Background Paper #7
Tacoma Narrows Bridge Toll Policy

This contract has a separate and distinct task of addressing specific policy issues related to tolling on the Tacoma Narrows Bridge (TNB). Since the TNB is the first new toll facility to be implemented in Washington State, issues that have been raised on that project will provide insight into issues that might arise statewide.

The legislation *(ESSB 6091, Section 206, 1) (a))* mandating this study, specifically states:

> *"(a) The study must include an analysis of the only currently authorized toll facility, the Tacoma Narrows Bridge project. The study findings must include i) the development of more uniform and equitable policies regarding the distribution of financial obligations imposed on those paying the tolls on the Tacoma Narrows Bridge, and (ii) opportunities and options for reducing the outstanding indebtedness on the bridge project, including the possibility of buy-downs and other means of spreading the cost of the project more equitably."*

From discussions with Commission and Washington State Department of Transportation (WSDOT) staff, as well as discussion at the September 20, 2005 Commission meeting, we understand that the motivation behind this directive is to consider policies to reduce the amount of project funding paid directly by TNB users. To undertake this analysis, we have conducted the following tasks:

1. Describe the TNB new construction project financing, based on official documentation and Washington statutes. This analysis will consider the underlying financial arrangements, payback mechanisms, and guarantees.

2. Describe the current toll policy projected in the TNB Financial Plan and the rationale for the projected toll rates. This will involve a review of available documents and discussions with those responsible for the toll policy.

3. Describe a few alternatives for toll setting on TNB to achieve the objective of reduced financial responsibility borne by toll payers.

4. Evaluate the alternatives identified in Item 3, from the following perspective:

   - Describe the proposed alternative.
   - Quantify or describe the assumptions used to form the alternatives.
   - Develop an approach to how an alternative could be carried out in a practical sense. This might include toll collection mechanisms and fiscal considerations. As part of this, we will identify the strengths and weaknesses of each alternative.

5. Consider the results of the analysis in Item 4 from the perspective of statewide tolling policy.

This analysis gives the Commission and the Legislature the information with which to make informed policy choices on this issue.

What is Equity and Uniformity?

At the heart of this task is the directive for "*the development of **more uniform and equitable** policies regarding the distribution of financial obligations imposed on those paying the tolls on the Tacoma Narrows Bridge.*" In order to carry out this task, it is important to lay out our understanding about the meaning of the key words "*more uniform and equitable.*"

The implication of these words is that the legislature may consider the current policies to be ***less*** uniform and equitable than desired. Based on our understanding of the criticism of the current policy, we understand the concerns to be as follows:

- The Tacoma Narrows Bridge will be the only toll facility in Washington, and tolls pay for almost 100 percent of the new span.[82]
- There are other high-value/high-cost facilities in the State that are not tolled.
- Although there are tolls on the ferries, the cost of operating the ferries is subsidized by fuel tax revenue, and the cost of buying ferries is entirely subsidized by fuel tax revenue.
- Therefore, users of the TNB have been singled out for special treatment, in that they have to pay tolls, while users of other facilities do not. This is the source of the characterization of the tolls on the TNB as less uniform and equitable.

In seeking a <u>*more*</u> uniform and equitable policy, it is important to understand two constraints:

1. The financial plan for the Tacoma Narrows Bridge relies on toll collections to reimburse the motor vehicle fuel tax fund. Any change in the toll policy would require a change in the financial plan for the Tacoma Narrows Bridge.
2. Few revenue collection policies are perfectly uniform and equitable.

Some stakeholders have expressed that TNB users have been singled out in that they have to pay tolls while users of other facilities do not. This is why the proposed TNB tolls are

[82] WSDOT indicates that there are significant portions of the Tacoma Narrows Bridge projects that are paid for by tax revenues; therefore, the project is not 100 percent paid for from tolls. However, this does not change the fact that Tacoma Narrows is currently the only toll project in the State.

viewed as not being equitable or uniform. In seeking a more equitable and uniform TNB tolling policy, it should be noted that equity can be defined in various ways:[83]

- **Geographic –** Are we being treated fairly with respect to other geographic areas?
- **Income –** Are we adversely impacting low-income populations?
- **Participation –** Are we being inclusive with respect to community participation?
- **Opportunity –** Were candidate projects given equitable consideration?
- **Modal –** Are different modes of transport being treated equitably?

The equity concerns that have been raised by stakeholders on the proposed TNB tolls pertain primarily to **geographic equity**, as well as opportunity and modal equity to a limited extent. Since the bridge project was developed with extensive public participation, including extensive evaluation of alternatives, participation and opportunity equity are not really issues here. Income equity has not been raised as a particular concern.

In order to resolve geographic and opportunity equity concerns, policies to expand the use of tolls around the State should be considered. This is exactly the scope of the tolling study as a whole. If multiple tolling projects in the State are implemented, the TNB will no longer be the only toll facility in Washington. A more complete discussion of geographic equity with respect to the TNB is provided in Background Paper #4: Equity, Fairness, and Uniformity.

With respect to modal equity, the key consideration is how the TNB tolls compare to those of the Washington State Ferries. The current round trip vehicle/driver fare between Fauntleroy and Southworth is $20.60 peak and $16.40 off-peak; the round trip vehicle/driver fare between Seattle and Bremerton is $26.60 peak and $21.20 off-peak.[84] These fares do not include other passengers in addition to the driver, who are charged separately. Ferry fares are significantly higher on a per passenger basis than the TNB tolls, which currently are envisioned to be $3.00 in the opening year.

In considering potential ways that could make the TNB toll policy more uniform and equitable, we explore two types of approaches:

1. Various ways of reducing the toll amount to users of the Tacoma Narrows Bridge, both as a whole, and for particular groups; and

2. Various ways of expanding the use of tolls around the State.

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[83]See also *Background Paper #4: Equity, Fairness and Uniformity and Tolling*.

[84]Washington State Ferries web site: http://www.wsdot.wa.gov/ferries/info_desk/fares/.

About the Tacoma Narrows Bridge Project

The TNB connects the Kitsap Peninsula with the City of Tacoma on State Route 16 (SR 16). The existing TNB was completed in 1950 as a toll bridge, with a toll rate of $1.00, which is equivalent to $8.77 in 2005 dollars. Tolls were removed in 1965 after the bonds that financed the project were retired. The existing bridge has four general purpose lanes (two in each direction) and is the only roadway connection between the Kitsap Peninsula and the south and east side of Puget Sound. In 2004, the TNB carried about 86,000 vehicles per day. Ferries serving the Kitsap peninsula carried about 19,000 vehicles per day.[85] Exhibit 7.1 shows the location of the TNB project.

Exhibit 7.1 Tacoma Narrows Bridge Project Location

Source: *Tacoma Narrows Bridge Traffic and Revenue Study Update – Base Case*, Figure 1, Wilbur Smith Associates, September 2005.

[85] *Tacoma Narrows Bridge Traffic and Revenue Study Update – Base Case*, Table 1, page 2; Wilbur Smith Associates, September 2005.

The TNB project involves the construction of a new suspension bridge, adjacent to the existing bridge, to provide three eastbound lanes – two general purpose lanes and one HOV lane. The existing bridge will be reconfigured to provide three westbound lanes – also two general purpose and one HOV. The TNB project also includes improvements to 3.4 miles of SR 16 in the immediate vicinity of the bridge, from the Jackson Avenue interchange in Tacoma to a new interchange at 24th/36th Streets. The provision of additional traffic capacity; standard-width lanes and shoulders; separation of eastbound and westbound traffic; improved pedestrian and bike travel; improved interchange connections; and higher seismic design standards will help improve safety and traffic movement.[86] The TNB project is scheduled to open to the public in April 2007. The legislature has allocated $849 million for the project, which includes project development and financing costs.

The TNB project is one element of an overall corridor improvement on SR 16. The other SR 16 project elements involve widening the highway to accommodate a new HOV lane in each direction between Tacoma and Gig Harbor. These other SR 16 project costs are estimated to be another $384 million, bringing the total cost of projects in the SR 16 corridor to $1,233 million.

Tacoma Narrows Bridge Project Financial Plan

WSDOT has developed a finance plan[87] for the TNB project which assumes the sale of several rounds of general obligation bonds to fund the project. A summary of the plan is provided below.

Capital Funding Sources

In the 2002 session, the Washington State Legislature specified a funding arrangement for up to $849 million for the TNB project. Of this amount, WSDOT was authorized to arrange with the State Treasurer for the sale of up to $800 million in tax-exempt bonds, backed by the State's gas tax issued under the authority of RCW 47.10.843. Not all of the bonds will necessarily be sold. Only those amounts necessary to pay for the project and/or project financing will be offered. For planning purposes, it was assumed that bonds would sell throughout the project at an interest rate of 5.85 percent, a projected interest rate that was 50 basis points above the current market conditions at the time the projection

[86] *Tacoma Narrows Bridge Project Financial Plan Version 1.0*, page 1, WSDOT, July 2002.

[87] *Tacoma Narrows Bridge Project Financial Plan Version 1.0*, page 1, WSDOT, July 2002. Note that this plan currently is being updated by WSDOT to reflect an updated traffic and revenue study and recent trends in bond interest rates.

was made. The balance of the funds will be from state cash sources (the Motor Vehicle Fund and investment income).

In practice, the bonds are to be paid by Tacoma Narrows Bridge tolls. Details on how this works are provided below. This means that tolls will be paying for 94.2 percent of the cost of the Tacoma Narrows Bridge project itself, and 64.9 percent of the entire corridor improvement.

The capital costs are expected to be expended from FY 2002 to FY 2008. About $761 million in construction and development costs and $88 million of financing and toll preparation costs bring to the total cost to $849 million (see Table 7.1).

Table 7.1 Sources and Uses of Capital Construction Funds

State Fiscal Years 2002-2008	Millions of Dollars
Sources of Funds	
Bond Proceeds	$800
Cash Transfer from Motor Vehicle Fund	39
Investment Income	10
Total Source of Funds	**$849**
Uses of Funds	
Design-Build Contract	$615
Construction Management and Oversight	41
Project Contingency and Toll System Supply	64
Phase 1 Development Costs	41
Subtotal	**$761**
Minimum Fund Balance	6
Toll Preparation	1
Financing Costs	8
Reserve for Capitalized Interest	73
Total Uses of Funds	**$849**

Source: *Tacoma Narrows Bridge Project Financial Plan Version 1.0*, page 9, WSDOT, July 2002.

Operating Costs, Debt Service, and Toll Revenue

The revenue expected from tolling the TNB eastbound bridge, starting in 2007, will be used to serve two functions:

1. Payment of ongoing TNB operations and maintenance (O&M) costs; and

2. Payment for principal and interest on the bonds that were issued to fund the TNB project capital costs.

These cost projections, shown in Table 7.2, have been updated since the July 2002 version of the Financial Plan.

Table 7.2 TNB Project Operations and Maintenance Costs

Estimated Operations and Maintenance Costs (Millions of Dollars)				
State Fiscal Year	**Toll Operating and Maintenance**	**Renewal and Replacement (R&R)**	**Deferred Sales Tax**	**Total Toll Operations Costs**
2007[a]	$8.615	-	-	$8.615
2008	13.961	0.162	-	14.123
2009	14.370	0.251	-	14.621
2010	14.833	0.182	-	15.015
2011	15.290	0.245	-	15.535
2012	15.746	0.304	2.851	18.901
2013	16.264	0.208	5.702	22.174
2014	16.734	0.237	5.702	22.673
2015	17.206	2.193	5.702	25.101
2016	17.789	3.751	5.702	27.242
2017	18.440	2.851	5.702	26.993
2018	18.692	1.654	5.702	26.048
2019	19.170	0.724	5.702	25.596
2020	19.652	0.311	5.702	25.665
2021	20.156	0.549	5.702	26.407
2022	20.678	1.056	2.851	24.585
2023	21.219	2.486	-	23.705
2024	21.773	1.993	-	23.766
2025	22.345	0.977	-	23.322
2026	23.048	2.737	-	25.785
2027	23.687	3.877	-	27.564
2028	24.146	2.683	-	26.829
2029	24.781	1.395	-	26.176
2030	25.434	2.697	-	28.131

Source: *Toll Operations Summary*, Excel forecast spreadsheet, WSDOT, transmitted December 2005.

EHB 2723 and RCW 47.46.060 allow WSDOT to defer payment of state and local sales taxes on construction costs until five years after the commencement of tolling (FY 2012).

This tax payment method allows toll revenues to grow before the taxes are paid and is expected to help keep an opening toll rate at $3.00. The deferred sales taxes will be paid back from FY 2012 to FY 2022, as shown in the second column to the right.

The toll schedule assumed in the current finance plan involves an initial TNB toll in the eastbound direction of $3.00 per automobile in 2007, with future increases in $1.00 increments every three years until a maximum of $6.00 is reached. This base case was projected to pay off all TNB project debt service by FY 2030, as shown in Table 7.3.

Table 7.3 shows the sum of FY 2007 to FY 2030 TNB gross toll revenue as being $2.159 billion. While this represents a revision downward of 6.4 percent from the July 2002 version of the Financial Plan, TNB project debt service is still projected to be paid off by FY 2030. This is because the estimated debt service costs were revised downward by 12.0 percent due to a substantial amount of debt having been sold at lower rates than what was originally assumed.[88] The year all debt will be paid off will ultimately be determined by the final financing costs of the project and the actual toll revenue collected.[89]

Relationship Between Bonds and the Motor Vehicle Fund

Through **EHB 2723** and **RCW 47.46**, the State Legislature requires that the gas tax revenues used for debt service on bonds sold for the TNB project be reimbursed from future deposits to the Tacoma Narrows Toll Bridge account (from tolls and other revenues). Furthermore, RCW 47.56.165 (4) states that the fund must be replenished on or before each debt service date:

> *Toll charges must remain on any facility financed by bonds issued by the State for a length of time necessary to repay the motor vehicle fund for any amounts expended from that fund for the design, development, right-of-way, financing, construction, maintenance, repair, or operation of the toll facility or for amounts transferred from the motor vehicle fund to the highway bond retirement fund under RCW 47.10.847 to provide for bond retirement and interest on bonds issued for the Tacoma Narrows public-private initiative project.*

This implies that the tolls must stay on until all of those expenditures occur. It does not necessary say that they must be taken off after a specified period of time. However, RCW 47.46.110(3)(a) provides that once the Tacoma Narrows Bridge bonds are repaid, the facility must be operated as a toll free facility.

Buying down the debt on the TNB would mean that the legislature would need to appropriate funds into the MV fund specifically to pay for debt service. Funds would have to be transferred into the TNB account, then transfer them back when debt is due to reimburse the MV fund. This would be a complex arrangement but would not require any changes to underlying laws.

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[88] *TNB Financial Plan 2005 JULY Forecast*, Excel spreadsheet, WSDOT, transmitted September 2005.

[89] *Tacoma Narrows Bridge Project Financial Plan Version 1.0*, page 11, Washington State DOT, July 2002.

Table 7.3 Expected Use of TNB Toll Revenue Through 2030

Net Toll Revenue and Debt Service Coverage (Millions of Dollars)					
State Fiscal Year	Gross Toll Revenue	Projected O&M Costs and Deferred Sales Tax[b]	Net Toll Revenue[c]	Estimated Debt Service	Debt Service Coverage[d]
2007[a]	$10.215	$8.615	$1.600	(e)	0.0%
2008	43.177	14.123	29.054	21.390	135.8%
2009	45.070	14.621	30.449	30.254	100.6%
2010	53.173	15.015	38.158	37.746	101.1%
2011	61.777	15.535	46.242	44.440	104.1%
2012	63.349	18.901	44.448	42.929	103.5%
2013	72.519	22.174	50.345	48.094	104.7%
2014	82.127	22.673	59.454	56.026	106.1%
2015	84.005	25.101	58.904	55.794	105.6%
2016	92.977	27.242	65.735	62.574	105.1%
2017	101.878	26.993	74.885	71.525	104.7%
2018	103.053	26.048	77.005	74.040	104.0%
2019	104.240	25.596	78.644	76.247	103.1%
2020	105.441	25.665	79.776	78.009	102.3%
2021	106.837	26.407	80.430	79.098	101.7%
2022	108.439	24.585	83.854	82.339	101.8%
2023	110.066	23.705	86.361	84.522	102.2%
2024	111.717	23.766	87.951	85.166	103.3%
2025	113.392	23.322	90.070	87.654	102.8%
2026	114.814	25.785	89.029	86.692	102.7%
2027	115.962	27.564	88.398	86.092	102.7%
2028	117.122	26.829	90.293	87.643	103.0%
2029	118.293	26.176	92.117	89.367	103.1%
2030	119.475	28.131	91.344	88.394	103.3%

Source: *Toll Operations Summary*, Excel forecast spreadsheet, WSDOT, transmitted December 2005.

Notes: [a] It is assumed that the project will be ready for tolling April 2007. The base toll is scheduled to increase from $3.00 to $4.00 in January 2010, from $4.00 to $5.00 in January 2013, and from $5.00 to $6.00 in January 2016.

[b] O&M costs and deferred sales taxes displayed previously in Table 7.2.

[c] Gross toll revenue minus O&M costs and deferred sales taxes.

[d] Ratio of net toll revenue to debt service.

[e] Paid from escrow.

If the tolls turn out to be inadequate to meet the debt service payment schedule, the toll levels may need to be adjusted upwards or else the transfers described above would need to take place. Since the projected debt service coverage ratio through 2030 from the original Financial Plan is 1.04, the risk of inadequate toll revenue (assuming the base case toll structure) is not insignificant.

What is the Tolling Policy for the Tacoma Narrows Bridge?

The Transportation Commission is the State's tolling authority, and as such, has the responsibility of setting tolls:

> *(1) The commission shall fix the rates of toll and other charges for all toll bridges built under this chapter that are financed primarily by bonds issued by the State. Subject to RCW 47.46.090, the commission may impose and modify toll charges from time to time as conditions warrant.*[90]

A governor-appointed citizen advisory committee consisting of nine permanent residents of the affected area is to be established to provide advice to the Commission on the toll to be set.[91] As of this writing the Commission has not yet taken action on toll setting for the Tacoma Narrows Bridge. WSDOT staff advised us that the anticipated schedule of toll setting activities is as follows:

1. Governor appoints Citizen Advisory Committee (CAC): Early 2006;
2. CAC Workshops: Spring-summer 2006;
3. Transportation Commission workshops on toll setting: April and July 2006;
4. CAC recommends toll amounts to Commission no later than 90 days prior to toll commencement (about December 2006 based on an April 2007 opening);
5. Commission hearing on toll setting: January 2007; and
6. Commission sets tolls: March 2007.

Toll Rates Assumed in the Financial Plan

The Financial Plan assumes the collection of tolls from all vehicles on the new eastbound bridge, with the following conditions (see Table 7.4):

- The completed TNB project will be open to the public and tolls will be collected on the eastbound bridge starting on April 2, 2007.
- The toll rate for all vehicles will be $3.00 for all of 2007.

[90] RCW 47.46.100.

[91] RCW 47.46.090.

- The toll rate per automobile will be $3.00 from 2007 to 2009, $4.00 from 2010 to 2012, $5.00 from 2013 to 2015, and $6.00 from 2016 on.

- Beginning in 2008, vehicles with more than two axles (i.e., autos with trailers; trucks) will be charged higher tolls than two-axle vehicles in proportion to the number of axles (capped at a maximum of six axles). For example, a four-axle vehicle is charged twice the auto toll; a vehicle with six axles or more is charged three times the auto toll.

Table 7.4 Tacoma Narrows Bridge Toll Rates Assumed in Current Financial Plan

	2007	2008-2009	2010-2012	2013-2015	2016-2030
Automobiles (Two Axles)	$3.00	$3.00	$4.00	$5.00	$6.00
Three-axle Vehicles	$3.00	$4.50	$6.00	$7.50	$9.00
Four-axle Vehicles	$3.00	$6.00	$8.00	$10.00	$12.00
Five-axle Vehicles	$3.00	$7.50	$10.00	$12.50	$15.00
Six- or More Axle Vehicles	$3.00	$9.00	$12.00	$15.00	$18.00

Source: WSDOT.

Note: The toll would apply to all vehicles that use the eastbound TNB. Automobiles with a trailer would be charged according to the total number of axles (two axles for the auto plus the axle(s) for the trailer).

Development of the initial TNB $3.00 toll and the graduated toll schedule was the result of planning, engineering, financing, and public involvement work by the United Infrastructure Washington, Inc. (UIW), their subconsultants, and WSDOT prior to the 1998 Public Advisory Election that proposed the improvements and imposition of tolls. Those conditions were maintained as the project transitioned to public financing since public expectation had been set – especially with respect to the opening toll of $3.00. The Commission has yet to take a formal action on setting the TNB tolls.

Public Attitudes Regarding TNB Tolls

A survey of 800 TNB users conducted in March 2005 by Lawrence Research regarding the TNB project found that:[92]

- Sixty percent were under the impression that the initial toll would be $3.00;
- Twenty-three percent thought the initial toll would be more than $3.00;
- Five percent thought the initial toll would be less than $3.00; and
- Twelve percent had no opinion.

The same TNB user survey also asked respondents to pick a statement that came closest to their own feelings regarding the plan to increase the toll from $3.00 to $6.00 in dollar increments every three years. The survey found that:

- Forty-six percent dislike the plan but will live with it;
- Thirty-two percent dislike the plan and intend to complain;
- Ten percent thought this was a good plan;
- Ten percent thought the plan was not a big deal; and
- Two percent had no opinion.

Evaluation of Alternative Toll Structures

Cambridge Systematics worked with the Commission and with WSDOT staff to develop several policy options that would reduce the amount of project funding that is paid directly by TNB users:

1. Reduced toll for frequent users;
2. Buying down the toll amount for everyone;
3. Subsidizing the toll during the later years of operation; and
4. Policies to expand the use of tolls around the State.

The primary rationale of policy Scenarios 1 to 3 is clearly to reduce TNB tolls for affected groups. Scenario 1 targets a specific group; Scenarios 2 and 3 are more general.

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[92] *A Study of Tacoma Narrows Bridge Users*, Lawrence Research, March 2005.

Scenario 4 is different. Rather than developing toll reductions, it looks to achieve geographic equity by expanding the use of tolls around the State. This is a potential outcome of actions that evolve from this Comprehensive Tolling Study.

Scenarios 1 to 3 are each evaluated to follow based on the following perspectives:

- **Description** – What is the illustrative toll policy being tested?
- **Equity and Uniformity –** Is the proposed policy more uniform and equitable than the base case?
- **Operational Impacts –** What effects would the proposed policy have with respect to TNB operations (i.e., toll collection and enforcement processes)?
- **Traffic Impacts –** What effects would the proposed policy have on traffic volumes?
- **Fiscal Impacts –** What effects would the proposed policy have on toll revenue, and the ability of toll revenue to pay back the motor vehicle fund for bond repayment?

In evaluating the traffic and fiscal impacts, we made use of the most recent traffic and revenue study prepared for the project:

- In August 2002, WSA prepared the *SR 16 Tacoma Narrows Bridge Traffic and Revenue Study*. Traffic and revenue projections for the expanded TNB were developed from 2007 to 2030 on the basis of data that included extensive travel pattern and trip characteristic surveys, historical traffic trends, projections of regional economic growth, and stated-preference surveys conducted by Resource Systems Group on motorists' value of time and willingness to pay tolls.[93]
- In September 2005, WSA prepared the *Tacoma Narrows Bridge Traffic and Revenue Study Update – Base Case* which updated the 2002 results by taking into account more recent traffic volume data and demographic forecasts.[94] The primary impact of the study update was a reduction in the projected traffic volumes and toll revenue due to lower experienced traffic growth than previously expected and reductions in regional employment and housing growth forecasts.

Our analysis is based on the WSA forecasts prepared in 2005. WSA projected that if the TNB toll was held at a flat rate, TNB traffic volumes and toll revenue would increase by 2.5 percent annually from 2007 to 2015, by 1.2 percent annually from 2016 to 2020, by

[93] *S.R. 16 Tacoma Narrows Bridge Traffic and Revenue Study*, Transmittal Letter page 1, Wilbur Smith Associates, August 2002.

[94] *Tacoma Narrows Bridge Traffic and Revenue Study Update – Base Case*, page 3, Wilbur Smith Associates, September 2005.

1.5 percent annually from 2021 to 2025, and by 1.0 percent annually from 2026 to 2030.[95] The forecast period for this analysis is through the year 2030, which is when the TNB bonds are projected to be paid off (i.e., all debt service payments have been made).

The WSA report also investigates the elasticity of traffic and revenue to higher toll rates. Elasticity is the percent change in traffic volumes resulting from every one percent change in the toll rate. The WSA study does not provide TNB elasticity estimates directly. However, background data provided by WSA does contain sufficient information for the elasticity to be derived.[96] The elasticity used for TNB is about -0.07, meaning that a 100 percent toll increase (i.e., doubling the toll) would result in a 7 percent drop in traffic volumes. This is relatively inelastic (a limited reduction in travel relative to the change in toll) when compared to other tolling applications, but makes sense for TNB given the absence of alternative routes in the area.

Note that WSA currently is under contract to WSDOT to study alternative toll schedules, including discounts for specific types of travelers and time-of-day pricing. These estimates were not available in time for this report.

Scenario 1: Reduced Toll for Frequent Users (TNB Discount Program)

Description

Various means to provide frequent users with a toll discount were considered. The scenario that is presented for this analysis is based on the Chesapeake Expressway Discount Program in Virginia. Users of the Chesapeake Expressway have the option to enroll in the discount program with payment of an upfront membership fee each month, and are then entitled to tolls that are significantly discounted from the regular tolls.[97]

The scenario selected for this analysis is shown in Table 7.5:

- The TNB Discount Program membership fee starts at $9.00 per month in 2007, escalating to $12.00 per month in 2010, $15.00 per month in 2013, and $18.00 per month from 2016 on.
- TNB Discount Program members are then entitled to tolls that are 50 percent of the regular TNB tolls. For two-axle automobiles, this equates to $1.50 in 2007, escalating to $2.00 in 2010, $2.50 in 2013, and $3.00 from 2016 on. For vehicles with more than two axles, the discounted toll is higher in proportion to the number of axles (capped at a maximum of six axles).

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[95] *Tacoma Narrows Bridge Traffic and Revenue Study Update – Base Case*, Table 3, page 11, Wilbur Smith Associates, September 2005.

[96] *Annual Transactions and Revenue_To Client.xls*, transmitted by WSA, November 2005.

[97] http://www.chesapeakeexpressway.com/discount.cfm.

Table 7.5 Potential TNB Toll Structure

Scenario 1: Reduced Toll for Frequent Users

	2007	2008-2009	2010-2012	2013-2015	2016-2030
Regular Toll	$3.00	$3.00	$4.00	$5.00	$6.00
Or: Monthly Membership Fee	$9.00	$9.00	$12.00	$15.00	$18.00
Plus Discounted Toll	$1.50	$1.50	$2.00	$2.50	$3.00

Source: Cambridge Systematics.

Note: Enrollment in the TNB Discount Program is voluntary. Users who enroll in the program pay an upfront membership fee each month and pay the discounted toll (instead of the regular toll) each time they cross the eastbound TNB.

Starting in 2008, vehicles with more than two axles are charged a toll in proportion to the number of axles (capped at a six-axle maximum toll). This is applicable to both the regular toll and the discounted toll.

As with the Chesapeake Expressway, enrollment in the TNB Discount Program is voluntary. In order to receive savings from enrolling in the program, users must make an average of roughly two round trips across the TNB per week (i.e., eight round trips per month). The total savings each month for users of two-axles automobiles in the year 2007 are roughly as follows:

- **Two trips per week** (8 trips per month) – $3.00 monthly savings (13%)
- **Three trips per week** (12 trips per month) – $9.00 monthly savings (25%)
- **Four trips per week** (17 trips per month) – $16.50 monthly savings (32%)
- **Five trips per week** (22 trips per month) – $24.00 monthly savings (36%)
- **More than six trips per week** (30 trips per month) – $36.00 monthly savings (40%)

Total monthly savings will increase from the year 2010 on. The percent savings will remain roughly the same.

Equity and Uniformity

By reimposing a toll on the Tacoma Narrows crossing, the State is changing the rules. For people that use the bridge infrequently the toll amount may be uncomfortable, but may not be a significant factor. For people that rely on crossing the Tacoma Narrows on a regular basis, the higher level of toll is seen by some as a burden. The discount concept in Scenario 1 is intended to mitigate this burden.

A toll system based on frequency of use is less uniform that a flat toll schedule. In terms of equity, travelers that have built their lives around crossing the Narrows without tolls

may be seen as having inequitable treatment from others around the State that can cross other bridges for no toll. It is important to remember, though, that Washington has a history of using tolls to finance bridge crossings. The current situation of having no tolls on any bridges is actually an anomaly. Depending on the decisions taken by the legislature after this study is completed, it could be that more bridge crossings will be tolled in Washington as the need to fund improvements continues.

Washington may choose to allow a frequent user discount for business reasons. Businesses often use frequent-user programs to encourage customer loyalty (such as airline clubs). Since there are no other business alternatives to the TNB (aside from the ferries, which also charge tolls, the revenue for which goes to the State), there is little case to be made on these grounds. Sometimes, frequent user discounts are used simply as a goodwill gesture. This could be an appropriate use, should the legislatures choose to do so, however as will be shown later, there is a considerable revenue shortfall that will need to be made up to accomplish this.

Operational Impacts

A range of technical and operational issues would need to be addressed if such a frequent user discount program was implemented. The key issues are described to follow.

- **Electronic Toll Collection (ETC) Accounts Only – I**mplementation of this discount should only be allowed for users whose vehicles are equipped with transponders. This is because the difficulty of tracking and accounting for individual users in the manual lanes would result in a decreased level of efficiency, require cumbersome user identification verification processes, and require extensive modifications to the electronic toll collection software system.

- **Up-Front Processing –** The toll collection system being installed at TNB does not at this time have the capability to address up-front payments to purchase an alternative toll amount. However, changes to the software application would be possible.

- **Who is Eligible for Discounts –** The revenue analysis assumed that discounts would be applied at the vehicle level – meaning that the $9.00 up front payment applies to individual vehicles, not to accounts with multiple vehicles.

In summary, although introducing volume discounts into the tolling system would require changes to the system now being designed, it would not cause significant long-term operational impacts, and the cost of these changes should not be significant in the larger scheme of the project.

Traffic and Fiscal Impacts

The 2002 WSA study found that 40.6 percent of surveyed TNB weekday trips were regular work trips, and the other 69.4 percent were for other trip purposes (mostly personal business, social, and recreation). This helps provide insight on the weekday trip frequency findings, which were as follows: [98]

- **44.2 percent of TNB round trips** involve drivers who make the trip one time a week or less. Such drivers would have no financial incentive to enroll in the TNB Discount Program.
- **9.1 percent of TNB round trips** involve drivers who make the trip two times a week, which is roughly eight to nine trips per month. Such drivers could receive monthly savings of about 13 percent by enrolling in the TNB Discount Program.
- **8.3 percent of TNB round trips** involve drivers who make the trip three times a week, which is roughly 12-13 trips per month. Such drivers could receive monthly savings of about 25 percent from the TNB Discount Program.
- **5.7 percent of TNB round trips** involve drivers who make the trip four times a week, which is roughly 17-18 trips per month. Such drivers could receive monthly savings of about 32 percent from the TNB Discount Program.
- **21.4 percent of TNB round trips** involve drivers who make the trip five times a week, which is roughly 21-22 trips per month. Such drivers could receive monthly savings of about 36 percent from the TNB Discount Program.
- **10.2 percent of TNB round trips** involve drivers who make the trip six or more times a week, which equates to 26 trips per month or more. Such drivers could receive monthly savings of about 40 percent from the TNB Discount Program.
- **1.1 percent of TNB round trips** did not have trip frequency stated. For purposes of this analysis, these trips were not assumed to be made by frequent users.

Assuming that all drivers who could receive monthly savings by enrolling in the TNB Discount Program do enroll (i.e., all drivers who make two or more round trips across the TNB per week), an estimated total of **54.7 percent of total TNB trips** would receive a frequent user discount, with the monthly discount ranging from roughly 13 to 40 percent. This is projected to result in **4.7 million more vehicle trips (+1.18 percent)** and a **$358.3 million loss in revenue (-16.14 percent)** over the 2007 to 2030 forecast period, relative to the base case tolling scenario. There also will be some additional operations costs associated with administration of a TNB Discount Program. The traffic and fiscal impacts of this scenario on an annual basis are provided in the Summary of Traffic and Fiscal Impacts section to follow.

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[98] *SR 16 Tacoma Narrows Bridge Traffic and Revenue Study*, Tables 10 and 11, pages 23-24, Wilbur Smith Associates, August 2002.

Scenarios 2 and 3: Buying Down the Toll Amount for Everyone, or Subsidizing the Toll During the Later Years of Operation

Description

Scenario 2 involves starting with a $2.00 toll in 2007, then raising the toll in $1.00 increments every three years until it becomes $5.00 in 2016, after which it would remain flat. Relative to the base case tolling scenario, this keeps the auto toll amount lower by $1.00 throughout the 2007 to 2030 forecast period. As with the base case, the toll for vehicles with more than two axles would be higher in proportion to the number of axles starting in 2008 (capped at a six-axle maximum toll).

Scenario 3 involves starting with a $3.00 toll in 2007, then keeping the toll fixed at $3.00 through 2030 rather than having the toll escalate over time. The toll for vehicles with more than two axles would be higher starting in 2008.

Equity and Uniformity

As with the base case tolling scenario, Scenarios 2 and 3 provide a toll structure that has a uniform axle-based toll for all vehicles. These scenarios offer a lower average toll to travelers than the base case over the 2007 to 2030 forecast period. This gets the cost closer to the "free" level that other drivers experience currently on other highways and bridges, and is more equitable from that perspective. This distinction would change, however, if additional toll projects, especially for bridges, were developed in Washington.

Operational Impacts

These scenarios have no particular operational impacts that differentiate them from the base case tolling scenario.

Traffic and Fiscal Impacts

With Scenario 2, the TNB toll for autos would be $1.00 lower than the base case when the new bridge opens in 2007, and would stay $1.00 lower through 2030. Doing this is projected to result in **5.5 million more vehicle trips (+1.38 percent)** and a **$391.0 million loss in revenue (-17.61 percent)** over the 2007 to 2030 forecast period.

With Scenario 3, the TNB toll for autos would stay fixed at $3.00 through 2030. Doing so is projected to result in **11.5 million more vehicle trips (+2.87 percent)** and a **$941.7 million loss in revenue (-42.41 percent)** over the 2007 to 2030 forecast period.

The annual traffic and fiscal impacts of these scenarios are provided next in the "Summary of Traffic and Fiscal Impacts" section.

Summary of Traffic and Fiscal Impacts

Table 7.6 shows the projected annual traffic volumes of Scenarios 1 to 3 from 2007 to 2030, as compared to the base case. The scenarios are sorted in order, with the base case having the lowest total traffic volumes and Scenario 3 having the highest.

Table 7.6 Annual Traffic Volumes by Scenario

Year	Base Case: $3.00 Toll Ramping to $6.00 Toll	Scenario 1: TNB Discount Program	Scenario 2: Buy-down Toll by $1.00 Each Year	Scenario 3: Toll Constant at $3.00
2007	10,525,171	10,649,820	10,770,733	10,525,171
2008	14,311,316	14,480,804	14,645,213	14,311,316
2009	14,670,159	14,843,897	15,012,429	14,670,159
2010	14,709,500	14,883,704	14,966,916	14,966,916
2011	15,084,126	15,262,766	15,348,098	15,348,098
2012	15,468,292	15,651,483	15,738,987	15,738,987
2013	15,663,846	15,849,353	15,883,140	16,102,434
2014	16,022,077	16,211,826	16,246,386	16,470,695
2015	16,388,500	16,582,588	16,617,939	16,847,378
2016	16,281,976	16,474,803	16,471,970	16,851,845
2017	16,469,589	16,664,638	16,661,773	17,046,025
2018	16,659,364	16,856,661	16,853,763	17,242,442
2019	16,851,326	17,050,896	17,047,964	17,441,123
2020	17,045,500	17,247,369	17,244,404	17,642,093
2021	17,301,183	17,506,080	17,503,070	17,906,724
2022	17,560,700	17,768,671	17,765,616	18,175,325
2023	17,824,111	18,035,201	18,032,100	18,447,955
2024	18,091,472	18,305,729	18,302,582	18,724,674
2025	18,362,844	18,580,315	18,577,121	19,005,544
2026	18,546,473	18,766,118	18,762,892	19,195,599
2027	18,371,938	18,953,779	18,950,521	19,387,555
2028	18,919,257	19,143,317	19,140,026	19,581,431
2029	19,108,450	19,334,750	19,331,426	19,777,245
2030	19,299,534	19,528,098	19,524,740	19,975,018
Total	**399,896,705**	**404,632,666**	**405,399,809**	**411,381,752**

Table 7.7 shows the projected annual toll revenue of Scenarios 1 to 3 from 2007 to 2030, as compared to the base case. The scenarios are sorted in order, with the base case having the highest total toll revenue and Scenario 3 having the lowest. While Scenarios 1 to 3 all have higher traffic volumes than the base case, the average toll paid per vehicle is lower which has a net result of lower toll revenue.

Table 7.7 Annual Toll Revenue by Scenario

Year	Base Case: $3.00 Toll Ramping to $6.00 Toll	Scenario 1: TNB Discount Program	Scenario 2: Buy-down Toll by $1.00 Each Year	Scenario 3: Toll Constant at $3.00
2007	$31,575,512	$26,480,497	$21,541,467	$31,575,512
2008	$44,522,503	$37,338,365	$30,374,172	$44,522,503
2009	$45,638,865	$38,274,591	$31,135,777	$45,638,865
2010	$61,015,006	$51,169,642	$46,562,076	$46,562,076
2011	$62,568,953	$52,472,845	$47,747,932	$47,747,932
2012	$64,162,477	$53,809,238	$48,963,990	$48,963,990
2013	$81,217,044	$68,111,886	$65,883,266	$50,094,673
2014	$83,074,469	$69,669,597	$67,390,009	$51,240,332
2015	$84,974,373	$71,262,933	$68,931,211	$52,412,193
2016	$101,306,455	$84,959,675	$85,407,167	$52,426,091
2017	$102,473,785	$85,938,645	$86,391,293	$53,030,184
2018	$103,654,565	$86,928,895	$87,386,759	$53,641,238
2019	$104,848,952	$87,930,556	$88,393,695	$54,259,333
2020	$106,057,101	$88,943,758	$89,412,234	$54,884,550
2021	$107,647,958	$90,277,915	$90,753,418	$55,707,818
2022	$109,262,677	$91,632,083	$92,114,719	$56,543,435
2023	$110,901,617	$93,006,565	$93,496,440	$57,391,587
2024	$112,565,141	$94,401,663	$94,898,887	$58,252,461
2025	$114,253,618	$95,817,688	$96,322,370	$59,126,248
2026	$115,396,155	$96,775,865	$97,285,594	$59,717,510
2027	$116,550,116	$97,743,623	$98,258,450	$60,314,685
2028	$117,715,617	$98,721,060	$99,241,034	$60,917,832
2029	$188,892,773	$99,708,270	$100,233,444	$61,527,010
2030	$120,081,701	$100,705,353	$101,235,779	$62,142,280
Total	**$2,220,357,433**	**$1,862,081,207**	**$1,829,361,183**	**$1,278,640,337**

Table 7.8 shows the 2007 to 2030 summary results of Scenarios 1 to 3, as compared to the base case scenario. As indicated previously, Scenario 3 has the largest projected changes from the base case, both in terms of increased traffic volumes and decreased toll revenue.

Table 7.8 Estimated Changes in Traffic and Revenue by Toll-Reduction Scenario
Cumulative from 2007-2030

	Base Case: $3.00 Toll Ramping to $6.00 Toll	Scenario 1: TNB Discount Program	Scenario 2: Buy-down Toll by $1.00 Each Year	Scenario 3: Toll Constant at $3.00
Traffic Volumes	399,896,705	404,632,666	405,399,809	411,381,752
# Change		4,735,961	5,503,105	11,485,048
% Change		1.18%	1.38%	2.87%
Toll Revenue	$2,220,357,433	$1,862,081,207	$1,829,361,183	$1,278,640,337
# Change		-$358,276,226	-$390,996,251	-$941,717,096
% Change		-16.14%	-17.61%	-42.41%

Conclusions

Any scenario that reduces the amount of TNB toll revenue collected would require that the Legislature find substitute funding to cover the lost toll revenue. In summary, our analysis of the Tacoma Narrows Bridge Toll Policy by scenario found that:

- **Scenario 1**, involving frequent user discounts through an up-front monthly payment should be feasible to develop and administer. It would create a toll system that is less uniform than the flat toll system now proposed, but does provide some toll relief to those that use the bridge more frequently. Some basis for this policy could be made from the perspective of a goodwill gesture. The roughly 16 percent in lost toll revenue would need to be made up through legislative appropriations.

- **Scenarios 2 and 3** both involve reduction in tolls, and would create significant cash flow shortfalls that would have to be made up from other sources. Under current conditions, where there are no other tolls in the State, the buydowns could be seen as generating a more equitable transportation funding system, bringing the tolls closer to zero. However, in the longer-term perspective of how major bridge crossings have been funded in Washington, bridge tolls remain an appropriate mechanism. As long

as future bridge projects continue to be advanced through the use of tolling, the current rates are equitable.

- **Scenario 4** does not involve any changes to the toll rate on the Tacoma Narrows Bridge. Rather, it relies on future policy decisions that might be made by the legislature. If significant use of tolls is advanced to fund major projects in Washington, then customers of the Tacoma Narrows Bridge will no longer be a special case. This is not to say that there might not be details to be worked out related to equitable toll amounts on future toll projects, but that issue is being addressed in the remainder of the tolling study.

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