SUGGESTED GUIDELINES FOR THE PREPARATION OF FEASIBILITY STUDIES FOR PRIVATE TOLL ROAD PROJECTS IN TEXAS

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16. Abstract

This is the third in a series of six research reports focusing on the process of preparing and evaluating feasibility studies for private toll road projects in Texas. State legislation requires that the sponsors of a proposed toll road submit a feasibility study to the Texas Department of Transportation (TxDOT). The financial viability of a proposed project, as documented in the feasibility study, must be considered by the Texas Transportation Commission as part of the preliminary approval process. The overall objective of this research project is to develop improved procedures for TxDOT's use in determining whether a proposed private toll road project will be financially viable. This report describes the suggested guidelines for the preparation of feasibility studies for private toll roads in the state.

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CHAPTER ONE–INTRODUCTION

This report is the third in a series focusing on the preparation and assessment of feasibility studies for private toll road projects in Texas. State legislation requires that sponsors of a proposed toll road submit a feasibility study to the Texas Department of Transportation (TxDOT). Preliminary approval of a proposed facility by the Texas Transportation Commission must consider the financial viability of the project based on this feasibility study.

This research project was undertaken to examine the factors that should be included in feasibility studies for private toll facilities in the state and to provide guidance to TxDOT on key elements to be considered in the review of these studies. The activities conducted as part of the research project and the suggested guidelines for reviewing private toll road feasibility studies are documented in other reports (1, 2).

Background

Legislation passed in 1991 governs the construction of private turnpikes and toll roads in Texas. The legislation established June 1, 1991, as the deadline for chartering private toll road projects in the state. Those legislative provisions have been codified in Chapter 362, Subchapter C (Private Turnpikes and Toll Projects), Section 362.101-362.104 of the Texas Transportation Code. The following elements highlight the major requirements of the legislation (3).

- A private entity or corporation may not construct any privately owned toll project which connects to a road, bridge, or highway included in the state highway system unless the project is approved by the Texas Transportation Commission.

- The Commission must adopt procedures and substantive rules and regulations for use in approving private toll road projects. These procedures must consider the integration of the project into the state roadway system and the potential impact on the economy of the area. If the proposed project is located along the Texas/Mexico border, the potential impact on the free flow of trade between the United States and Mexico must also be examined.

- A private entity or corporation must complete a feasibility study addressing the alignment, environmental impacts, and the financial viability of a proposed project. The financial assessment must include the proposed methods of financing, traffic data, and forecasted revenues.

- The Commission may grant preliminary approval for construction of a project if it finds the facility is consistent with state and metropolitan transportation plans, will have no significant negative impacts on the economy of the area, will not adversely impact the free flow of trade between Mexico and the United States, and is financially viable.

A total of 45 potential private toll road projects were chartered by six private toll road corporations by the 1991 legislatively mandated deadline. The Camino Columbia Toll Road project is the only facility actively pursued to date. This project has been preliminarily approved by the Commission. The other chartered projects may be pursued at any time.

Research Objectives

Although the legislation requires that a feasibility study determining the financial viability of a project be completed, only limited guidance is provided on how these studies should be conducted and the specific elements to be included. The legislation indicates that the feasibility study must include the proposed method of financing for planning, designing, constructing, operating, and maintaining the proposed toll project, and must address traffic data and revenue projections. This research project was conducted to assist TxDOT in identifying the key elements that should be included in both the financial feasibility assessment and the process the Department should use to review feasibility studies submitted by project sponsors.

The objectives of this research project were to develop suggested guidelines for the preparation of feasibility studies for private toll roads in the state, as well as suggested guidelines for the review of these studies by TxDOT, and methods for assessing the revenue and cost projections. A number of activities were conducted to accomplish these objectives. First, a state-of-the-art literature review was completed to identify relevant information on toll road feasibility studies, experience in other states with toll facilities, and revenue and cost estimation procedures. This review included an examination of the experience with revenue forecasts on recently completed toll projects in the United States. Second, information on the approaches and requirements used in other states was obtained through a survey of state departments of transportation. Third, interviews were conducted with representatives from eight investment banks and rating agencies. The results of these activities were used to develop the suggested guidelines outlined in this report.

Organization of this Report

The remainder of this report is divided into three chapters. The requirements and criteria used in other states to guide the preparation of feasibility studies for toll facilities, the factors examined by investment banks and rating agencies, and the literature review results are summarized in Chapter Two. Chapter Three presents the suggested guidelines for the preparation of private toll facility feasibility studies in Texas. The report concludes with a summary of the main elements covered in the research project.

CHAPTER TWO—SUMMARY OF PRIVATE TOLL ROAD FEASIBILITY STUDY GUIDELINES USED IN OTHER STATES AND FACTORS EXAMINED BY INVESTMENT BANKS AND RATING AGENCIES

This chapter summarizes the criteria and guidelines for private toll facilities used in six other states. The information presented was obtained through a survey of state departments of transportation. Information obtained through interviews with representatives from eight investments banks and rating firms is also presented, along with key elements from the literature review. A more detailed description of these topics is presented in Research Reports 1 and 2 (1, 2).

Guidelines Used in Other States

Information on the main elements required in private toll facility feasibility studies and public/private roadway projects in Arizona, California, Florida, Minnesota, Virginia, and Washington is presented in Table 1 and summarized below. Additional information on the approaches used in these states and the specific proposal requirements are documented in Research Report 1 (1).

Arizona. Arizona uses requests for proposals (RFPs) for preliminary financial plans of toll facilities. The RFP provided by the Arizona Department of Transportation (ADOT) was for a 1995 preliminary financial plan for a project in Maricopa County (4). The major requirements outlined in the RFP include a description of the sources and uses of funds for the project.

California. California uses a combination of requests for qualifications (RFQs) and RFPs to obtain financial information on proposed toll facilities. Information on the financial plan elements is included in the 1990 California Department of Transportation (Caltrans) *Guidelines for Conceptual Project Proposals for Toll Revenue Transportation Projects* (5). Financial information required in the proposal includes the source and nature of equity contributions; the extent, type, and mix of debt financing; documentation of credit; and any agreements with local governments or other entities. The required cash flow analysis has two components. The first includes cash flow projections, interest rates, cost associated with financing, the expected rate of return and internal rate of return, the toll structure, traffic estimates, the operation and maintenance projections, and any non-toll revenues. In addition, a sensitivity analysis is required that tests the financial plan under different assumptions, identifies the best-case and the worst-case scenarios, and examines different assumptions related to property values, development schedules, and market absorption. Finally, Caltrans requires that a third-party financial consultant examine the adequacy of the plan.

Table 1. Main Elements in Toll Facility Feasibility Studies Required by Other States

State	Data and Information Requirements
Arizona	**Financial Plan, including sources and uses of funds**
California	**Financing Structure** • Equity contribution • Debt financing • Credit support letters or lines of credit • Bank loans • Real estate financing • Other funding **Cash Flow** • Projections for construction and subsequent years • Interest rates and fees on borrowed funds • Costs associated with financing • Expected rate of annual return • Proposed internal rate of return • Proposed toll and fee structure • Traffic count estimates • Projected operation/maintenance costs and funding sources • Non-toll revenues **Sensitivity Analysis** • Test financial plan under different assumptions • Identify best-case and worst-case scenarios • Test any assumptions relating to property values and development schedules **Review by Third-Party Financial Consultant**
Florida	**Quantity, Type, and Source of Funding** • Public sector funding • Equity funds from private entity • Bond financing and other debt financing • Contributions from net operating revenues **Proposed Operating Budget for each Activity Phase, Including Methods and Assumptions for Verification** **Operating Revenue Projections** • Toll revenues • Other operating revenues (advertising, station concessions, etc.) • Associated development/supplemental revenues • Public sector subsidies • Methods and assumptions **Cash Flow Analysis, 30-Year Period** **Sensitivity Analysis of Financing Scenarios** **Ability to Request Additional Information**

Table 1. Main Elements in Toll Facility Feasibility Studies Required by Other States (continued)

State	Data and Information Requirements
Minnesota	**Traffic and Demand Forecasts** **Financial Plan**
Virginia	**Phase One Conceptual Proposal** • Cost estimate by project phase • Plan/schedule for development, financing, and operation • List and discussion of assumptions (toll rates, facility usage) • Risk factors and mitigation methods • Resources requested (financial, services, property) **Phase Two Proposal** • Total life-cycle cost • Detailed list of assumptions (toll rates, facility usage)
Washington	**Cost Estimate by Project Phase** **Plan for Development and Operation** • Funding schedule and sources • Project revenues, costs, return on investment • List of assumptions

Florida. The Florida Administrative Code (6) addresses the requirements of financial plans for Private Transportation Facilities in the state. The financing plan must include the level, type, and source of financing for the various phases of the project. Specific information on public sector funds, equity, bond financing, any other debt financing methods, and contributions from operating revenues is required. A proposed operating budget containing detailed annual costs associated with each proposed activity phase must be provided. The methods and assumptions used to develop the cost estimates are required for verification.

Other requirements include detailing the operating revenue projections, along with the methods and assumptions used in developing the estimates. Projections related to revenues from tolls, other operating sources, and associated developments must be documented, and any public sector subsidies must be identified. A cash flow analysis for a 30-year period is required. Components in the sensitivity analysis include the examination of variations in interest rates, inflation, capital costs, traffic volumes, operations and maintenance costs, and other revenue streams. The Florida Department of Transportation (FDOT) also has the authority to request additional information or clarification regarding any deficiencies in a proposal.

Minnesota. The Minnesota Department of Transportation (Mn/DOT) issued a request for public-private toll facilities in 1995 (7). Traffic forecasts, an explanation of the methods and assumptions used to develop these estimates, and a financial plan were required in proposals submitted in response to this solicitation.

Virginia. The development of proposals for private toll facilities in Virginia is governed by the *Public-Private Transportation Act of 1995: Implementation Guidelines* (8). Toll projects may be proposed by the Virginia Department of Transportation (VDOT) or through unsolicited proposals from interested parties. Virginia has a two phased proposal submission process. The first phase is a conceptual proposal which includes the estimated cost of the project by phase; the plan and schedule for developing, financing, and operating the facility; a discussion of all assumptions used in developing the proposal; the identification of proposed risk factors and approaches for dealing with these; and the identification of any anticipated public resources. The second phase requires more specific deliverables including those relating to life-cycle costs and detailed information on traffic forecasts and toll revenue assumptions.

Washington. The *New Partners Program 1993-1995: Summary* (9) highlights the Washington State Department of Transportation (WSDOT) requirements for innovative public-private projects. Financial data required in proposals includes an estimate of project cost by phase, sources of funding, a development and operation plan, and a description of the assumption and methodologies used in preparing the plan.

Information Examined by Investment Banks and Rating Agencies

Researchers interviewed representatives from seven investment banks and one rating agency to obtain additional information on the factors these groups examine when considering proposals for private toll facilities. Firms providing information were Bear, Stearns & Company; J.P. Morgan & Company; Morgan Stanley & Company; Paine Webber; Salomon Brothers; Smith Barney Shearson; and Standard & Poor's. Table 2 outlines the major elements suggested by these firms for toll road feasibility studies.

The individuals interviewed stressed two key elements for financial feasibility studies. The first is the inclusion of revenue projections for the full term of the bonds issued to finance the toll facility. The second is sufficient documentation of the traffic forecasts, toll revenue projections, and any other estimates to permit adequate review. Representation from these groups also noted the difficulty of establishing a formal list of elements to be required in every financial feasibility study given the industry's limited experience with recent toll facilities.

Table 2. Factors Considered by Investment Banks and Rating Agencies

Investment Banks	**Documentation of Traffic/Revenue Studies** • Assumptions • Calculations • Sources of numbers/information **Projected Revenues, Costs, Cash Flows**
Rating Agencies	***For Feasibility Studies:*** **Market and Demand Analysis** • Demographics • Traffic patterns and traffic mix • Competing facilities • Historical/projected toll rates **Financial Analysis** • Revenues and operating costs • Projected impact of travel-related factors ***For Start-up Toll Roads:*** **Demand Analysis** • Service area, local economy • Nature of facility and competitive facilities **Operational/Financial Analysis**

Literature Review

The literature review identified additional elements to consider in developing suggested guidelines for private toll road feasibility studies. A 1996 study examined the experience with 14 recent toll projects and compared the estimated traffic levels and revenues with the actual use and tolls collected (10).

Only two of the 14 projects examined in the study had revenues above those projected during the first four years of operation. Factors identified that appeared to contribute to the over-estimation of revenues included overly optimistic economic growth projections in the area and the corridor, assumptions of fairly high rates of revenue growth, travel time savings of less than five minutes over competing routes, and toll charges in excess of 10 cents per mile (10). Factors that seemed to contribute to more accurate forecasts included conservative economic projections with moderate levels of growth, congested travel corridors, travel time savings of five to 10 minutes over competing routes, toll charges averaging eight cents per mile, and revenue growth forecasts under 5 percent per annum during the first four years of operation (10).

CHAPTER THREE—SUGGESTED GUIDELINES FOR THE PREPARATION OF FEASIBILITY STUDIES FOR PRIVATE TOLL ROADS IN TEXAS

This chapter presents the suggested guidelines for the preparation of feasibility studies for private toll roads in Texas. The requirements contained in the legislation, and the information obtained from other states, investment banks, rating firms, and available literature were all used in the development of the proposed guidelines.

The elements suggested for inclusion in toll road feasibility studies are highlighted in Table 3 and summarized below. Based on the objectives of this research project, the suggested guidelines focus on the financial elements of toll road feasibility studies, as well as other factors. The proposed elements are provided for consideration by TxDOT for use in guiding the development of toll road feasibility studies in the state.

Project Description and Proposed Alignment. A description and alignment of the proposed toll road should be provided as part of a feasibility study. The description should include the proposed alignment in enough detail to allow for a review of the proposed path and the identification of any potential problems or issues. Elements to be identified in the alignment include proposed connections to the state, city, or county roadway system, as well as any connections to other toll roads. Links to major traffic generators, such as ports, airports, rail yards, or other facilities should also be highlighted. The project description and alignment should identify any potentially sensitive environmental areas.

Integration with State, Metropolitan, and Local Transportation Plans. Legislation requires that the process established by TxDOT to review and approve the construction of a private toll road project include consideration of existing transportation facilities and plans. As a result, the suggested guidelines require the proposing party to identify how the project will be integrated into appropriate state highways plans, metropolitan and regional plans, and county and local plans. In addition, coordination with the transportation plans of other special generators, such as ports and airports, should be addressed.

Traffic Forecast. Detailed information on the traffic projections for the proposed toll projects should represent a major component of the feasibility study. The overprotection of traffic volumes on recent toll projects, and the subsequent lower levels of revenue generation, indicates the importance of this element. The feasibility study should document the assumptions, methodology, and data sources used in the development of the traffic demand projections. Information on the economic projections, growth factors, development and land use forecasts, and population and employment trends used in developing the forecasts should be included. In addition, the diversion ratios used in the forecasting process should be identified.

Financial Plan. The financial plan on a proposed project represents another key component of the suggested guidelines. It is recommended that the financial plan cover a number of elements. The first is a detailed budget for all phases of the project, including design, construction, operations, and maintenance. The second component is the financing structure. The use of bonding, bank loans, real estate financing, equity contributions, lines of credit, public funding, and other financing techniques should be identified and the level anticipated from each source should be documented. The third element of the financial plan focuses on the operating revenue projections. The proposed toll or fee structure, the estimated toll revenues, and other anticipated operating revenues should be provided. Finally, it is suggested that the plan include a cash flow analysis for the proposed project.

Potential Environmental Impacts of Proposed Project. The potential environmental impacts of a proposed toll road project should be identified and examined in the feasibility study. The possible impact on air quality, water quality, wetlands, biodiversity and endangered species, noise levels, and environmental justice should be identified and potential mitigation strategies analyzed.

Economic Impact Assessment. State legislation requires that the potential impact on the economy of an area be included in a feasibility study for a proposed toll road project. Elements that could be requested in this section of a feasibility study are new development opportunities and estimates of new jobs generated from these developments.

Impact on U.S./Mexico Trade Flow. State legislation also requires that a proposed project located along the Texas/Mexico border examine the impact on the free flow of trade between the U.S. and Mexico. This element is incorporated into the suggested guidelines. Factors that might be included in this assessment are connections with border crossings, links to ports, rail, and other modes, and travel time savings.

Sensitivity Analysis. The final element suggested for the feasibility study guidelines is a sensitivity analysis. Elements that could be required in this section include testing the proposed financial plan under different assumptions, identifying best-case and worst-case scenarios, and examining the impact of alternative economic growth projections.

Table 3. Outline of Suggested Guidelines for Toll Road Feasibility Studies

Project Description and Proposed Alignment
- General route
- Connections to state highway and road system
- Connection to other public roads
- Connections to other toll roads
- Identification of any environmentally sensitive areas

Integration with Existing Transportation Plans
- State plan
- Metropolitan and regional plans
- County and local plans
- Special generator plans (airports, ports, etc.)

Traffic Forecasts
- Assumptions
- Methodology
- Data sources
- Diversion routes
- Sensitivity analysis

Financial Plan
- Proposed Budget
  - Design
  - Construction
  - Operation
  - Maintenance
- Financing Structure
  - Bonds/debt financing
  - Bank loans
  - Real estate financing
  - Toll revenues
  - Equity contributions
  - Lines of credit
  - Public funding
  - Other sources
- Operating Revenue Projects
  - Toll levels
  - Toll revenues
  - Other operating revenues
- Cash Flow Analysis

Table 3. Outline of Suggested Guidelines for Toll Road Feasibility Studies (Continued)

Environmental Impacts • Air quality • Water quality • Wetlands • Biodiversity and endangered species • Noise levels • Environment justice
Economic Impact Assessment • New development opportunities (commercial, industrial, residential) • Estimates of new job generation
Impact on U.S./Mexico Trade Flow • Connections with border crossings • Travel time savings • Links to ports, rail, and other modes
Sensitivity Analysis • Testing the financial plan under different assumptions • Best-case and worst-case scenarios • Impact of economic growth projections

CHAPTER FOUR – SUMMARY

This report provides suggested guidelines for the preparation of feasibility studies for private toll roads in Texas. It is the third in a series of reports prepared as part of a research project focusing on the development and assessment of feasibility studies for private toll road facilities in Texas. The guidelines were developed based on a review of available literature, a survey of the procedures used in other states, and factors considered by investment banks and rating agencies. These elements are documented in other research reports.

The suggested guidelines focus on eight major elements. These are project description and proposed alignment; integration with existing transportation plans; environmental impacts; traffic forecasts; financial plan; operating revenue projections; economic impact assessments; impact on U.S./Mexico flow of trade; and a sensitivity analysis. These elements address the state legislative requirements and directions relating to private toll road feasibility studies.

The information presented in this report and the suggested guidelines can be used by TxDOT in developing procedures and requirements for the preparation of feasibility studies for private toll road projects in the state. The suggested guidelines will help ensure that proposals for toll road projects include information necessary for adequate TxDOT review. Ultimately, the proposed guidelines should assist in ensuring that future toll facilities are financially viable, represent sound transportation improvements, and contribute to the economic vitality of the state.

REFERENCES

1. Glenn, Thomas L. *Data and Information Required in Feasibility Studies for Private Toll Road Projects by States and Private Entities*. Texas Transportation Institute: College Station, Texas, 1998.

2. Glenn, Thomas L. *Procedures and Criteria Used to Evaluate the Financial Viability of Private Toll Road Projects by States and Private Entities Involved in the Approval, Financing and/or Evaluation of Private Toll Road Projects*. Texas Transportation Institute: College Station, Texas, 1998.

3. Texas Transportation Code. Chapter 362, Subchapter C (Private Turnpikes and Toll Projects), Sections 362.101-362.104, 1991.

4. Arizona Department of Transportation. *Proposal Number 95-52, Privately Financed Transportation Facility/Highway Construction Projects for the Maricopa County Regional Transportation System*, July 1995.

5. California Department of Transportation. *Guidelines for Conceptual Project Proposals for Toll Revenue Transportation Projects*, 1990.

6. State of Florida. *Florida Administrative Code, Chapter 14-107 (Private Transportation Facilities), Section 003 (Proposal Requirements)*, Undated.

7. Minnesota Department of Transportation. *Request for Proposals for TRANSMART: Minnesota's Toll Facilities Public-Private Initiatives Program*, July 1995.

8. Commonwealth of Virginia. *Public-Private Transportation Act of 1995: Implementation Guidelines*, July 1995.

9. Washington State Department of Transportation. *New Partners Program 1993-1995: Summary*, 1993.

10. Muller, Robert H. "Examining Toll Road Feasibility Studies." *Municipal Market Monitor*, March 22, 1996. New York: J.P. Morgan Securities, Inc.