until 2028. In the “Implied Cost of Capital (Leverage Model),” the Report (Report dated May 24, 2007, page 7) estimates a tax shield of 40%, the effect of which reduces the implied cost of debt of the concessionaire by 2.4%—from 6% to 3.6%.

In the Report, the weighted average cost-of-capital assumption of 6.13% for the concessionaire is too low. We estimate that a more realistic cost-of-capital estimate is about 7.75% (See *Relative Cost of Capital Section*). *The lower cost-of-capital assumption for the concessionaire in the Report leads to an overestimate of an up-front concession payment.*

### ***Assumption of 25% Private Operator Efficiency is not Supported***

The two previous sections focus on compounding and discounting rates and their effect on the Turnpike’s DCF valuation. This section focuses on an assumption that reduces the capital expenditures of a concessionaire with the effect of increasing its expected future cash inflows to be discounted in the Model.

The Report assumes that a concessionaire immediately will be able to lower the capital expenditures of the Turnpike by 25%, and that these cost savings will continue for the life of the lease. That is a bold assumption. Further, the Report does not cite any academic support for this assumption. The studies and evidence that we have found show otherwise.

Academic studies and empirical evidence suggests that there is little, if any, cost savings from privatization. In two studies that focused on privatization of public transit (Good, 1992) and municipal water entities (Bruggink, 1982), it was found that costs actually increased following privatization. In a third study focusing on public transit (Karlaftis and McCarthy, 1999), it was shown that costs dropped by only 2.5% following privatization.

In a fourth study, Vining, Boardman and Poschmann (2005) examine public and private partnerships in the U.S. and Canada. They find that contracting costs have been high. They find this as evidence that “the private sector can behave opportunistically at the expense of the public sector.”

The efficiency assumption of a 25% reduction in capital expenditure costs is arbitrary and unsubstantiated and results in an overestimate of the expected future cash flows of the Turnpike and a higher valuation for a Corporate Lease of the Turnpike.

### **Assumptions Underlying the Public Corporation Structure**

#### ***Assumption of 25% Private Operator Efficiency is not Supported***

Same private operator efficiency assumption and argument as above.

#### ***Cost of Capital is Overstated***

The cost of capital assumption for the Public Corporation is too high, relative to the cost-of-capital assumption of the concessionaire. The Report assumes a cost-of-capital for the Public Corporation, which can issue tax-exempt bonds, of 5.50%, and a discounting rate of 6.00% - 8.00%. The Report assumes a cost of capital calculation for the concessionaire that issues taxable debt, of 6.13%, and a reinvestment interest rate assumption of 7.00% – 9.00%. These assumptions are inconsistent and make little sense.

We estimate the cost-of-capital for both the Commission and the Public Corporation in the Alternative 3, Full Municipal Monetization to be 5.23%, and the cost of capital for the concessionaire in Alternative 2, the Corporate Lease, to be 7.75% (See Relative Cost of Capital Comparison). *The lower cost-of-capital assumption for the concessionaire in the Report leads to an overestimate of the upfront lease payment to the Commonwealth.*

#### ***Why use a 63-20 not-for-profit public benefit corporation?***

In Option 2, MS proposes creating a special purpose non-profit organization (similar to Harristown Development Corporation) known as a “63-20” to finance the Turnpike. Why bother to use a 63-20 with no toll road operating history when the PTC, itself, can implement the financing program?

The PTC has extensive experience, established financing documents, and currently high investment grade bond ratings. In all likelihood, expenses to create a 63-20, to establish and rate a new financing plan and documents, to ensure that the new entity can issue tax-exempt municipal bonds, to discharge outstanding Turnpike debt, and to terminate interest rate swaps, will add many multi-millions of dollars in unnecessary costs to the transaction. ***A 63-20 entails unnecessary duplication of effort with no discernable financial benefit over using the PTC itself.***

## Assumptions Underlying the PTC plan

### *Comparison of Total Toll Revenue is misleading*

Total Turnpike toll revenue on Options 1 & 2 is compared to total toll revenue on Option 3. In Option 3, MS includes toll revenues from both the Turnpike and I-80. (See Report page 24). This comparison is misleading and tries to show that Turnpike users will pay more under PTC Option 3 than in Options 1 and 2. The chart conveniently ends with many years remaining in the concession agreement. A more informative approach would have been to compare the toll rates over time for a cross state car trip and use the tolls under the PTC future toll assumptions versus the toll assumptions under Options 1 and 2.

The Report does not mention that, based on a 5.5% yearly increase in Options 1 and 2, versus a 3.0% increase in Option 3, the per car toll increase in Options 1 and 2 are much greater over time than the PTC per car toll increase in Option 3.

- Option 1 “Assumes 5.5% toll increases through 50<sup>th</sup> year, then reversion to 3.0% (CPI)” (MS Report footnote page 5). Assumes 75, 99 year term
- Option 2 “Assumes 5.5% toll increases through 50<sup>th</sup> year, then reversion to 3.0% (CPI)” (MS Report footnote 2 page 6). Assumes 30/50 year term
- Option 3 “25% toll increase in 1010, then rises by 3.0% per year, \$1 congestion tax in Harrisburg, Pittsburgh, Scranton, and Philadelphia regions” (MS Report dated May 21, 2007). Assumes 50 year term

### *Apples to Oranges Comparison*

The toll revenue streams that MS compares are unequal—both on an aggregate expected set of cash flows on an annual basis, and over a different time frame—50 years for Options 2 and 3, and 75 and 99 years for Option 1. Under the lease scenario and the public corporation approach, the toll revenues are assumed to grow by different percentages than under the PTC scenario. There is no consistency in discount rates for present value calculations. The written description of what is being calculated and valued did not match up with the Operating Model. The MS Report is based upon an apples to oranges comparison of assumptions, and the Report raises more questions than it answers.

## What About Tolling I-80?

What is the importance of tolling I-80 to the revenue potential of the Turnpike?

One of the key elements of Act 44 is the tolling of I-80 with the resulting revenues being used, in part, to fund the mandated Act 44 payments. One question that has been posed is what effect does tolling I-80 have on the revenue potential of the Turnpike, i.e. will traffic usage on the Turnpike change if I-80 is tolled or remains a “free” road.

The answer to this question lies in the price elasticity of demand on the Turnpike, or to put it another way, under what conditions will traffic divert from the Turnpike to other

routes in the face of increasing tolls on the Turnpike. Different classes of users have varying elasticity. The elasticity of a particular user is based on whether that user believes it is receiving value (e.g. convenience, time savings, comfort, etc.) of at least as much as the toll being charged; and second, whether there is a practical alternative route. With respect to the first, if the toll is less than the perceived value, then there will be no change in usage. If the toll is higher than the perceived value and there is a practical alternative, then diversion is likely to occur.

In the case of passenger vehicles and local commercial traffic, i.e. vehicles making trips with a total length of, say, less than 100 miles, alternative routes to the Turnpike are secondary roads. I-80 is not a practical alternative and therefore it would not make a significant difference to these users if I-80 is tolled or not (although there is likely to be diversion of traffic to secondary roads).

I-80 does represent a viable alternative, however, for one class of user; long haul (i.e. interstate or cross state) commercial vehicles. As a consequence, there may be significant demand elasticity displayed by this particular class of user based on the relative tolls charged on the Turnpike and I-80.

Although we do not know the actual number of long haul commercial vehicles that would divert to I-80 if it is not tolled (or if the tolls are lower than the tolls on the Turnpike), there would certainly be some diversion away from the Turnpike. This diversion represents lost revenue for the Turnpike. To measure the potential magnitude of this loss, we can use the model shown in Table 7. (Note: Two of the inputs, noted by a “?”, need to be supplied by a traffic engineer.)

**Table 7**  
**Revenue Loss Model—Pennsylvania Turnpike**

A. Net Fare Revenue from Commercial Vehicles (2005)	\$258 million (44% of total revenue)
B. Long Haul Comm. Vehicles as % of Total Comm. Revenue	??%
C. Percent of Long Haul Comm. Vehicles Diverted to I-80	??%
D. Revenue Loss on Turnpike	\$(AxBxC) million

The revenue loss from long haul commercial traffic diverting from the Turnpike to I-80 has the following implications. In the concession scenario, the upfront concession payment will, all other things being equal, be lower because the cash flows will be less. Under Act 44, if I-80 is not tolled, the Turnpike Commission will need to make up the lost revenue by increasing tolls on the other classes of users or another source. In either of these two scenarios, the way to mitigate toll revenue loss resulting from the diversion of long haul commercial traffic from the Turnpike to I-80 is to charge tolls on I-80.

There is a third scenario; the Turnpike is leased to a concessionaire, and I-80 is permitted to be tolled at some point in the future. In this scenario, if the Turnpike and I-80 are under

separate management (e.g. one private and one public), there will be an implicit competition established which could result in the tolls levied on the “elastic” users (long haul commercial vehicles) of the two roads to converge to marginal costs associated with each road. (This would mean a reduction in or increase in the toll rates charged on the respective routes.) If the routes are under common management, then the toll schedules on the two routes could be established with the objective of influencing a particular volume and mix of traffic on the two routes.

### **Event of Default by the Concessionaire**

Certain proponents of leasing the Turnpike have claimed that the best thing that could happen would be a default by the concessionaire under the Concession and Lease Agreement, since the Commonwealth would have received its lease payment upfront and would then get the road back. What are the implications if a concessionaire defaulted under the Concession and Lease Agreement?

#### **An Answer from the Reason Foundation**

In Policy Brief No. 58, *Building New Roads Through Public-Private Partnerships: Frequently Asked Questions*, Reason Foundation, undated, page 5; the authors—Leroy C. Gilroy, Robert W. Poole, Jr., Peter Samuel, and Geoffrey Segal—ask the following question:

“What happens if the private concessionaires go bankrupt after a new toll road is built?”

Their answer is: “If a concessionaire were to file for bankruptcy or close during a lease period, the contract would end and the state would take the toll road back without any obligation to repay concession fees. The state would essentially get the road for ‘free,’ and it could then re-concession the toll road or run it itself.”

Unfortunately the correct answer is not nearly as cut and dried. In fact, the scenario in the event of a default is likely to be very different,

#### **Default Risk of the Concessionaire**

As mentioned in the background section the concession agreement describes several events of default by the concessionaire:

- failure to comply with the terms of the concession agreement;
- inability to pay its debts; or
- a declaration of bankruptcy.

Although there is the possibility of the owner *repossessing* the road as a consequence of any of the events, the terms of the concession agreement make that possibility very remote.

### **Implications of a Concessionaire Default**

Because the proposed form of concession agreement in Pennsylvania has not yet been made public, let's examine the specific language in the Skyway and ITR agreements to see what happens in the event that a concessionaire defaults. These Agreements set forth the roles and responsibilities of the various parties under the long-term leases of their respective transportation facilities. It also grants the lease and concession to the Concessionaire and requires the payment of the *Rent*—a one time payment of \$3.8 billion in the case of the ITR concession, and \$1.83 billion in the case of the Skyway concession. The concessionaire finances the Rent payment through the sale of equity and debt (the “Corporate Bonds”) to investors, pursuant to financing documents that define the rights and obligations of each class of investors. The principal security for the debt will be the cash flows generated by the toll road.

In both the Chicago Skyway and the Indiana Toll Road transactions, the party responsible for monitoring the debt for the various investors is referred to as the *Leasehold Mortgagee*, or the “Lender.” Its role is described below.

Article 18 of the Indiana Turnpike concession and lease agreement and Article 17 of the Chicago Skyway document are titled “LENDER’S RIGHTS AND REMEDIES” and gives the concessionaire the right to grant one or more Leasehold Mortgagee in the transaction. If a group of banks fund the debt portion, the Lender will be the syndicating bank. If bonds that are sold in the capital market fund the debt portion, the Lender will be the trustee. In the event of a concessionaire default, the Leasehold Mortgagee is granted the opportunity to cure a concessionaire default, and is given the right to acquire the Concessionaire Interest, or to take possession of (the Turnpike) and manage the transportation facility.

What happens in the scenario in which there is insufficient toll revenues to service the debt used to finance the transaction? This could occur if projected levels of traffic fail to materialize; or if the concessionaire is overleveraged due to issuing too much debt, as opposed to equity, to finance the Rent; or if other events occur that lead to a mismatch between projected revenues and expenses. What happens?

First, the concession agreement allows a cure period after the notice of default which gives the concessionaire time to address the cause of the default. More importantly, however, the concession agreement also gives the Leasehold Mortgagee the opportunity to cure the default in the event the concessionaire is unable to do so. Too much money is at stake in these transactions for the Leasehold Mortgagee to allow the default to go uncured; the Leasehold Mortgagee would step in and operate the transportation facility, or it would appoint a successor (the “Successor”) corporation or affiliated entity to perform under the concession and lease agreement.

The Successor's first priority would be to pay operations and maintenance costs. The remaining cash flows would be divided by the various Corporate Bonds investors in accordance with the Financing Documents and to pay for required capital expenditures.

The operations model used in the Morgan Stanley report (see Section on the Morgan Stanley Report) estimates that the EBITDA margin for the Pennsylvania Turnpike was 58.9% in 2007, and will grow due to increasing tolls to 93.5% in 2064. Even if cash flows are insufficient to fully meet interest and principal on the concessionaire's loans, as long as the cash flows exceed operating and maintenance expense, it makes economic sense for the Successor to perform under the Concession and Lease Agreement and operate the Turnpike. The remaining cash flows would be divided among the various Corporate Bonds investors.

In contrast to Messrs. Gilroy et al, we believe that, *it is highly unlikely, even in the event of a default by the original concessionaire, that the result would be that "the state would essentially get the road for 'free,' and it could then re-concession the toll road or run it itself."* For bank lenders or Corporate Bonds investors, something is better than nothing.

### **Discounting and Monetizing the Act 44 Payment Stream**

Act 44 requires the Turnpike Commission to pay an aggregate amount of \$83.3 billion over 50 years pursuant to a specified schedule. What is the appropriate rate, from the Commonwealth's perspective, to discount this stream of payments, and what is its net present value, as compared to a concession payment?

#### **Act 44 and Net Present Value Schedule**

The present value of an asset, such as the Turnpike, is the total of all of the expected future cash flows of the Turnpike (in this case the expected turnpike tolls and other revenues) discounted to today's value at the appropriate discounting rate. The present value of the Turnpike is calculated using DCF Analysis as follows:

$$\textit{Present Value of Turnpike} = \textit{Sum of Discounted Expected Future Cash Flows}$$

It is important to note that the value of an asset, such as the Pennsylvania Turnpike, is very much dependent on **the expected future cash flows set by the tolling schedule and the discounting rate** used in the discounted cash flow analysis. All else equal, the higher the future tolling rates, the greater the present value of the Turnpike. The lower the discounting rate associated with the owner/operator of the Turnpike, the higher the present value of the Turnpike. If we assume that the future tolls levels and other revenues associated with the Pennsylvania Turnpike are set in stone, such as the Act 44 payments, for either a concessionaire or the Commission, *the value of the Turnpike will be highest for the owner/operator who has the lowest financing costs.*

Governor Edward G. Rendell signed Act 44 into law on July 18, 2007. Act 44 created a partnership between the Pennsylvania Department of Transportation ("PennDot") and the

PTC. The principal purpose of Act 44 is to provide funding for transportation infrastructure throughout the Commonwealth.

Act 44 requires that the PTC make payments of \$750 million, \$850 million, and \$900 million per year in the fiscal years ending in 2008, 2009, and 2010, respectively. After 2010, payments shall increase by 2.5% for each fiscal year. The Act 44 expected payments are shown in Exhibit 5 and total \$83.3 billion over the 50-year term ending in 2057. The PTC has made three quarterly payments to PennDot totaling \$521.4 million in fiscal year 2008—the most recent payment was on January 30, 2008.

Three different financing alternatives have been identified relating to the possible fate of the Turnpike enterprise.

- Alternative 1: Act 44 Monetization. This is the Act 44 legislatively-mandated payment stream from the PTC to PennDot over a 50 year period.
- Alternative 2: Corporate Lease. Assumes Turnpike is leased to for-profit company for one-time payment of the Rent.
- Alternative 3: Full Public Monetization. Turnpike operated by PTC itself, which makes a one-time payment, the Public Payment, to the Commonwealth.

While payments under the Act 44 Monetization are known and are over a 50-year period, the amount of the upfront Rent payment under the Corporate Lease, or the Public Payment under the Full Public Monetization depends upon the Turnpike's net operating cash flows--which now are unknown, and the term of the Lease--which also is unknown. Net operating cash flow is calculated by forecasting gross revenues and deducting estimated operating expenses.

Governor Rendell has stated that any Corporate Lease transaction would utilize a toll rate assumption similar to that used by the General Assembly in adopting the toll schedule (e.g., 3% per year in toll rate growth after an initial 25% increase in 2009) under Act 44. Accordingly, it is reasonable to assume that the Turnpike toll revenue profile would be similar under all three alternatives. Concerning expenses, the Report of the financial advisor to the Governor assumes *no operational cost savings* in having a concessionaire manage the Turnpike. We believe it is reasonable to assume that the Turnpike as an enterprise would generate similar net operating cash flows under either continued PTC management or a Corporate Lease.

It is unknown what Turnpike traffic growth and revenue projections would be used by a private concessionaire. However, the Commission's investment banker, Citigroup, did develop a set of pro-forma projections (the Citigroup Model) at the request of staff of the General Assembly. The Citigroup Model served as the basis for the General Assembly's determination of the Act 44 payment structure. Therefore, we use the payment envelope of Act 44 as a *proxy* for the net operating cash flow of the Turnpike enterprise, to determine financial value on a consistent basis across the 3 different alternatives.

It is the fixed Act 44 payment stream then that can be analyzed under the three alternative funding scenarios. Because payments under Alternative 1 are spread over 50 years versus

the upfront payments under Alternatives 2 and 3, it is necessary to discount this payment stream to arrive at a net present value for the Act 44 payments that are currently being paid by the PTC.

The Act 44 payments may be viewed as a promissory obligation from the Commission to the Commonwealth. In order to reflect the fact that the receipt of the Act 44 payments over time is dependent upon the credit worthiness of the Commission, the discount rate should be risk-adjusted. The best metric of credit risk is the PTC's current long-term debt rating of AA-/Aa3. Therefore, for Alternative 1, we use a discount rate of 4.5% to calculate the present value of the Act 44 payment stream.

### **An Apples to Apples Comparison of Present Values**

The following is an all else equal analysis that allows a valid comparison of calculating net present values for the Act 44 Monetization, the Corporate Lease, and the Full Public Monetization alternatives. In the example the net cash flows are set in stone, and the discount rates have been well-vetted and are reasonable. We don't try to confuse issues, create different cash flow streams, or use unrealistic reinvestment rates. We understand that any cash flows generated by the future toll formula for the Turnpike will not follow exactly the scheduled Act 44 payments that we are now going to discount. However, the result of this analysis will show the correct influence of the relative costs of capital on the present value of a known cash flow payment stream.

Under Alternative 1, we have taken the scheduled payments under Act 44 shown in Exhibit 5, and have discounted those cash flows at the PTC's borrowing cost of 4.5%. For the Corporate Lease, Alternative 2, the concessionaire's estimated weighted average cost of capital is 7.75% (See Relative Cost of Capital Section) based on a Baa/BBB corporate ratings for a highly levered transaction. For the Full Public Monetization of Alternative 3, the PTC's estimated bond yield is 5.23%, based on a Baa/BBB municipal rating for a highly levered transaction.

The present value of the scheduled Act 44 payments, discounted at the PTC's borrowing cost (Aa3/AA- rating) of 4.5% under the current Act 44 Monetization of the Turnpike, is **\$26.4 billion** (see Exhibit 5).

The present value of the scheduled Act 44 payments, discounted at the concessionaire's assumed weighted average cost of capital (Baa/BBB rating) of 7.75% under a Corporate Lease of the Turnpike, is **\$14.8 billion** (See Exhibit 6).

The present value of the scheduled Act 44 payments, discounted at the Commission's assumed 5.23% yield (Baa/BBB rating) on its municipal bonds in a Full Public Monetization of the Turnpike, is **\$22.8 billion**—significantly higher than the present value under a Corporate Lease of the Turnpike (See Exhibit 7).

The Municipal Efficiency Ratio (MER) is 154%. The toll increase equivalent (TIE) is approximately 71.5%. (See Appendix for description of MER and TIE). This means that

under a similar sized financing, the toll increase under a Full Public Monetization would only need to be approximately 71.5% as much as the toll increase associated with a Corporate Lease.

### ***A Note on Debt Service Coverage Ratios***

What effect does the required debt service coverage ratios have on these transactions?

No adjustments in the present value calculations have been made for debt service coverage ratios, which likely would reduce the amount of bonds that can be issued against the respective cash flow stream by both the concessionaire and the PTC. Morgan Stanley (Report dated May 24, 2007) notes that the minimum debt service coverage ratio for a public corporation structure (page 8) would be 1.3 times coverage. The financing documents relating to the outstanding debt of the PTC also have a 1.3 debt service coverage ratio.

A concessionaire also would have essentially what is a debt service coverage requirement on a Corporate Lease relating to the debt that is being issued to fund the upfront payment of the Rent. Morgan Stanley estimates that the debt service coverage ratio for a concession transaction (Report page 7) would be 1.5 times coverage. The Preliminary Offering Memorandum for the \$1.4 billion Skyway Concession Company LLC, pages 21 and 111, also cites a debt service coverage ratio of 1.5 times coverage.

A debt service coverage ratio effectively reduces the amount of bonds that a concessionaire or municipal entity can issue to match an expected future cash flow stream. The higher the debt service coverage ratio, the smaller the volume of bonds that can be issued and amortized by a given cash flow stream.

To keep the previous monetization analysis simple and to not unduly penalize the Corporate Lease alternative, we ignore the concept of debt service coverage ratios and discount the same expected net cash flows under the Act 44 Monetization, the Corporate Lease and the Full Public Monetization models.

### **The Lowest Cost of Capital**

On a purely financial decision making basis and given the same expected future toll revenue assumption, *the toll road operator with the lowest borrowing cost or lowest weighted average cost of capital should win every time.* The ability to issue tax-exempt municipal bonds gives a municipal issuer, such as the PTC, a significant advantage over a for-profit concessionaire.

## **Public Policy Factors in the Decision to Lease Turnpike**

What are the non-financial, public policy factors that should be considered in comparing Act 44 to a proposed concession agreement with a private entity, or to a public benefit

corporation; in particular what has been the effect on existing labor agreements, design-build contracts, and other employment considerations?

### **Non-Financial Implications of a Concession**

Most of the discussion in the paper has focused on the absolute and relative financial merits of a concession (including a 63-20 monetization) and Act 44. There are, however, important non-financial implications associated with these alternative funding mechanisms. Although difficult to quantify, identifying these impacts is critical to getting the public policy decision “right”.

One helpful way to look at these non-financial impacts is to determine how the various stakeholders are affected. These stakeholders are the Commonwealth, the users of the Turnpike, Turnpike employees, and “neighbors” of the Turnpike (i.e. residents and businesses who live on or near alternative routes). The impact on each of these stakeholders is directly related to how the Commonwealth would structure a concession.

### **Impact on Stakeholders**

#### ***The Commonwealth of Pennsylvania***

The non-financial impact on the Commonwealth is grounded in how a private operator would manage the Turnpike; a private concessionaire’s philosophical approach to the management of the Turnpike will be significantly different than that of the Turnpike Commission. A concessionaire will run the Turnpike with a singular eye on the financial bottom line. All decisions regarding investments, services, etc., to the extent not mandated in the concession agreement, will be evaluated by the concessionaire on the basis of the effect on profits or cash flow. If an investment or enhanced service will not improve the profitability of the concession, even though it may be of benefit to the Commonwealth as a whole (e.g. new interchanges to promote economic development, congestion mitigation strategies, etc.), the concessionaire is unlikely to make the decision to proceed unless incentivized in some way by the Commonwealth.

#### ***The Users of the Turnpike***

As a general statement, assuming the concession agreement for a Turnpike lease would resemble the Skyway and ITR agreements, it can be reasonably assumed that there will be no significant change for better or for worse in the operation of the Turnpike from the perspective of the user. Further, Turnpike users are unlikely to see any substantive difference in the “product,” i.e. the safety, comfort, convenience, aesthetics, etc., of the Turnpike under either the concession or Act 44 scenario.

Under both scenarios, however, tolls will increase continually over time. The Turnpike, under private management whose primary motivation is to maximize toll revenue, will likely see toll increases up to maximum allowed by the concession agreement. Act 44 does not establish maximum tolls, but instead requires that “tolls shall be fixed and

adjusted as to provide funds at least sufficient” to pay the operating and maintenance cost of the Turnpike, debt service, and payments to the Commonwealth mandated by Act 44. That being said, the Commission’s toll setting policy, based on history, will likely keep tolls at the lowest possible level that will satisfy its contractual obligations. Also, if there are surpluses under Act 44, these monies will stay in the public’s hands. (Under the Skyway and ITR concession agreements all surpluses are captured by the concessionaire.)

A concession transaction, in the absence of other mechanisms to fund the Commonwealth’s statewide transportation needs, places the incremental funding burden exclusively on the Turnpike users. Under Act 44, this burden is shared among the Turnpike users and I-80 users.

Finally, it can be argued that the current Turnpike toll rates are artificially low relative to the full costs of using the Turnpike. After a series of toll increases in excess of inflation (as shown in the Morgan Stanley analysis), toll rates will exceed costs and cross the line that divides a user fee (which by definition is a price that is paid to cover the costs of the service being used) from a tax (which has no basis in cost).

### ***Employees of the Turnpike***

The impact on the employees of the Turnpike is a function of the way the concession agreement is written, which in turn reflects whether the objective is to maximize the concession price or to protect workers. For example, the concession agreement could require the concessionaire to assume all existing employment and labor agreements or give the concessionaire a free hand.

The obligation or the ability of the concessionaire to do one or the other is a political decision to be made by the Commonwealth at the time the concession is structured. Presumably, this decision would turn on the strength of the employees as a group and the magnitude of the potential costs savings that would result if the concessionaire was not constrained. (Any cost savings theoretically would translate into a higher concession price. As shown in the Background section, a 10% reduction in operating costs would result in the concession price increasing by approximately \$600 million.)

### ***Neighbors of the Turnpike***

Higher tolls will either be borne by the users of the Turnpike, or discourage some portion of motorists from using the Turnpike. If the latter is the case, motorists will need to find alternative ways to get from point A to point B. If the alternative is public transit, carpooling, etc., a benefit may be enjoyed by the entire community.

If the alternative is an adjacent highway or secondary road, there may be a negative impact on the communities in which that road is located. The potential negative impact of traffic diverting onto secondary roads falls into several categories; safety, road maintenance costs and congestion. Peter Swan and Michael Belzer, in a recent paper,

state that “a substantial increase in crashes, crash severity, and fatalities...is likely as a result of this diversion. In 2002, 23% of all fatal crashes in the United States occurred on divided highways four lanes or wider, with the remainder on a mix of highways to those which traffic was diverted.” In the same paper, the authors state that diversion will cause higher maintenance costs on secondary roads with no offsetting revenue. Finally, placing more vehicles on secondary roads will contribute to congestion, the cost of which will be borne by all users.

Diversion of commercial (truck) traffic to a non-tolled I-80 also has implications in terms of the safety and comfort of the users of I-80, and economic impact on businesses at the eastern end of the state. For example, higher tolls on the Turnpike could discourage shippers from utilizing the Port of Philadelphia in favor of the Port of New York and New Jersey.

## Appendix

### Finance Terms, DCF and Monetization

This Appendix lays the groundwork to help the reader to understand the terms of finance and the math that is used in calculating present value and discounted cash flow.

#### Some Finance Terms Defined

Monetization, Discounted Cash Flow (DCF), Present Value (PV) and other esoteric finance terms are being referenced a lot these days in Harrisburg. Let's discuss what these terms mean and their implications for the citizens of the Commonwealth of Pennsylvania.

*Monetization* means to take a set of expected future cash payments, such as turnpike tolls generated from trucks and passenger cars, and to convert (or monetize) that payment stream into money today. This is how the PTC monetizes its stream of expected toll collections. The PTC uses its expected future cash flows from tolls and other revenues to act as a source of security for the tax-exempt bonds that it issues to pay for the extensions and improvements to the Turnpike.

*Discounted Cash Flow Analysis* is Wall Street's and Main Street's preferred method of valuing an investment. Using DCF Analysis, the value of any investment (stock, bond, mortgage, apartment complex, strip mall, turnpike) is equal to the present value of the asset's expected future cash flows, discounted (reduced) for the risk and timing of those cash flows. This DCF valuation relationship is a basic principle of finance.

*Expected future cash flows* are the most likely cash payments (tolls, interest payments, dividends, capital gain or loss) that you expect (not hope) to receive from an investment.

To *discount* means to multiply by a number less than 1.0 over a number of time periods.

The *discount rate* (or yield) that you should use in any valuation depends upon:

- the *timing* of the expected future cash flows,
- the *risks* associated with receiving the expected future cash flows,
- and in the case of an issuer of municipal bonds, the *tax status* of the cash flows received on the investment.

The discount rate should increase for securities with a greater default risk (Enron bonds) and decrease for securities with a lower default risk (US Treasury Bonds). The discount rate should also decrease for securities that have a tax-exemption from Federal income tax (municipal bonds issued by the Commission) when compared to the discount rate associated with corporate bonds (bonds issued by the concessionaire) that do not have that valuable tax exemption.

Similar to the discount rate, the *discount factor* takes into account both the discounting rate and the timing of the expected cash flow. For example, the discount factor for a cash flow expected to be received 1-year in the future, with a discount rate of 6%, is simply equal to (1.0) divided by (1.06) which in equation form looks like this:  $1/(1.06) = 0.9434$ . The discount factor for a 2-year cash flow, with a discount rate also of 6%, is equal to one divided by (1.06) = 0.9434, that amount divided again by (1.06) =  $0.9434/(1.06) = 0.8900$ . This process for a 3-year cash flow continues with a third division by (1.06). And so on, ad infinitum. The discount factor decreases with increasing time to the payment of a cash flow and decreases with an increasing discount rate.

*Present Value (PV)* is the value of an investment—what it is worth today! PV is found by taking the sum of the investment's expected cash flows multiplied by their respective discount factors. For example, using a 6% discount rate, a discount factor of (0.9434), and an expected \$100 cash flow in 1 year, the present value of that cash flow would be \$100 times (0.9434):  $\$100 * (0.9434) = \$94.34$ . Using a 6% discount rate, a \$100 cash flow expected in 2 years, and a discount factor of (0.8900), the present value of that cash flow would be:  $\$100 * (0.8900) = \$89.00$ . The value of an investment is the sum of the present values of all of the expected cash flows. The present value of the two cash flows described above is:  $PV = \$94.34 + \$89.00 = \$183.34$ .

### A Simple \$100 Cash Flow Monetization Example

To keep things simple we assume annual compounding, and we also assume that the Pennsylvania Turnpike increases its tolls, in total, by \$100 per year for three (3) years. The operator of the Turnpike can monetize the \$100 per year toll increase by borrowing against it at the operator's relevant discounting rate. Under a Corporate Lease, the relevant discounting rate is the concessionaire's weighted average cost of capital, e.g. 7.75%. For the PTC under a Full Public Monetization, the relevant discounting rate is its cost of borrowing in the tax-exempt bond market, e.g. 5.23%.

### *The Municipal Debt Service and Monetization Schedule*

So let's assume that the PTC issues tax-exempt municipal bonds under a Full Public Monetization that are secured by that 3-year, \$100 stream at a Baa/BBB yield or discounting rate of 5.23% (again using annual compounding). What amount of bonds can the PTC sell at 5.23% against that \$100/year, 3-year stream, and how would those bonds be fully amortized over the same 3-year period. The results are shown in Table 8.

**Table 8**  
**Municipal Debt Service and Monetization Schedule: Interest Rate = 5.23%**

Period	Cash Flow	Discount		Payment	Interest	Principal	Remaining Balance
		Factor	DCF				
1	\$ 100	0.9503	\$ 95.03	\$ 100	\$ 14.18	\$ 85.82	\$ 185.34
2	\$ 100	0.9031	\$ 90.31	\$ 100	\$ 9.69	\$ 90.31	\$ 95.03
3	\$ 100	0.8582	\$ 85.82	\$ 100	\$ 4.97	\$ 95.03	\$ -
Totals	\$ 300	2.7116	\$ 271.16	\$ 300	\$ 28.84	\$ 271.16	

The left side of the schedule shows the \$100/year payment over the three-year period, and the discount factors relating to a 5.23% discounting rate for the three year period. Remember that the discount factor for period 1 is equal to  $1/(1+.0523)=0.9503$ . The discount factor for period 2 is equal to the discount factor for period 1, again divided by  $(1 + \text{the discount rate})$ ; which is equal to:  $0.9503/(1+.0523)=0.9031$ . The discount factor for period 3 is equal to the discount factor for period 2,  $(0.9031)$ , again divided by  $(1 + .0523)=(0.9031)/(1.0523)=0.8582$ . We then multiply the relevant discount factor times its expected cash flow during the period—in each of the 3 periods equal to \$100. Then we add all of the discounted cash flows to find that the PTC could monetize **\$271.16 in bonds** to be sold against the \$300 in expected future cash flows using a discounting rate of 5.23%.

The right side of the schedule shows how the \$271.16 in bonds would be fully amortized over the three-year period. As the \$100 is received at the end of year 1, the Commission would pay \$14.18 in interest (equal to  $5.23\% * \$271.16$ ) and the remaining \$85.82 would be used to retire principal, leaving \$185.34 outstanding. The \$100 received at the end of the second year would first pay the \$9.69 in interest (equal to  $5.23\% * 185.34$ ) and the remaining \$90.31 would be used to retire bonds leaving \$95.03 outstanding. The third \$100 payment would pay \$4.97 in interest and the remaining amount would retire the \$95.03 in outstanding bonds.

### *The Concessionaire's Debt Service and Monetization Schedule*

Let's now assume that a concessionaire has a 3-year Corporate Lease on the Turnpike and the concessionaire capitalizes itself by selling a combination of 3-year debt and equity that has a WACC of 7.75%, again using annual compounding against the 3-year, \$100 toll stream. What amount of debt and equity can the concessionaire sell at 7.75% against that \$100/year, 3-year stream, and how would it be amortized over the same 3-year period? The results are shown in Table 9.

**Table 9**  
**Concession Debt Service and Monetization Schedule: WACC = 7.75%**

Period	Cash Flow	Discount		Payment	Interest	Principal	Remaining Balance
		Factor	DCF				
1	\$ 100	0.9281	\$ 92.81	\$ 100	\$ 20.06	\$ 79.94	\$ 178.94
2	\$ 100	0.8613	\$ 86.13	\$ 100	\$ 13.87	\$ 86.13	\$ 92.81
3	\$ 100	0.7994	\$ 79.94	\$ 100	\$ 7.19	\$ 92.81	\$ -
Totals	\$ 300	2.5888	\$ 258.88	\$ 300	\$ 41.12	\$ 258.88	

As in the previous table, the left side of the schedule shows the \$100/year payment over the three-year period but the discount factors now relate to a 7.75% discounting rate. Now the discount factor for period 1 is equal to  $1/(1+.0775)=0.9281$ , significantly lower than the discount factor associated with a 5.23% tax-exempt discount rate. The discount factors for periods 2 and 3 are calculated similarly to what we previously have discussed. However, because the discounting rate in the Corporate Lease example is greater than in the Full Public Monetization example, the discount factors are smaller.

Under the Corporate Lease the concessionaire could monetize **\$258.88 in debt and equity** to be sold against the \$300 in expected future cash flows using a discounting rate of 7.75%. So using a simple example, and based solely on the relative difference in discounting rates, *the Full Public Monetization example outperforms the Corporate Lease example with an identical toll revenue stream by its ability to issue and amortize 4.74% more (271.16/258.88=1.0474) in bonds than the concessionaire could amortize in debt and equity.*

**Corporate Versus Municipal Efficiency Schedules for 30, 55, 75 and 99 Years**

The Skyway transaction has a life of 99 years. The ITR transaction has a life of 75 years. Some concessionaires have stated that concessions of 55 years or longer are more valuable because the benefits of tax ownership pass to the concessionaire who can then deduct the depreciation cash flows of the transaction. This prompts a question. Does the relationship above, where a Full Public Monetization outperforms a Corporate Lease over a three (3) year period, hold for very long-term concession and lease agreements?

**Table 10**

**Corporate versus Municipal Monetization and Efficiency Schedules for 30, 55, 75 and 99 Years**

No. of Years	Cash Flow Per Period	Corporate Discount Rate	Corporate Discount Factor	Corporate Discounted Cash Flow	Municipal Discount Rate	Municipal Discount Factor	Municipal Discounted Cash Flow	Municipal Efficiency Ratio	Toll Increases Equiv
30	\$ 100	7.75%	\$11.53	\$1,153	5.23%	\$14.98	\$1,498	130%	76.97%
55	\$ 100	7.75%	\$12.69	\$1,269	5.23%	\$17.96	\$1,796	142%	70.65%
75	\$ 100	7.75%	\$12.86	\$1,286	5.23%	\$18.70	\$1,870	145%	68.74%
99	\$ 100	7.75%	\$12.90	\$1,290	5.23%	\$19.00	\$1,900	147%	67.88%

In the above schedule we summarize the results of monetizing future tolls for both the Corporate Lease and the Full Public Monetization models for four time horizons—30, 55, 75 and 99 years. Again, we try to keep it simple and assume annual compounding and a toll hike of \$100 in total tolls per year. We determine how much capital we could monetize on a Corporate Lease basis using a weighted average cost of capital of 7.75%, and how much debt we could monetize on a Full Public Monetization basis using a 5.23% discounting rate.

The difference in the numbers is significant!

The two columns on the extreme right side of Table 10 merit close attention. We find that as the term of the project lengthens, a Full Public Monetization increasingly outperforms the Corporate Lease model. We have developed the *Municipal Efficiency Ratio* (MER) which is calculated by dividing the total discounted cash flows generated by a Full Public Monetization, by the total discounted cash flows generated by a concession or Corporate Lease model.

The MER ratio shows how much more or less money that a Full Public Monetization will raise in a transaction versus a Corporate Lease. If the ratio is greater than 100%, then a public monetization outperforms the concession. If the ratio is less than 100%, the converse is true. This ratio is dependent on absolute differences in cost of capital, cash flow patterns, and the term of concession. In our simple example the MER ratio measures 130% for the 30-year transaction and increases to 147% for the 99-year transaction.

Another way to measure the efficiency of a Full Public Monetization versus a Corporate Lease is to determine the relative percentage amounts by which each transaction will raise future toll rates given the same amount of financing. In the table above, we examine the *Toll Increase Equivalent (TIE)*. This measure shows whether a Full Public Monetization or a Corporate Lease will result in a lower toll increase and by what percentage. The TIE measure is shown in the last column in Table 9. For example, in a 75-year financing and assuming a comparable amount of funds raised, a Full Public Monetization will be amortized by tolls—have a TIE—that is only 68.7% as high as the tolls required to amortize a Corporate Lease. For a 50-year time horizon such as under the Act 44 Monetization, and based on a 7.75% WACC versus a 5.23% municipal bond rate, the TIE would be approximately 71.5%.

## **List of Exhibits**

**Exhibit 1: Tax-Exempt Muni Market Data Curve and PA Turnpike Insured vs AA-/Aa3 Uninsured Scale: February 1, 2008**

**Exhibit 2: Section 808 of the Constitution of Pennsylvania**

**Exhibit 3: Morgan Stanley Tax-Exempt Securities/Swap Weekly Rate Guide: February 4, 2008**

**Exhibit 4-A: Centre Daily Times Article Relating to Legislative Redirection**

**Exhibit 4-B: Governor's Notice of Veto of House Bill 471**

**Exhibit 5: Required Payments Under Act 44 Discount Rate of 4.50%**

**Exhibit 6: Required Payments Under Act 44 Discount Rate of 7.75%**

**Exhibit 7: Required Payments Under Act 44 Discount Rate of 5.23%**

**Exhibit 8: Debt Service and Monetization Schedules: 5.23% Municipal Rate versus 7.75% Corporate WACC**

**Exhibit 1**  
**Tax-Exempt Muni Market Data Curve and**  
**PA Turnpike Insured vs AA-/Aa3 Uninsured Scale**  
**February 1, 2008**

Maturity	MMD	Call Date	Scale 1: Tax-Exempt & FSA Insured		Scale 2: Tax-Exempt & Uninsured	
			Coupon	Yield	Coupon	Yield
12/1/2009	1.900%	-	4.000%	1.95%	4.000%	1.97%
12/1/2010	2.200%	-	4.250%	2.28%	4.250%	2.30%
12/1/2011	2.350%	-	4.500%	2.45%	4.500%	2.48%
12/1/2012	2.530%	-	4.500%	2.65%	4.500%	2.68%
12/1/2013	2.710%	-	5.000%	2.85%	5.000%	2.89%
12/1/2014	2.840%	-	5.000%	2.99%	5.000%	3.03%
12/1/2015	2.970%	-	5.000%	3.13%	5.000%	3.18%
12/1/2016	3.110%	-	5.000%	3.28%	5.000%	3.34%
12/1/2017	3.230%	-	5.000%	3.41%	5.000%	3.47%
12/1/2018	3.360%	-	5.000%	3.55%	5.000%	3.61%
12/1/2019	3.480%	12/01/2018	5.000%	3.68%	5.000%	3.75%
12/1/2020	3.600%	12/01/2018	5.000%	3.80%	5.000%	3.87%
12/1/2021	3.710%	12/01/2018	5.000%	3.91%	5.000%	3.98%
12/1/2022	3.820%	12/01/2018	5.000%	4.02%	5.000%	4.09%
12/1/2023	3.910%	12/01/2018	5.000%	4.11%	5.000%	4.18%
12/1/2024	3.990%	12/01/2018	5.000%	4.19%	5.000%	4.26%
12/1/2025	4.060%	12/01/2018	5.000%	4.26%	5.000%	4.33%
12/1/2026	4.130%	12/01/2018	5.000%	4.33%	5.000%	4.40%
12/1/2027	4.180%	12/01/2018	5.000%	4.38%	5.000%	4.45%
12/1/2028	4.230%	12/01/2018	5.000%	4.43%	5.000%	4.50%
12/1/2029	4.280%	12/01/2018				
12/1/2030	4.300%	12/01/2018				
12/1/2031	4.320%	12/01/2018				
12/1/2032	4.330%	12/01/2018				
12/1/2033	4.340%	12/01/2018	5.000%	4.54%	5.000%	4.60%
12/1/2034	4.350%	12/01/2018				
12/1/2035	4.350%	12/01/2018				
12/1/2036	4.350%	12/01/2018				
12/1/2037	4.360%	12/01/2018				
12/1/2038	4.360%	12/01/2018	5.000%	4.56%	5.000%	4.61%

**Exhibit 2**  
**Section 808 of the Constitution of Pennsylvania**

Section 808 - CONSTITUTION OF PENNSYLVANIA

Page 1 of 1

**§ 8. Commonwealth credit not to be pledged.**

The credit of the Commonwealth shall not be pledged or loaned to any individual, company, corporation or association nor shall the Commonwealth become a joint owner or stockholder in any company, corporation or association.  
(Apr. 23, 1968, P.L.App.5, Prop. No.3)

**1968 Amendment.** Proposal No.3 amended and renumbered former section 6 to present section 8.

**Prior Provisions.** Former section 8 was repealed by amendment of April 23, 1968, P.L.App.11, Prop. No.6.

### Exhibit 3 Morgan Stanley Tax-Exempt Securities/Swap Weekly Rate Guide February 4, 2008

Morgan Stanley

MUNICIPAL CAPITAL MARKETS

February 4, 2008

Weekly (25-Jan to 1-Feb)

NORTH AMERICA

#### Municipal Financial Products Update

Capital Markets Curves						Basis Swaps			Synthetic Fixed Rate						Synthetic Floating Rate			
Term	AAA MMD	MMD-SIFMA Spread	UST	M2 Paye % LIBOR	Week Change	Term	Insured Muni	SIFMA Swap*	SIFMA Savings**	67% LIBOR Swap*	67% LIBOR Swap Savings**	Term	Insured Muni	Issuer	All-in Cost			
1	1.85%	-0.34%	2.13%	75.33%	-0.74%	1	1.90%	2.54%	-0.64%	2.18%	-0.28%	1	1.90%	2.05%	SIFMA - 19 bp			
3	2.35%	-0.03%	2.12%	75.21%	-0.89%	3	2.48%	2.73%	-0.27%	2.38%	0.10%	3	2.45%	2.28%	SIFMA - 16 bp			
5	2.68%	-0.03%	2.75%	74.59%	-0.43%	5	2.82%	3.06%	-0.24%	2.57%	0.15%	5	2.82%	2.61%	SIFMA - 21 bp			
7	3.94%	-0.02%	3.05%	74.10%	-0.66%	7	3.11%	3.31%	-0.20%	2.82%	0.15%	7	3.11%	2.86%	SIFMA - 25 bp			
10	3.35%	0.12%	3.60%	73.95%	-0.72%	10	3.54%	3.58%	-0.04%	3.16%	0.38%	10	3.54%	3.13%	SIFMA - 41 bp			
15	3.88%	0.37%	3.78%	74.44%	-0.53%	15	4.08%	3.86%	0.22%	3.40%	0.68%	15	4.08%	3.41%	SIFMA - 67 bp			
20	4.16%	0.52%	3.96%	75.50%	-0.53%	20	4.39%	4.01%	0.37%	3.45%	0.89%	20	4.35%	3.56%	SIFMA - 82 bp			
30	4.25%	0.53%	4.32%	76.53%	-0.54%	30	4.48%	4.11%	0.37%	3.53%	0.95%	30	4.48%	3.66%	SIFMA - 82 bp			

\* As compared to Insured MMD; \*\* Assumes 25bp of receipt costs for underlying issues

Weekly Change						Short-Term Indices				Averages	
Term	AAA MMD	SIFMA Swap	67% LIBOR	MMD-SIFMA	UST	SIFMA Spot	Change	52 Wk High/Low	3 Month	1 Year	
1	-0.15%	-0.09%	-0.05%	-0.05%	-0.21%	2.20%	-0.55%	3.55% / 2.20%	3.15%	3.66%	
3	0.05%	-0.04%	-0.02%	0.05%	-0.11%	3.14%	-0.17%	5.82% / 3.14%	4.53%	5.12%	
5	0.00%	-0.00%	0.01%	0.00%	-0.04%	3.10%	-0.21%	5.73% / 3.10%	4.58%	5.17%	
7	0.02%	0.00%	0.03%	0.02%	-0.01%						
10	0.07%	0.01%	0.04%	0.05%	0.02%						
15	0.05%	0.02%	0.04%	0.05%	0.03%						
20	0.05%	0.02%	0.04%	0.04%	0.03%						
30	0.01%	0.02%	0.04%	-0.01%	0.04%						

**Commentary**

The Treasury curve steepened to another new high since late 2004 over the past week on good front-end gains and modest back-end losses. The Fed acquiesced to market demands for a more aggressive 50 bp rate cut to 3.00% on top of the 75 bp intermeeting move a week ago, views on the financial stability of the bond insurers swung around quite a bit, and the key employment report was significantly weaker than expected. The Ratio market exhibited significant volatility and SIFMA reset 56 bp lower at 2.20%.

**Swap Rates vs. AAA MMD**

**Reinvestment Products**

Term	Debt Service Reserve Fund			Project Fund		
	A-1/P-1	CP	Investment	Average	Investment	Repo
5	3.15%	3.35%	3.00%	1	2.72%	2.17%
10	3.90%	4.08%	3.73%	2	2.76%	2.31%
20	4.42%	4.52%	4.27%	3	2.99%	2.64%
30	4.53%	4.53%	4.33%	5	3.42%	3.15%

\* Inclusions may vary with bid specifics

**Credit Ratings**

	Senior Debt	Commercial Paper	MSFAI
Standard & Poors	AA-	A-1+	AA
Moody's Investor	Aa3	P-1	Aa2
Fitch IBCA, Inc	AA-	F1+	NR

Exhibit 4-A  
Article Relating to Legislative Redirection  
Centre Daily Times, November 29, 2007

# Rendell pulls penny request on gas sales

By Marc Levy  
The Associated Press

HARRISBURG — Gov. Ed Rendell on Wednesday said his administration would withdraw a request that could have added a penny onto the cost of a gallon of gas in Pennsylvania to help clean up damage from leaking underground fuel tanks.

The state Department of Insurance sought regulatory approval for the higher fee after the board of the Underground Storage Tank Indemnification Fund voted for it as a way to keep the fund solvent. The board voted in September, prompted by a state consultant's projection that the fund would run out of cash in 2015 and reach a deficit of \$1 billion shortly after that.

But Rendell said in a statement Wednesday that he had only just learned about the proposed fee increase from news accounts, and he called the price of gas high enough right now.

"While I appreciate the



Rendell

board's intent to ensure the solvency of the fund, given the cost of gas at the pump and the fact that there is no in-

solvency issue confronting the fund in the short term, I think the action was ill-advised," Rendell wrote in the statement.

In a story Tuesday, The Associated Press reported on the pending request to almost double the fee to 2 cents a gallon. The proposal by the fund's board called for boosting the fee from the current rate of 1.1 cents per gallon.

Adding to the fund's financial uncertainty is the fact that, in 2002, legislators and then-Gov. Mark S. Schweiker borrowed \$100 million from the fund to plug a hole in the state budget. Less than a third of that amount has been repaid.

**Exhibit 4-B**  
**Governor's Notice of Veto of House Bill 471**

**THE GOVERNOR**

**Notice of Veto**

November 29, 2006

To the Honorable, the House of Representatives  
of the Commonwealth of Pennsylvania:

I am returning House Bill 471 without my approval. I regret doing so as there are provisions in the bill—the continuing education requirements for renewal of licenses for volunteer health services and the extension of the application and expiration date for the Merchant Marine World War II bonus—that I do support.

However, this bill, which amends The Administrative Code of 1929, places unreasonable and unnecessary restrictions on the transfer of appropriations and on inter-fund transfers and loans that are just not good policy. The General Assembly in several statutes has already recognized the need for this flexibility and the Pennsylvania Constitution acknowledges that loans from the Motor License Fund may be necessary from time to time.

The provisions of House Bill 471 that seek to limit transfers between appropriations are especially troubling. The Executive Branch is charged with the day-to-day operation of state government. To carry out that charge effectively, and to do so in a timely manner, it is from time to time necessary to transfer appropriated funds between agencies so long as the original purpose of the appropriation is adhered to. For example, it may be more efficient and cost effective for a department or agency to help administer a program that initially was the responsibility of a different department or agency. Losing that flexibility could result in the delay or denial of the delivery of services to our citizens.

In addition, the requirement in the bill that transfers must be approved by the Attorney General would unnecessarily complicate the efficient administration of state government even further—for example, it would significantly impair the process established in The Fiscal Code that allows for the transfer of funds between several Department of Public Welfare appropriations to provide child care for low income families. These families are not in a position to suffer the delay in payments that this requirement could cause.

For these reasons I must withhold my signature from House Bill 471.



*Governor*

**Exhibit 5  
Required Payments Under Act 44  
Discount Rate of 4.50%**

Post-2010 Payment Growth Factor: 2.50%				
Discount Rate for Cash Flows: 4.50%				
<b>Present Value of Total Assistance to PennDOT: \$26,405,575,728</b>				
	<b>Highway Share 55.6%</b>	<b>Transit Share 44.4%</b>		
<b>Fiscal Year</b>	<b>Roads and Bridges</b>	<b>Transit</b>	<b>Total</b>	<b>PV</b>
2008	\$ 450,000,000	\$ 300,000,000	\$ 750,000,000	\$ 717,703,349
2009	500,000,000	350,000,000	850,000,000	778,370,459
2010	500,000,000	400,000,000	900,000,000	788,666,944
2011	512,500,000	410,000,000	922,500,000	773,572,839
2012	525,312,500	420,250,000	945,562,500	758,767,618
2013	538,445,313	430,756,250	969,201,563	744,245,749
2014	551,906,445	441,525,156	993,431,602	730,001,812
2015	565,704,106	452,563,285	1,018,267,392	716,030,485
2016	579,846,709	463,877,367	1,043,724,076	702,326,552
2017	594,342,877	475,474,301	1,069,817,178	688,884,896
2018	609,201,449	487,361,159	1,096,562,608	675,700,496
2019	624,431,485	499,545,188	1,123,976,673	662,768,429
2020	640,042,272	512,033,818	1,152,076,090	650,083,866
2021	656,043,329	524,834,663	1,180,877,992	637,642,069
2022	672,444,412	537,955,530	1,210,399,942	625,438,393
2023	689,255,522	551,404,418	1,240,659,940	613,468,281
2024	706,486,910	565,189,528	1,271,676,439	601,727,261
2025	724,149,083	579,319,267	1,303,468,350	590,210,950
2026	742,252,810	593,802,248	1,336,055,059	578,915,046
2027	760,809,131	608,647,304	1,369,456,435	567,835,332
2028	779,829,359	623,863,487	1,403,692,846	556,967,671
2029	799,325,093	639,460,074	1,438,785,167	546,308,002
2030	819,308,220	655,446,576	1,474,754,796	535,852,347
2031	839,790,926	671,832,741	1,511,623,666	525,596,799
2032	860,785,699	688,628,559	1,549,414,258	515,537,531
2033	882,305,341	705,844,273	1,588,149,614	505,670,784
2034	904,362,975	723,490,380	1,627,853,355	495,992,874
2035	926,972,049	741,577,639	1,668,549,688	486,500,187
2036	950,146,350	760,117,080	1,710,263,431	477,189,179
2037	973,900,009	779,120,007	1,753,020,016	468,056,372
2038	998,247,509	798,598,008	1,796,845,517	459,098,355
2039	1,023,203,697	818,562,958	1,841,766,655	450,311,784
2040	1,048,783,790	839,027,032	1,887,810,821	441,693,376
2041	1,075,003,384	860,002,707	1,935,006,092	433,239,914
2042	1,101,878,469	881,502,775	1,983,381,244	424,948,241
2043	1,129,425,431	903,540,344	2,032,965,775	416,815,261
2044	1,157,661,066	926,128,853	2,083,789,919	408,837,935
2045	1,186,602,593	949,282,074	2,135,884,667	401,013,286
2046	1,216,267,658	973,014,126	2,189,281,784	393,338,390
2047	1,246,674,349	997,339,479	2,244,013,829	385,810,383
2048	1,277,841,208	1,022,272,966	2,300,114,174	378,426,452
2049	1,309,787,238	1,047,829,791	2,357,617,029	371,183,841
2050	1,342,531,919	1,074,025,535	2,416,557,455	364,079,844
2051	1,376,095,217	1,100,876,174	2,476,971,391	357,111,808
2052	1,410,497,598	1,128,398,078	2,538,895,676	350,277,133
2053	1,445,760,038	1,156,608,030	2,602,368,068	343,573,264
2054	1,481,904,038	1,185,523,231	2,667,427,269	336,997,699
2055	1,518,951,639	1,215,161,312	2,734,112,951	330,547,982
2056	1,556,925,430	1,245,540,344	2,802,465,775	324,221,705
2057	1,595,848,566	1,276,678,853	2,872,527,419	318,016,505
<b>TOTAL</b>	<b>\$ 46,379,791,214</b>	<b>\$ 36,993,832,971</b>	<b>\$ 83,373,624,185</b>	<b>\$ 26,405,575,728</b>

**Exhibit 6  
Required Payments Under Act 44  
Discount Rate of 7.75%**

Post-2010 Payment Growth Factor: 2.50%				
Discount Rate for Cash Flows: 7.75%				
<b>Present Value of Total Assistance to PennDOT: \$14,851,039,750</b>				
	<b>Highway Share 55.6%</b>	<b>Transit Share 44.4%</b>		
<b>Fiscal Year</b>	<b>Roads and Bridges</b>	<b>Transit</b>	<b>Total</b>	<b>PV</b>
2008	\$ 450,000,000	\$ 300,000,000	\$ 750,000,000	\$ 696,055,684
2009	500,000,000	350,000,000	850,000,000	732,123,535
2010	500,000,000	400,000,000	900,000,000	719,433,527
2011	512,500,000	410,000,000	922,500,000	684,379,921
2012	525,312,500	420,250,000	945,562,500	651,034,264
2013	538,445,313	430,756,250	969,201,563	619,313,337
2014	551,906,445	441,525,156	993,431,602	589,137,977
2015	565,704,106	452,563,285	1,018,267,392	560,432,878
2016	579,846,709	463,877,367	1,043,724,076	533,126,404
2017	594,342,877	475,474,301	1,069,817,178	507,150,408
2018	609,201,449	487,361,159	1,096,562,608	482,440,063
2019	624,431,485	499,545,188	1,123,976,673	458,933,703
2020	640,042,272	512,033,818	1,152,076,090	436,572,664
2021	656,043,329	524,834,663	1,180,877,992	415,301,142
2022	672,444,412	537,955,530	1,210,399,942	395,066,051
2023	689,255,522	551,404,418	1,240,659,940	375,816,893
2024	706,486,910	565,189,528	1,271,676,439	357,505,629
2025	724,149,083	579,319,267	1,303,468,350	340,086,562
2026	742,252,810	593,802,248	1,336,055,059	323,516,219
2027	760,809,131	608,647,304	1,369,456,435	307,753,248
2028	779,829,359	623,863,487	1,403,692,846	292,758,310
2029	799,325,093	639,460,074	1,438,785,167	278,493,984
2030	819,308,220	655,446,576	1,474,754,796	264,924,671
2031	839,790,926	671,832,741	1,511,623,666	252,016,509
2032	860,785,699	688,628,559	1,549,414,258	239,737,282
2033	882,305,341	705,844,273	1,588,149,614	228,056,347
2034	904,362,975	723,490,380	1,627,853,355	216,944,553
2035	926,972,049	741,577,639	1,668,549,688	206,374,169
2036	950,146,350	760,117,080	1,710,263,431	196,318,815
2037	973,900,009	779,120,007	1,753,020,016	186,753,397
2038	998,247,509	798,598,008	1,796,845,517	177,654,043
2039	1,023,203,697	818,562,958	1,841,766,655	168,998,046
2040	1,048,783,790	839,027,032	1,887,810,821	160,763,802
2041	1,075,003,384	860,002,707	1,935,006,092	152,930,763
2042	1,101,878,469	881,502,775	1,983,381,244	145,479,380
2043	1,129,425,431	903,540,344	2,032,965,775	138,391,058
2044	1,157,661,066	926,128,853	2,083,789,919	131,648,106
2045	1,186,602,593	949,282,074	2,135,884,667	125,233,697
2046	1,216,267,658	973,014,126	2,189,281,784	119,131,823
2047	1,246,674,349	997,339,479	2,244,013,829	113,327,257
2048	1,277,841,208	1,022,272,966	2,300,114,174	107,805,511
2049	1,309,787,238	1,047,829,791	2,357,617,029	102,552,806
2050	1,342,531,919	1,074,025,535	2,416,557,455	97,556,034
2051	1,376,095,217	1,100,876,174	2,476,971,391	92,802,724
2052	1,410,497,598	1,128,398,078	2,538,895,676	88,281,013
2053	1,445,760,038	1,156,608,030	2,602,368,068	83,979,618
2054	1,481,904,038	1,185,523,231	2,667,427,269	79,887,804
2055	1,518,951,639	1,215,161,312	2,734,112,951	75,995,359
2056	1,556,925,430	1,245,540,344	2,802,465,775	72,292,568
2057	1,595,848,566	1,276,678,853	2,872,527,419	68,770,193
<b>TOTAL</b>	<b>\$ 46,379,791,214</b>	<b>\$ 36,993,832,971</b>	<b>\$ 83,373,624,185</b>	<b>\$ 14,851,039,750</b>

**Exhibit 7  
Required Payments Under Act 44  
Discount Rate of 5.23%**

Post-2010 Payment Growth Factor: 2.50%				
Discount Rate for Cash Flows: 5.23%				
<b>Present Value of Total Assistance to PennDOT: \$22,821,458,603</b>				
	<b>Highway Share 55.6%</b>	<b>Transit Share 44.4%</b>		
<b>Fiscal Year</b>	<b>Roads and Bridges</b>	<b>Transit</b>	<b>Total</b>	<b>PV</b>
2008	\$ 450,000,000	\$ 300,000,000	\$ 750,000,000	\$ 712,724,508
2009	500,000,000	350,000,000	850,000,000	767,608,517
2010	500,000,000	400,000,000	900,000,000	772,367,157
2011	512,500,000	410,000,000	922,500,000	752,329,503
2012	525,312,500	420,250,000	945,562,500	732,811,689
2013	538,445,313	430,756,250	969,201,563	713,800,229
2014	551,906,445	441,525,156	993,431,602	695,281,987
2015	565,704,106	452,563,285	1,018,267,392	677,244,167
2016	579,846,709	463,877,367	1,043,724,076	659,674,305
2017	594,342,877	475,474,301	1,069,817,178	642,560,261
2018	609,201,449	487,361,159	1,096,562,608	625,890,210
2019	624,431,485	499,545,188	1,123,976,673	609,652,632
2020	640,042,272	512,033,818	1,152,076,090	593,836,309
2021	656,043,329	524,834,663	1,180,877,992	578,430,311
2022	672,444,412	537,955,530	1,210,399,942	563,423,994
2023	689,255,522	551,404,418	1,240,659,940	548,806,989
2024	706,486,910	565,189,528	1,271,676,439	534,569,195
2025	724,149,083	579,319,267	1,303,468,350	520,700,774
2026	742,252,810	593,802,248	1,336,055,059	507,192,144
2027	760,809,131	608,647,304	1,369,456,435	494,033,971
2028	779,829,359	623,863,487	1,403,692,846	481,217,163
2029	799,325,093	639,460,074	1,438,785,167	468,732,863
2030	819,308,220	655,446,576	1,474,754,796	456,572,446
2031	839,790,926	671,832,741	1,511,623,666	444,727,508
2032	860,785,699	688,628,559	1,549,414,258	433,189,866
2033	882,305,341	705,844,273	1,588,149,614	421,951,547
2034	904,362,975	723,490,380	1,627,853,355	411,004,785
2035	926,972,049	741,577,639	1,668,549,688	400,342,017
2036	950,146,350	760,117,080	1,710,263,431	389,955,875
2037	973,900,009	779,120,007	1,753,020,016	379,839,183
2038	998,247,509	798,598,008	1,796,845,517	369,984,950
2039	1,023,203,697	818,562,958	1,841,766,655	360,386,366
2040	1,048,783,790	839,027,032	1,887,810,821	351,036,801
2041	1,075,003,384	860,002,707	1,935,006,092	341,929,793
2042	1,101,878,469	881,502,775	1,983,381,244	333,059,049
2043	1,129,425,431	903,540,344	2,032,965,775	324,418,441
2044	1,157,661,066	926,128,853	2,083,789,919	316,001,998
2045	1,186,602,593	949,282,074	2,135,884,667	307,803,903
2046	1,216,267,658	973,014,126	2,189,281,784	299,818,494
2047	1,246,674,349	997,339,479	2,244,013,829	292,040,251
2048	1,277,841,208	1,022,272,966	2,300,114,174	284,463,800
2049	1,309,787,238	1,047,829,791	2,357,617,029	277,083,907
2050	1,342,531,919	1,074,025,535	2,416,557,455	269,895,472
2051	1,376,095,217	1,100,876,174	2,476,971,391	262,893,527
2052	1,410,497,598	1,128,398,078	2,538,895,676	256,073,235
2053	1,445,760,038	1,156,608,030	2,602,368,068	249,429,883
2054	1,481,904,038	1,185,523,231	2,667,427,269	242,958,881
2055	1,518,951,639	1,215,161,312	2,734,112,951	236,655,757
2056	1,556,925,430	1,245,540,344	2,802,465,775	230,516,156
2057	1,595,848,566	1,276,678,853	2,872,527,419	224,535,835
<b>TOTAL</b>	<b>\$ 46,379,791,214</b>	<b>\$ 36,993,832,971</b>	<b>\$ 83,373,624,185</b>	<b>\$ 22,821,458,603</b>

**Exhibit 8**  
**Debt Service and Monetization Schedules**  
**5.23% Municipal Rate/7.75% Corporate WACC**  
**Debt Service and Cash Flow Monetization Schedules**

Municipal Interest Rate            5.23%  
 Concession WACC                    7.75%

**Municipal Debt Service and Monetization Schedule: Interest Rate = 5.23%**

Period	Cash Flow	Discount		Payment	Interest	Principal	Remaining Balance
		Factor	DCF				
1	\$ 100	0.9503	\$ 95.03	\$ 100	\$ 14.18	\$ 85.82	\$ 185.34
2	\$ 100	0.9031	\$ 90.31	\$ 100	\$ 9.69	\$ 90.31	\$ 95.03
3	\$ 100	<u>0.8582</u>	<u>\$ 85.82</u>	<u>\$ 100</u>	<u>\$ 4.97</u>	<u>\$ 95.03</u>	\$ -
Totals	\$ 300	2.7116	\$ 271.16	\$ 300	\$ 28.84	\$ 271.16	

**Corporate Lease Debt Service and Monetization Schedule: WACC = 7.75%**

Period	Cash Flow	Discount		Payment	Interest	Principal	Remaining Balance
		Factor	DCF				
1	\$ 100	0.9281	\$ 92.81	\$ 100	\$ 20.06	\$ 79.94	\$ 178.94
2	\$ 100	0.8613	\$ 86.13	\$ 100	\$ 13.87	\$ 86.13	\$ 92.81
3	\$ 100	<u>0.7994</u>	<u>\$ 79.94</u>	<u>\$ 100</u>	<u>\$ 7.19</u>	<u>\$ 92.81</u>	\$ -
Totals	\$ 300	2.5888	\$ 258.88	\$ 300	\$ 41.12	\$ 258.88	

**Corporate versus Municipal Monetization and Efficiency Schedules for 30, 55, 75 and 99 Years**

No. of Years	Cash Flow Per Period	Corporate Discount Rate	Corporate Discount Factor	Corporate Discounted Cash Flow	Municipal Discount Rate	Municipal Discount Factor	Municipal Discounted Cash Flow	Municipal Efficiency Ratio	Toll Increases Equiv
30	\$ 100	7.75%	\$11.53	\$1,153	5.23%	\$14.98	\$1,498	130%	76.97%
55	\$ 100	7.75%	\$12.69	\$1,269	5.23%	\$17.96	\$1,796	142%	70.65%
75	\$ 100	7.75%	\$12.86	\$1,286	5.23%	\$18.70	\$1,870	145%	68.74%
99	\$ 100	7.75%	\$12.90	\$1,290	5.23%	\$19.00	\$1,900	147%	67.88%

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## About the Authors

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Gary J. Gray has been a Visiting Professor of Finance at The Pennsylvania State University since 1988. He has taught courses on the capital markets, derivative securities, investment banking, valuation and financial innovation for undergraduate, MBA and Ph.D. students. He has published articles in numerous periodicals including *Harvard Business Review* and *Municipal Finance Journal*. He is the author of Running with the Bulls published by Lyons Press 2001; co-author of Municipal Derivative Securities: Uses and Valuation, Irwin (1995), Streetsmart Guide to Valuing a Stock, McGraw-Hill (1999, 2004), and Applied Principles of Finance, Kendall/Hunt (2005). Dr. Gray received a B.S. in Electrical Engineering, an MBA and a Ph.D. in Finance from the Pennsylvania State University.

From 1973 until 1996, Dr. Gray was an investment banker/financial engineer specializing in new product development in municipal finance. He was a Managing Director of Lehman Brothers and a Senior Vice President of E.F. Hutton. Dr. Gray was the principal architect of a number of new financial products including: tax-exempt zero-coupon bonds, capital appreciation bonds, agricultural revenue bonds, tender option crossover refunding bonds, RIBS/SAVRS, Bond Payment Obligations (BPOs), municipal call options (MuniCHOPs), and various secondary market versions of RIBS/SAVRS, Tender Option Bond programs and other tax-exempt bond and preferred stock programs using custody and trust arrangements. Since 1996, he has consulted for many state and local governments, banks and corporations.

### **Patrick J. Cusatis, Ph.D., CFA**

Assistant Professor of Finance  
The Pennsylvania State University-Harrisburg

Patrick J. Cusatis is an Assistant Professor of Finance at the Pennsylvania State University where he has taught graduate courses in Finance continuously since 1992. Until 2002, Dr. Cusatis was a Senior Vice President in charge of municipal derivatives and municipal remarketing at Tucker Anthony Sutro, where he originated and managed a \$250 million Tender Option Bond (TOB) Program. Before joining Tucker-Anthony, he managed a TOB program in excess of \$3 billion for First Union National Bank. From 1992 to 1997, he specialized in municipal new product development at Lehman Brothers where he assisted in the development and marketing of many of the primary and secondary market municipal derivatives currently in the market.

Dr. Cusatis has published numerous articles in books and journals including *Journal of Financial Economics*, *Journal of Applied Corporate Finance*, and *Municipal Finance Journal*. His research has been highlighted extensively in the financial press, including *The New York Times*, *The Wall Street Journal*, *Barron's*, *Investor's Business Daily*,

*Fortune*, *Forbes* and *Business Week*. His research has been featured on CNN's *Money Line* and on CNBC's *Squawk Box*. He is co-author of Hedging Instruments and Risk Management, McGraw-Hill (2005), The Streetsmart Guide to Valuing a Stock, McGraw-Hill (1999, 2004), and Municipal Derivative Securities: Uses and Valuation, Irwin (1995). Dr. Cusatis received a B.S. in Finance and a Ph.D. in Finance and Statistics from the Pennsylvania State University.

**John H. Foote**  
Senior Fellow  
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John H. Foote is a Senior Fellow at Harvard University's Kennedy School of Government where he is specializing in the area of transportation policy, particularly privatization. He is a guest lecturer at the Kennedy School and Cornell University.

Prior to coming to the Kennedy School, Mr. Foote was a co-founder and executive vice-president of a company providing intelligent transportation services and systems to toll authorities and state departments of transportation, and was a public finance investment banker. John has a bachelors of science in engineering from Cornell University and a master of public administration from The Wharton School of the University of Pennsylvania.

Mr. Foote has provided testimony to the Highways, Transit and Pipelines Subcommittee of the U.S. House Transportation and Infrastructure Committee and the Pennsylvania House Republican Policy Committee. He has authored a number of working papers, including "Comparison of Recent Toll Road Concession Transactions in the United States and France" (with co-author Germa Bel, Professor of Economics-University of Barcelona) (September 2007) and "Analysis of the Public Policy Aspects of the Chicago Skyway Concession" (January 2006).