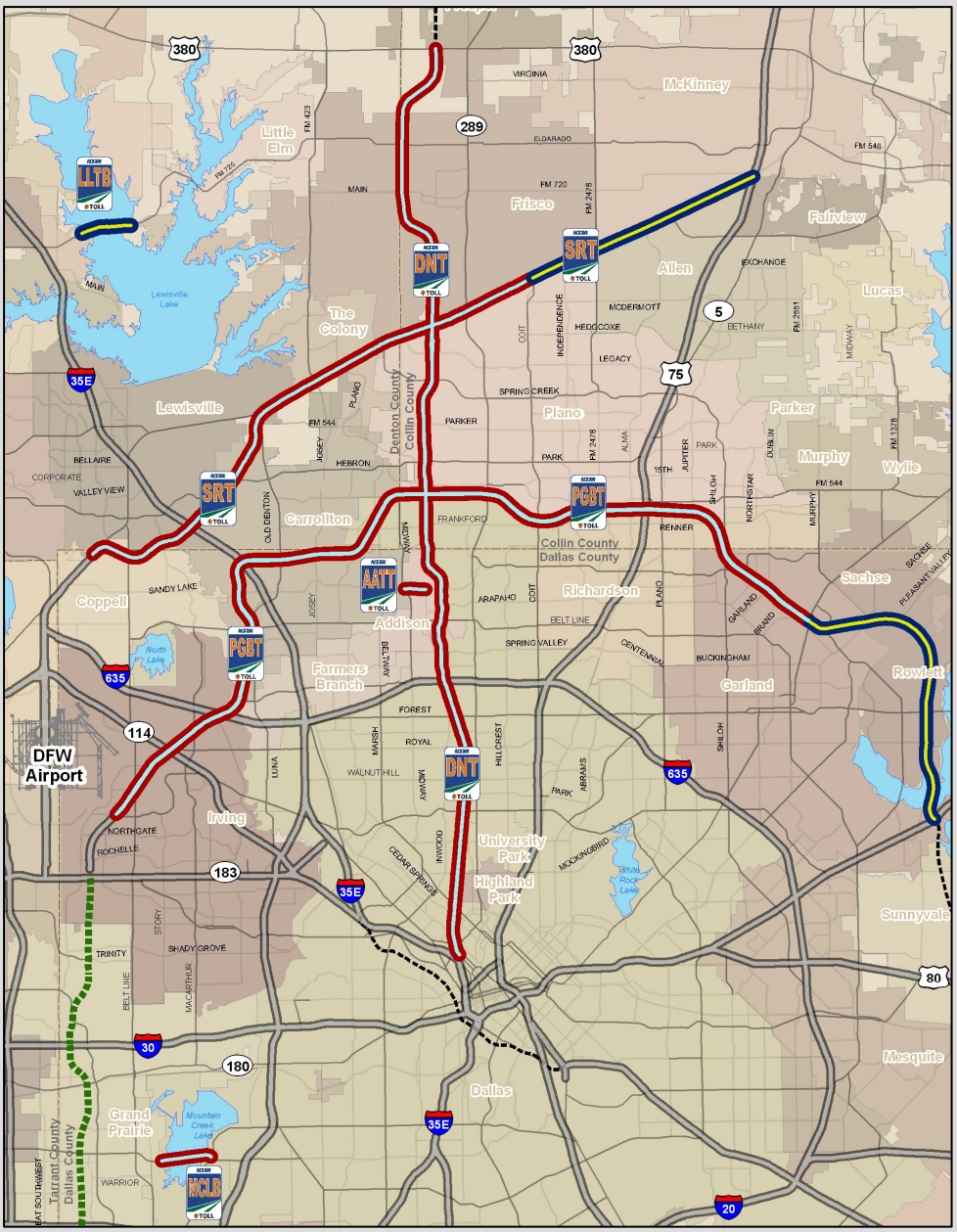
North Texas Tollway Authority System

Investment Grade Traffic and Toll Revenue Study



NTTA DALLAS NORTH TOLLWAY TOLL

NTTA PRESIDENT GEORGE BUSH TURNPIKE TOLL

NTTA SAM RAYBURN TOLLWAY TOLL

NTTA ADDISON AIRPORT TOLL TUNNEL TOLL

NTTA MOUNTAIN CREEK LAKE TOLL BRIDGE TOLL

NTTA LEWISVILLE LAKE TOLL BRIDGE TOLL

NTTA®

NORTH TEXAS TOLLWAY AUTHORITY

ENGINEERS PLANNERS ECONOMISTS

WilburSmith ASSOCIATES

July 2009

North Texas Tollway Authority System

Investment Grade Traffic and Toll Revenue Study

Prepared For:

NTTA
NORTH TEXAS TOLLWAY AUTHORITY

Prepared By:

ENGINEERS
PLANNERS
ECONOMISTS
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July 2009

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July 17, 2009

Mr. Allen Clemson
Executive Director
North Texas Tollway Authority
5900 West Plano Parkway, Suite 100
Plano, TX 75093

Re: NTTA System Investment Grade Traffic and Toll Revenue Study

Dear Mr. Clemson:

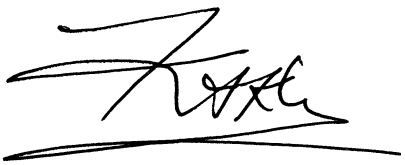
Wilbur Smith Associates (WSA) is pleased to submit this report of our traffic and toll revenue study for the North Texas Tollway Authority System.

The purpose of this study was to conduct an Investment Grade Traffic and Toll Revenue evaluation for the NTTA System, which includes the Dallas North Tollway, the President George Bush Turnpike, the Sam Rayburn Tollway, the Addison Airport Toll Tunnel, the Mountain Creek Lake Bridge, the Lewisville Lake Toll Bridge, and the President George Bush Turnpike Eastern Extension.

Our project team, including Michael Copeland, Phani Jammalamadaka, Worapong Hirunyanitiwattana, Naveen Mokkapati, Yagnesh Jarmarwala, Justin Winn, Mark Middleton and others, gratefully acknowledge the assistance and cooperation received from NTTA as well as others contacted during the course of the study. WSA sincerely appreciates the opportunity to have participated in this important project.

Respectfully submitted,

WILBUR SMITH ASSOCIATES



Kamran Khan
Senior Vice President

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EXECUTIVE SUMMARY

This comprehensive traffic and revenue report reflects all current efforts requested of Wilbur Smith Associates (WSA) by the North Texas Tollway Authority (NTTA) to update the traffic and toll revenue forecasts for the North Texas Tollway Authority System (NTTAS). The NTTAS includes the Dallas North Tollway, the President George Bush Turnpike, the Sam Rayburn Tollway, the Addison Airport Toll Tunnel, the Mountain Creek Lake Bridge, the President George Bush Turnpike Eastern Extension and the Lewisville Lake Toll Bridge. This study includes the development of a system-wide review and update of traffic and toll revenue estimates for all the NTTAS facilities.

In October 2007, WSA completed the *Dallas North Tollway System and SH 121 Tollway Investment Grade Traffic and Toll Revenue Study* (DNTS report). In August 2008, WSA completed the *President George Bush Turnpike Eastern Extension Investment Grade Traffic and Toll Revenue Study* (PGBT EE report). Both studies were based on the demographic forecasts and transportation modeling networks developed by the North Central Texas Council of Governments (NCTCOG) for the Mobility 2030 Plan, approved by the Regional Transportation Council (RTC) in January 2007. Due to sudden surge in gasoline prices in mid-2008, WSA produced a report titled *The Impacts of Gasoline Price on Traffic and Toll Revenue* dated August 2008 (White Paper).

Since the completion of the DNTS report, the PGBT EE report and the White Paper, several key events have occurred and circumstances have arisen that require a re-evaluation of the traffic and toll revenue estimates. These key events include:

- Economic downturn
  - Impact on NTTAS traffic
  - Population, housing and employment growth noticeably affected
  - Revised economic outlook
- Toll rate policy changes
  - Adoption of a new toll rate policy by NTTA Board of Directors
  - Alignment of scheduled toll increases across all facilities
- Changes to project schedules
  - All-ETC implementation schedule changes
  - Capital improvements
  - Roadway expansions
- Adoption of new Mobility Plan
  - Development of 2009 Update to Mobility 2030 Plan (MTP 2030 – 2009 Update).

The following factors were incorporated in the current study:

- Travel demand model was updated to account for the impact produced by the economic recession. Understanding how travel is affected by the current economic stresses is a key component of forecasting travel behavior.
- NCTCOG's official demographics along with the "revised" demographics from the 2007 DNTS report were examined in light of the economic downturn. Conclusions from that independent review altered the previously assumed revised demographics.

- All aspects of tolling were examined to ensure the latest NTTA plans were taken into account. In August 2007, NTTA Board of Directors approved the system-wide conversion to all-electronic toll collection (all-ETC) on all NTTA facilities. Sections of the NTTAS are operating today as all-ETC. Traffic and revenue experience at those specific locations was examined in great detail to inform the traffic and revenue estimates on each of the other facilities. A toll adjustment was implemented in late 2007 on the NTTAS (a TollTag toll increase of about 16.7 percent at the then existing DNT and PGBT mainlane plazas). The impacts to traffic and revenue from that toll adjustment were used to refine the forecasts associated with future scheduled increases.
- As traffic growth has slowed, and even declined on some facilities, previously determined needs for additional roadway capacity were reexamined. Congestion thresholds that indicate the need for additional capacity are likely to be reached further into the future than previously predicted.
- In April 2009, the Regional Transportation Council (RTC) approved the 2009 Update to the Mobility 2030 Plan. This investment grade study incorporates all the regional transportation infrastructure included in the 2009 Update. The official demographic forecast datasets for the Dallas-Fort Worth region adopted by the NCTCOG Executive Board in 2003 were used as part of the Mobility 2030 Plan-2009 Update.

The study effort involved the following key elements:

- **Traffic Trends and Characteristics** – WSA evaluated historical and recent traffic and toll revenue trends on the existing NTTAS, as detailed in Chapter 2. This included an analysis of annual and monthly transaction trends, TollTag utilization rates and the travel time characteristics on the NTTAS.
- **NTTAS Corridor Growth Considerations** – Using the most recently approved demographics included by NCTCOG in their latest 2030 Mobility Plan, WSA evaluated the socioeconomic conditions along the NTTAS corridors as described in Chapter 5. This included a review of the historical population and employment growth trends, as well as the future growth projections of these two major socioeconomic characteristics along the NTTAS corridors. WSA found that many of the major corporations in the Dallas/Fort-Worth area are located within a five-mile area of the NTTAS corridors. A summary of the independent economic reviews performed along the NTTAS and other corridors is also presented in Chapter 5.
- **NTTAS Tollway Traffic and Toll Revenue Forecasts** – WSA updated traffic and toll revenue forecasts for the NTTAS, as detailed in Chapter 7. The traffic and toll revenue forecasts were made using trip tables developed based on findings of the independent economic reviews that were conducted along the NTTAS and the other corridors, with additional adjustments to reflect the effects of the current economic downturn.

The toll sensitivity analyses for the NTTAS, as described in Chapter 7, show that the current and planned toll charges on the NTTAS facilities are below the theoretical revenue maximization points. This demonstrates that, if needed, there is expected to be considerable potential for revenue enhancement through toll increases above those assumed for traffic and revenue forecasting purposes.

Table ES-1 presents estimated annual revenue for the existing NTTAS. The total NTTAS revenue is estimated to be $377 million in 2010, increasing to over $841 million by 2020. Total NTTAS revenue is estimated to reach approximately $1.3 billion per year by 2030 and is projected to exceed $2.0 billion per year by 2040.

On a total system basis, annual revenue growth is expected to average 8.3 percent per year between 2010 and 2020, and about 4.8 percent per year between 2020 and 2030. Between 2010 and 2055, revenues on the total NTTAS are expected to increase at an average of about 5.1 percent per year.

Table ES-1

Estimated NTTAS Annual Revenue

Year	DNT	PGBT	AATT	MCLB	LLTB	PGBT EE	SRT	NTTAS Total
2009	$129,377,300	$105,992,500	$886,400	$1,537,500	$1,511,000	$0	$44,252,900	$283,557,600
2010	$168,535,000	$135,324,000	$876,000	$1,876,400	$5,169,300	$0	$65,352,100	$377,132,800
2011	$174,547,800	$147,638,100	$860,800	$1,486,900	$7,191,600	$923,840	$85,559,900	$418,208,940
2012	$189,226,700	$160,023,000	$914,700	$1,666,400	$9,046,000	$13,709,680	$102,403,100	$476,989,580
2013	$201,487,100	$170,413,600	$950,800	$1,796,000	$10,905,000	$18,433,920	$114,725,300	$518,711,720
2014	$213,569,400	$179,893,800	$991,400	$1,900,600	$11,793,100	$22,846,960	$125,776,400	$556,771,660
2015	$229,504,700	$189,041,200	$1,029,400	$1,967,900	$12,558,000	$25,428,880	$136,294,600	$595,824,680
2016	$244,193,900	$198,308,800	$1,066,000	$2,066,600	$13,334,800	$28,341,520	$148,453,700	$635,765,320
2017	$258,700,000	$207,506,800	$1,108,500	$2,149,800	$14,139,400	$31,264,720	$160,806,700	$675,675,920
2018	$274,737,500	$217,633,900	$1,155,300	$2,267,200	$15,044,200	$34,617,840	$174,725,900	$720,181,840
2019	$291,019,700	$235,045,500	$1,190,300	$2,340,900	$15,923,100	$38,043,600	$204,409,300	$787,972,400
2020	$304,705,500	$245,890,500	$1,226,300	$2,428,700	$16,728,800	$40,264,560	$229,684,200	$840,928,560
2021	$319,185,000	$257,100,600	$1,269,300	$2,517,700	$17,509,300	$42,829,760	$244,435,100	$884,846,760
2022	$334,984,800	$269,355,900	$1,316,300	$2,630,500	$18,376,400	$45,661,040	$260,775,700	$933,100,640
2023	$350,874,500	$281,087,600	$1,360,400	$2,724,500	$19,285,000	$48,071,920	$277,805,900	$981,209,820
2024	$368,202,100	$293,880,800	$1,408,300	$2,838,700	$20,289,500	$50,734,720	$296,648,200	$1,034,002,320
2025	$385,162,500	$307,463,100	$1,453,400	$2,937,900	$21,276,600	$57,733,280	$315,986,500	$1,092,013,280
2026	$399,869,800	$320,614,600	$1,500,700	$3,046,900	$22,271,500	$61,223,200	$331,832,700	$1,140,359,400
2027	$414,798,900	$332,998,000	$1,545,100	$3,141,900	$23,235,900	$64,810,000	$347,386,700	$1,187,916,500
2028	$430,957,800	$346,456,700	$1,593,300	$3,250,300	$24,285,900	$68,726,720	$364,334,700	$1,239,605,420
2029	$447,060,900	$360,357,800	$1,648,100	$3,366,300	$25,453,900	$71,966,400	$381,685,300	$1,291,538,700
2030	$464,452,100	$375,467,900	$1,707,900	$3,498,100	$26,729,300	$75,493,280	$400,575,800	$1,347,924,380
2031	$482,158,100	$390,366,900	$1,754,100	$3,597,100	$27,891,200	$80,158,880	$419,889,500	$1,405,815,780
2032	$501,235,900	$406,538,200	$1,804,100	$3,706,900	$29,149,500	$85,275,360	$440,919,900	$1,468,629,860
2033	$519,716,200	$422,903,400	$1,860,500	$3,826,900	$30,459,100	$89,723,760	$462,327,500	$1,530,817,360
2034	$539,612,200	$440,651,000	$1,921,500	$3,958,800	$31,881,000	$94,597,040	$485,638,700	$1,598,260,240
2035	$559,996,600	$458,823,700	$1,988,600	$4,101,500	$33,350,900	$100,257,600	$509,827,800	$1,668,346,700
2036	$581,694,700	$477,069,400	$2,059,900	$4,254,900	$34,950,100	$105,100,880	$534,137,100	$1,739,266,980
2037	$603,578,100	$494,379,200	$2,116,700	$4,377,100	$36,505,500	$108,709,840	$557,690,200	$1,807,356,640
2038	$627,099,500	$513,124,200	$2,178,900	$4,511,400	$38,190,000	$112,606,720	$583,236,200	$1,880,946,920
2039	$651,211,700	$532,058,600	$2,246,200	$4,655,700	$39,926,200	$117,418,960	$608,834,800	$1,956,352,160
2040	$677,061,600	$552,609,400	$2,319,400	$4,813,400	$41,810,400	$122,639,760	$636,603,300	$2,037,857,260
2041	$701,177,100	$572,560,000	$2,397,500	$4,980,500	$43,735,600	$128,563,040	$663,434,800	$2,116,848,540
2042	$726,286,500	$594,160,200	$2,482,200	$5,162,400	$45,828,300	$135,054,240	$692,498,600	$2,201,472,440
2043	$751,049,000	$615,849,300	$2,551,700	$5,312,300	$47,865,300	$140,142,320	$722,029,600	$2,284,799,520
2044	$777,513,600	$639,355,400	$2,627,200	$5,475,500	$50,070,800	$145,637,200	$754,078,800	$2,374,758,500
2045	$804,024,300	$663,018,500	$2,707,900	$5,649,500	$52,326,400	$152,069,440	$785,430,700	$2,465,226,740
2046	$831,467,500	$688,668,400	$2,795,900	$5,839,500	$54,615,000	$158,600,160	$819,417,600	$2,561,404,060
2047	$858,699,300	$714,112,800	$2,887,900	$6,037,400	$56,930,600	$164,763,920	$853,935,900	$2,657,367,820
2048	$887,848,000	$741,693,300	$2,987,900	$6,253,000	$59,445,100	$171,494,880	$891,389,500	$2,761,111,680
2049	$916,514,200	$769,299,300	$3,070,800	$6,433,100	$61,875,300	$177,864,800	$928,347,600	$2,863,405,100
2050	$947,257,000	$799,219,300	$3,160,700	$6,628,100	$64,504,600	$184,768,480	$968,259,500	$2,973,797,680
2051	$977,984,700	$828,806,800	$3,265,800	$6,855,300	$67,271,800	$192,424,960	$1,008,186,600	$3,084,795,960
2052	$1,010,966,700	$860,877,800	$3,380,400	$7,103,200	$70,277,600	$200,733,200	$1,051,469,000	$3,204,807,900
2053	$1,044,273,800	$892,372,800	$3,476,600	$7,312,600	$73,182,600	$208,298,560	$1,095,425,300	$3,324,342,260
2054	$1,080,007,500	$926,494,700	$3,581,200	$7,540,000	$76,327,100	$216,526,400	$1,143,098,800	$3,453,575,700
2055	$1,114,946,200	$960,627,400	$3,699,600	$7,797,200	$79,606,800	$225,291,680	$1,190,719,800	$3,582,688,680
2056	$1,152,399,400	$997,615,000	$3,828,600	$8,077,100	$83,168,600	$234,838,080	$1,242,117,800	$3,722,044,580
2057	$1,189,449,400	$1,032,619,900	$3,938,200	$8,316,800	$86,611,800	$243,448,240	$1,293,108,000	$3,857,492,340
2058	$1,228,996,300	$1,069,478,300	$4,057,100	$8,576,300	$90,339,600	$252,793,040	$905,868,400	$3,560,109,040
2059	$1,268,867,900	$1,105,862,800	$4,189,900	$8,865,800	$94,198,600	$263,248,000	$0	$2,745,233,000
2060	$1,311,653,300	$1,145,352,000	$4,334,700	$9,181,500	$98,388,600	$274,635,200	$0	$2,843,545,300
2061	$1,353,458,900	$1,184,234,500	$4,458,800	$9,453,700	$102,440,300	$284,780,160	$0	$2,938,826,360
2062	$1,398,283,300	$1,226,435,500	$4,593,600	$9,749,200	$106,826,400	$295,775,280	$0	$3,041,663,280
Total	**$34,671,641,500**	**$29,054,732,700**	**$121,782,800**	**$251,841,400**	**$2,262,008,300**	**$6,309,365,920**	**$27,061,832,000**	**$99,733,204,620**

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CHAPTER 1
INTRODUCTION

This comprehensive traffic and revenue report reflects all current efforts requested of Wilbur Smith Associates (WSA) by the North Texas Tollway Authority (NTTA) to update the traffic and toll revenue forecasts for the NTTA System (NTTAS). The work efforts associated with this endeavor include the development of a system-wide review and update of traffic and toll revenue estimates for the NTTAS facilities.

Figure 1-1 illustrates all the facilities that were assumed to be part of the NTTAS corridors. The following facilities are assumed to be part of the NTTAS:

Currently Open Facilities:

- Dallas North Tollway (DNT) from IH 35E to US 380
- President George Bush Turnpike (PGBT) from Belt Line Road to SH 78
- Sam Rayburn Tollway (SRT) from Business 121 to East of Hillcrest Road
- Addison Airport Toll Tunnel (AATT)
- Mountain Creek Lake Bridge (MCLB)

Future Facilities:

- Lewisville Lake Toll Bridge (LLTB), scheduled to open to traffic on August 15, 2009
- PGBT Eastern Extension (PGBT EE), scheduled to open to traffic December 1, 2011
- Remaining Sections of SRT:
  - SRT Segment 3S: East of Hillcrest Road to East of Custer Road, scheduled to be open on September 1, 2009
  - SRT Segment 3N: East of Custer Road to East of Lake Forest Drive, scheduled to be open on October 1, 2009
  - SRT Segment 4: East of Lake Forest Drive to US 75, including the SRT/US 75 interchange, scheduled to be open on January 1, 2011
  - SRT Segment 5: SRT/DNT interchange, scheduled to be open on January 1, 2012

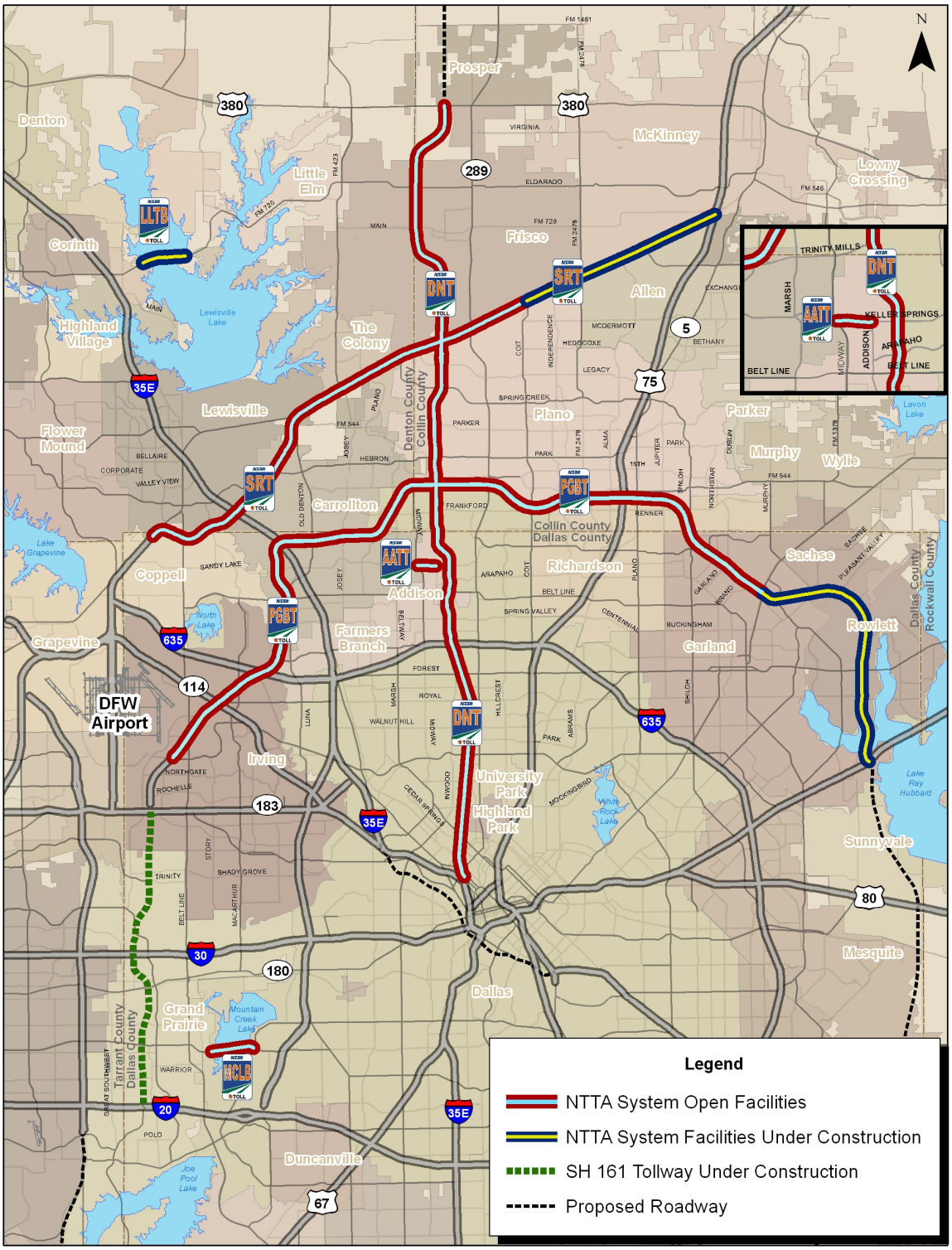

Figure 1-1. NTTA System

BACKGROUND AND AUTHORITY FOR STUDY

In October 2007, WSA completed the *Dallas North Tollway System and SH 121 Tollway Investment Grade Traffic and Toll Revenue Study* (DNTS report). Previously known as the DNT System, the NTTA System now includes Sam Rayburn Tollway (formerly known as 121 Tollway) and the PGBT EE. In August 2008, WSA completed the *President George Bush Turnpike Eastern Extension Investment Grade Traffic and Toll Revenue Study* (PGBT EE report). Both studies were based on the demographic forecasts and transportation modeling networks developed by the North Central Texas Council of Governments (NCTCOG) for the Mobility 2030 Plan, approved by the RTC in January 2007. Due to sudden surge in gasoline prices in mid-2008, WSA produced a report titled *The Impacts of Gasoline Price on Traffic and Toll Revenue* dated August 2008 (White Paper).

Since the completion of the DNTS report, the PGBT EE report and the White Paper, several key events have occurred and circumstances have arisen that require a re-evaluation of the traffic and toll revenue estimates. These key events include:

- Economic downturn
  - Impact on NTTAS traffic
  - Population, housing and employment growth noticeably affected
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- Toll rate policy changes
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  - Development of 2009 Update to Mobility 2030 Plan (MTP 2030 – 2009 Update).

The following factors were incorporated in the current study:

- The travel demand model was updated to account for the impact produced by the economic recession. Understanding how travel is affected by the current economic stresses is a key component of forecasting travel behavior.
- NCTCOG's official demographics along with the "revised" demographics from the 2007 DNTS report were examined in light of the economic downturn. Conclusions from that independent review altered the previously assumed revised demographics.
- All aspects of tolling were examined to ensure the latest NTTA plans were taken into account. In August 2007, NTTA Board of Directors approved the system-wide conversion to all-electronic toll collection (all-ETC) on all NTTA facilities. Sections of the NTTAS are operating today as all-ETC. Traffic and revenue

experience at those specific locations was examined in great detail to inform the traffic and revenue estimates on each of the other facilities. A toll adjustment was implemented in late 2007 on the NTTAS (a TollTag toll increase of about 16.7 percent at the then existing DNT and PGBT mainlane plazas). The impacts to traffic and revenue from that toll adjustment were used to refine the forecasts associated with future scheduled increases.

- As traffic growth has slowed, and even declined on some facilities, previously determined needs for additional roadway capacity were reexamined. Congestion thresholds that indicate the need for additional capacity are likely to be reached further into the future than previously predicted.
- In April 2009, the Regional Transportation Council (RTC) approved the 2009 Update to the Mobility 2030 Plan. This investment grade study incorporates all the regional transportation infrastructure included in the 2009 Update. The official demographic forecast datasets for the Dallas-Fort Worth region adopted by the NCTCOG Executive Board in 2003 were used as part of the Mobility 2030 Plan-2009 Update.

OBJECTIVE AND SCOPE OF STUDY

The purpose of this study is to update traffic and toll revenue forecasts for the NTTAS (see Figure 1-1). The following outlines the general structure of the report:

CHAPTER 2 – EXISTING TRAFFIC TRENDS AND CHARACTERISTICS

This chapter illustrates the historical traffic trends on the existing NTTAS and nearby major arterials. Traffic characteristics such as traffic counts, speed and delay and others are detailed in this chapter.

CHAPTER 3 – DALLAS-FORT WORTH AREA TRANSPORTATION EXISTING AND PLANNED IMPROVEMENTS

This section contains a broad overview of the transportation system in the Dallas-Fort Worth region and outlines the region-wide characteristics that may impact the NTTAS. The Mobility 2030 Plan-2009 Update transportation commitments are described in this chapter.

CHAPTER 4 – SUMMARY OF MOTORIST TRAVEL PATTERN SURVEYS AND TRIP CHARACTERISTICS

This chapter summarizes the regional origin/destination (O/D) survey performed by WSA in 2002 for the NTTA and a survey conducted in 2006 in the SRT corridor.

CHAPTER 5 – NTTA SYSTEM DEMOGRAPHIC GROWTH CHARACTERISTICS

This chapter provides an overview of the methodology used to develop the official future socioeconomic datasets for the Dallas-Fort Worth Metropolitan Area (DFWMA) created and approved by the Regional Transportation Council (RTC) in 2003. NCTCOG demographic projections were evaluated throughout the areas surrounding the NTTAS.

During the last five years NTTA has authorized multiple independent economic reviews along NTTAS corridors and elsewhere in the DFW metroplex. The demographic datasets which include the findings of these independent economic reviews were incorporated into the NCTCOG travel demand model to develop an alternate set of trip tables, which are used for the traffic and revenue estimation.

CHAPTER 6 – TRAVEL DEMAND MODEL DEVELOPMENT

This chapter describes the databases utilized as part of this analysis and highlights the methodologies implemented to calibrate and validate the travel demand model. The model is used to estimate future traffic on toll facilities, and it is calibrated to the current traffic conditions to ensure that future projections are consistent with observed traffic characteristics along the corridors.

CHAPTER 7 – NTTA SYSTEM ESTIMATED TRANSACTIONS AND TOLL REVENUE

The toll sensitivity analyses performed as part of the study are described in detail in this chapter. Included as part of this section is the analysis of the transactions and toll revenues anticipated on the NTTAS.

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CHAPTER 2

EXISTING TRAFFIC TRENDS AND CHARACTERISTICS

This chapter provides background information regarding the existing traffic conditions for the highway infrastructure in and around the North Texas Tollway Authority System (NTTAS). The information in this chapter provides a historical overview of traffic in the vicinity of the corridors and was used as input when developing the toll revenue forecasts.

NTTAS FACILITIES IN OPERATION

The NTTAS facilities which are currently operated and maintained by NTTA include DNT, PGBT, SRT, AATT and MCLB.

DALLAS NORTH TOLLWAY

The DNT, as shown in Figure 2-1, is currently functioning as a limited-access, high-speed toll facility which extends from the junction with the Stemmons Freeway (IH 35E) north of downtown Dallas, northbound through the rapidly growing north Dallas suburbs to US 380 in Frisco. The existing DNT covers a distance of approximately 31 miles. The original DNT, which extended from its current southern terminus to IH 635, was constructed and opened to traffic in its entirety in June 1968. It was extended to Frankford Road in June 1987 and to Legacy Road in Plano in September 1994. In April 2004, with the completion of the grade-separated multi-level interchange with SRT, the DNT was extended north to just south of Gaylord Parkway in Frisco. The Extension Phase 3 extended the DNT from Gaylord Parkway to US 380 and opened to traffic on September 28, 2007. The opening sequence for the DNT is shown in Table 2-1.

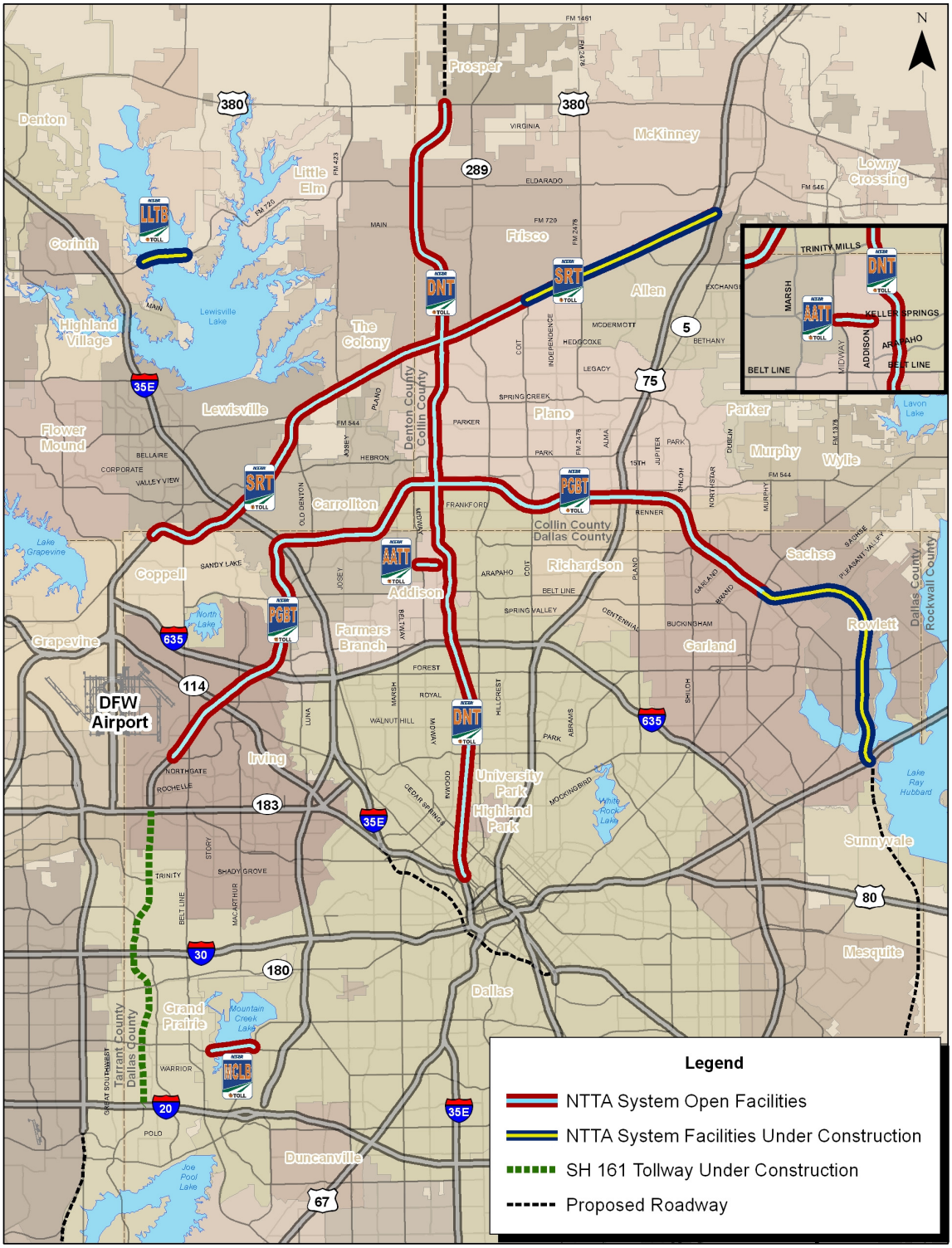


Figure 2-1. The NTTA System

Table 2-1 Opening Sequence of DNT		
Project Phasing	**Segment**	**Completion Date**
Phase 1	IH 35E to IH 635	June 1968
Phase 1 Extension	IH 635 to Frankford Road	June 1987
Phase 2	Frankford Road to Legacy Road	September 1994
Phase 2 Extension	Legacy Road to Gaylord Parkway	April 2004
Phase 3 Extension	Gaylord Parkway to US 380	September 2007

The existing DNT utilizes a "closed" toll collection system. Each of the four major sections of the facility have one mainlane toll plaza at which tolls are collected in both directions, with toll plazas positioned at selected ramps to prohibit toll-free movements on the facility. The sections of the DNT north of the IH 635 are flanked by city- or county-maintained service roads.

Access to the DNT is provided by a series of full interchanges located at Mockingbird Lane, Northwest Highway, Royal Lane, IH 635, Spring Valley Road, Belt Line Road, Keller Springs Road, Frankford Road, PGBT, West Park Boulevard, Parker Road, Spring Creek Parkway, John Hickman, Stonebrook Parkway, Cotton Gin Road, and Eldorado Parkway. Additional access is provided via partial interchanges located at Oaklawn Avenue, Wycliff Avenue, Cedar Springs Road, Lemmon Avenue, Lovers Lane, Walnut Hill Lane, Forest Lane, Harvest Hill Road, Alpha Road, Trinity Mills Road, Plano Parkway, Windhaven Parkway, Legacy Drive, Headquarters Drive, SRT, Gaylord Parkway, Panther Creek Parkway, and County Road 24.

PRESIDENT GEORGE BUSH TURNPIKE

As illustrated in Figure 2-1, the PGBT currently extends from the junction with SH 78 and Northeast Parkway at its eastern end, traversing the communities of Garland and Richardson to a junction with US 75. The PGBT continues westward through the cities of Plano and Dallas to an interchange with the DNT. The facility then continues in the southwest direction through Carrollton to the interchange with IH 35E. At this point from IH 35E, the PGBT turns due south, along the section referred to as Segment IV, to the interchange with IH 635. From IH 635, the PGBT section referred to as Segment V continues southwesterly through the City of Irving to the northern terminus of the existing SH 161 mainlanes in the vicinity of Belt Line Road just east of the DFW International Airport. The entire PGBT, from SH 78 to Belt Line Road covers a total distance of approximately 30 miles. The opening sequence of the PGBT facility is shown in Table 2-2.

Table 2-2
Opening Sequence of PGBT

Project Phasing	Segment	Completion Date
Segment I A	Midway Road to Preston Road	November 1998
Segment I B	Preston Road to Coit Road	June 1999
Segment I C	Coit Road to US 75	December 1999
Segment II A	US 75 to Campbell Road	December 1999
Segment II B	Campbell Road to SH 78	April 2000
Segment III	Midway Road to IH 35E	July 2001
Segment IV	IH 35E to IH 635	September 2005
Segment V	IH 635 to Beltline Road	December 2001

The PGBT utilizes a "semi-closed" system of toll collection. The PGBT has five mainlane plazas positioned along the entire length of the facility with ramp plazas positioned on selected ramps along the project. Early in the PGBT planning process, it was decided that free access would be provided to the interchanges located at SH 78, US 75 and IH 35E, thus not meeting the requirements of a traditional "closed" toll collection system. Selected portions of the PGBT are flanked by city/county-maintained frontage roads.

Access to the completed PGBT is provided by full interchanges located at North Garland Avenue, Campbell Road, Renner Road, Jupiter Road, US 75, Independence Parkway, Coit Road, Preston Road, DNT, Josey Lane, Old Denton Road, IH 35E, Sandy Lake Road, Belt Line Road, Valley View Lane and Royal Lane. Partial interchanges are located at Shiloh Road, Plano Road, Alma Drive, Custer Drive, Midway Road, Rosemeade Parkway, Marsh Lane, Frankford Road, Kelly Boulevard, IH 635, Las Colinas Boulevard, SH 114, Gateway, and Belt Line Road. Additional intermediate access is allowed via a system of frontage roads and slip ramps.

SAM RAYBURN TOLLWAY

The SRT corridor is about 26 miles in length and runs in a northeast/southwest direction between the interchange of US 75 in McKinney and Denton Tap Road near the bridge over Denton Creek in Coppell. The corridor is crossed by several arterial streets as well as the DNT and IH 35E. Currently, the mainlanes of the facility are open from Denton Creek to Coit Road. The opening sequence for the SRT is shown in Table 2-3. The SRT currently utilizes a "semi-closed" system of toll collection. Toll-free sections are currently located at the SRT/IH 35E and SRT/DNT interchanges.

Table 2-3 Opening Sequence of SRT		
Project Phasing	**Segment**	**Completion Date**
Phase 1	Denton Tap Road to Old Denton Road	July 2006
Phase 2	Old Denton Road to Coit Road	August 2008

ADDISON AIRPORT TOLL TUNNEL

The AATT is located in Addison to the west of the DNT between IH 635 and the PGBT as shown in Figure 2-1. The AATT is a connector for Keller Springs Road and covers a distance of approximately 3,700 feet from Midway Road to Addison Road with the actual tunnel length being 1,600 feet long traveling under the Addison Airport runway. The AATT is a 2-lane facility and is served by a single two-way toll plaza located at the western terminus. The AATT opened to traffic in February 1999.

MOUNTAIN CREEK LAKE BRIDGE

The MCLB is located in southwest Dallas and crosses Mountain Creek Lake and connects to Spur 303 on either side. The total length of the MCLB including approach roads is approximately two miles. The MCLB is a two lane facility served by a single two-way toll plaza located at its western terminus. The MCLB was opened to traffic on April 30, 1979.

TOLL COLLECTION SYSTEMS

The following section provides a summary of the existing NTTAS toll collection configuration and toll rates. Also included is a comparison of DNT, PGBT and SRT per mile toll rates with other similar toll facilities throughout the United States. A brief description of the NTTA TollTag System is also provided.

Dallas North Tollway

As shown in Figure 2-2, the southernmost Mainlane Plaza 1 (MLP 1) is located between Wycliff Avenue and Cedar Springs Road. Ramp toll collection facilities within the original portion of the DNT are located at Mockingbird Lane, Northwest Highway and Royal Lane to and from the north only.

On the Extension Phase 1, the MLP 2 is located between Arapaho Road and Keller Springs Road. Ramp toll collection facilities within the Extension Phase 1 are located at Spring Valley Road and Belt Line Road to and from the south, and at Keller Springs Road and Frankford Road to and from the north.

The MLP 3 on the Extension Phase 2 is located between Chapel Hill Boulevard and Parker Road. Ramp toll collection facilities within the Extension Phase 2 are located to and from the south at Park Boulevard, and to and from the north at Parker Road and

Spring Creek Parkway. In addition, with completion of the SRT/DNT interchange ramp toll collection facilities are located to and from the south on the ramps just north of SRT.

On the Extension Phase 3, the MLP 4 is located between Main Street and Eldorado Parkway. Ramp toll collection facilities within the Extension Phase 3 are located to and from the south of John Hickman, Stonebrook Parkway, and Cotton Gin Road. Additional ramp toll collection facilities are located to and from the north of Eldorado Parkway.

President George Bush Turnpike

The collection system for the PGBT is presented in Figure 2-3. There are five mainlane plazas between SH 78 in the City of Garland and Belt Line Road in the City of Irving. MLP 6 is positioned between Shiloh Road and Renner Road; MLP 7 is located between Coit Road and Hillcrest Road; MLP 8 is placed between Frankford Road and Kelley Boulevard; MLP 9 is set between Sandy Lake Road and Belt Line Road in Carrollton/Farmers Branch; and MLP 10 is located between Gateway Road and Belt Line Road in Irving.

When traveling eastbound on the PGBT the on-ramp toll plazas are located west of Gateway Road, east of Royal Lane, east of Marsh Lane, east of Midway Road, east of Coit Road, west of Custer Drive, east of Shiloh Road, east of Campbell Road, and east of Garland Avenue. While the off- ramp toll plazas are located west of Beltline Road, west of Josey Lane, west of Kelly Boulevard, west of Preston Road, east of Jupiter Road and east of Renner Road.

When traveling westbound on the PGBT the on-ramp toll plazas are located east of Renner Road, west of Preston Road, west of Kelly Boulevard, west of Josey Lane and west of Belt Line Road, while the off-ramp toll plazas are located east of Garland Avenue, east of Campbell Road, east of Shiloh Road, west of Custer Drive, east of Coit Road, east of Midway Road, east of Royal Lane and west of Gateway Road.

Sam Rayburn Tollway

Tolls are currently collected on the SRT at two mainlane gantries and thirteen pairs of ramp gantries as shown in Figure 2-4. The mainlane gantries are located at Denton Tap and Josey Lane. The ramp gantries are located at MacArthur Boulevard, Carrollton Parkway, FM 544, FM 2281, Standridge Drive, Josey Lane, Plano Parkway, Spring Creek Parkway, Preston Road, Ohio Drive and Coit Road.

Addison Airport Toll Tunnel and Mountain Creek Lake Bridge

As stated previously, the AATT and MCLB are each served by a single mainlane toll plaza. The mainlane plaza for the AATT is positioned at the western terminus of the tunnel. The mainlane plaza for the MCLB is located at the bridge's western terminus.

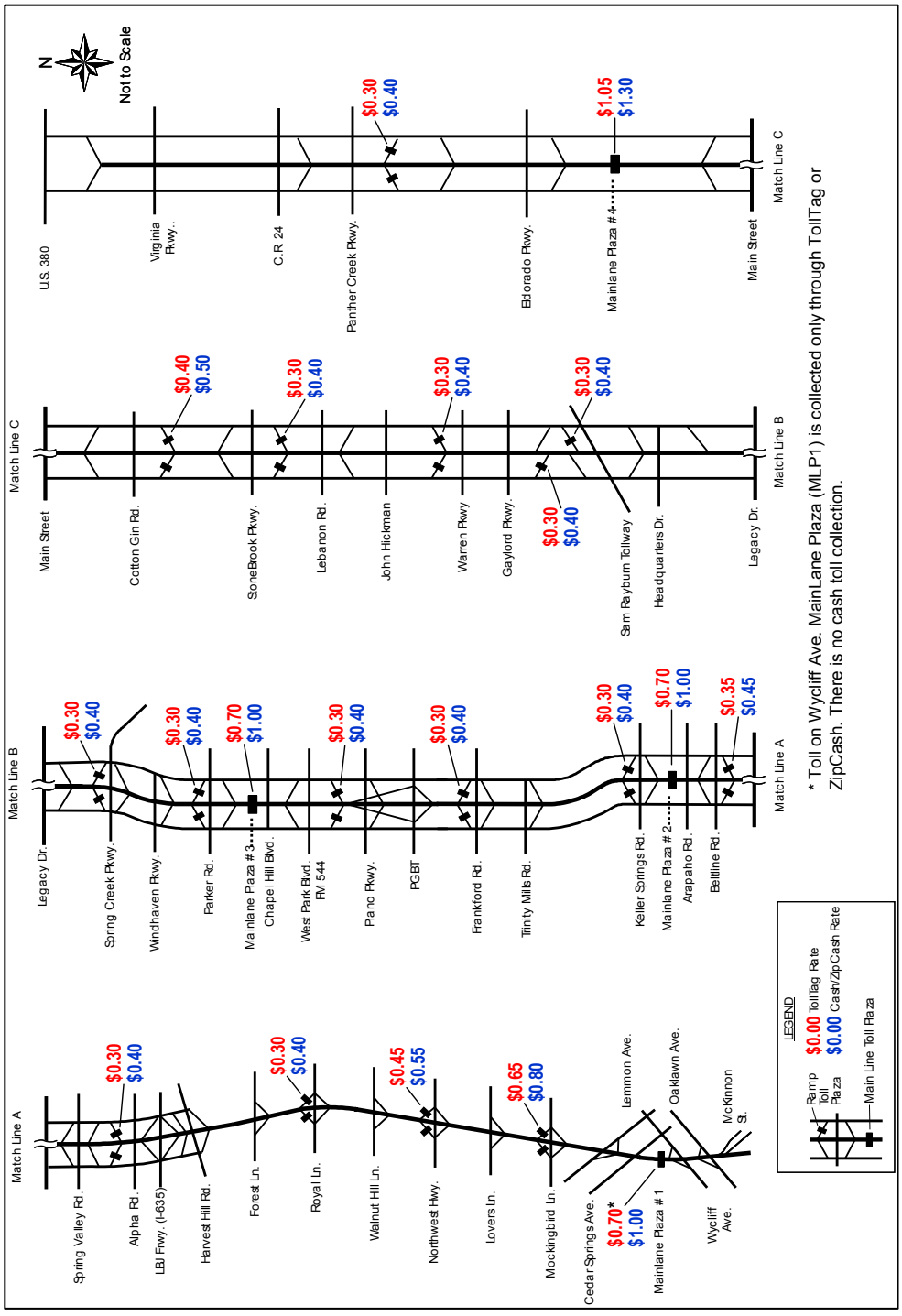


Figure 2-2. Current DNT Toll Collection System and Passenger Car Toll Rates

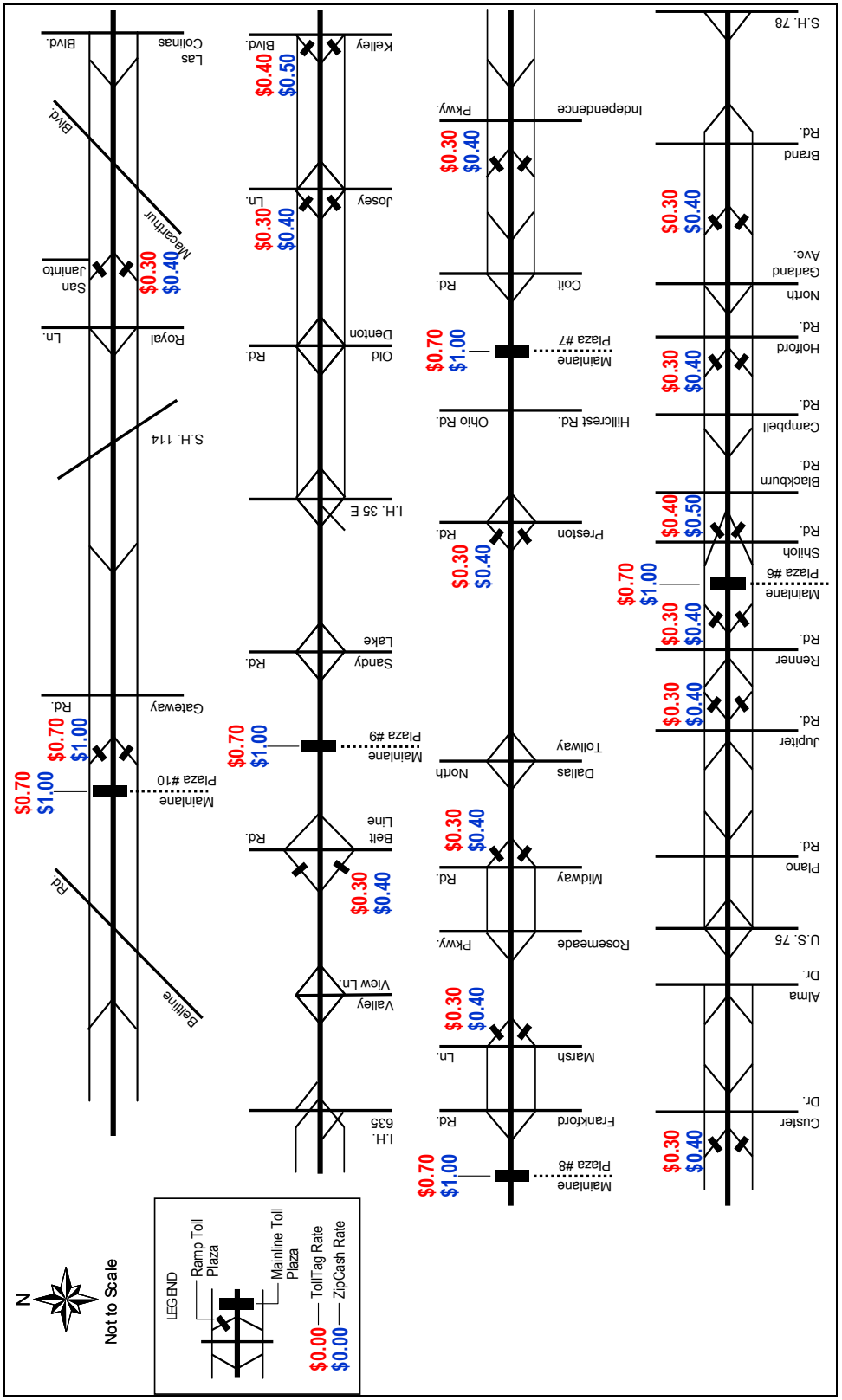


Figure 2-3. Current PGBT Toll Collection System and Passenger Car Toll Rates

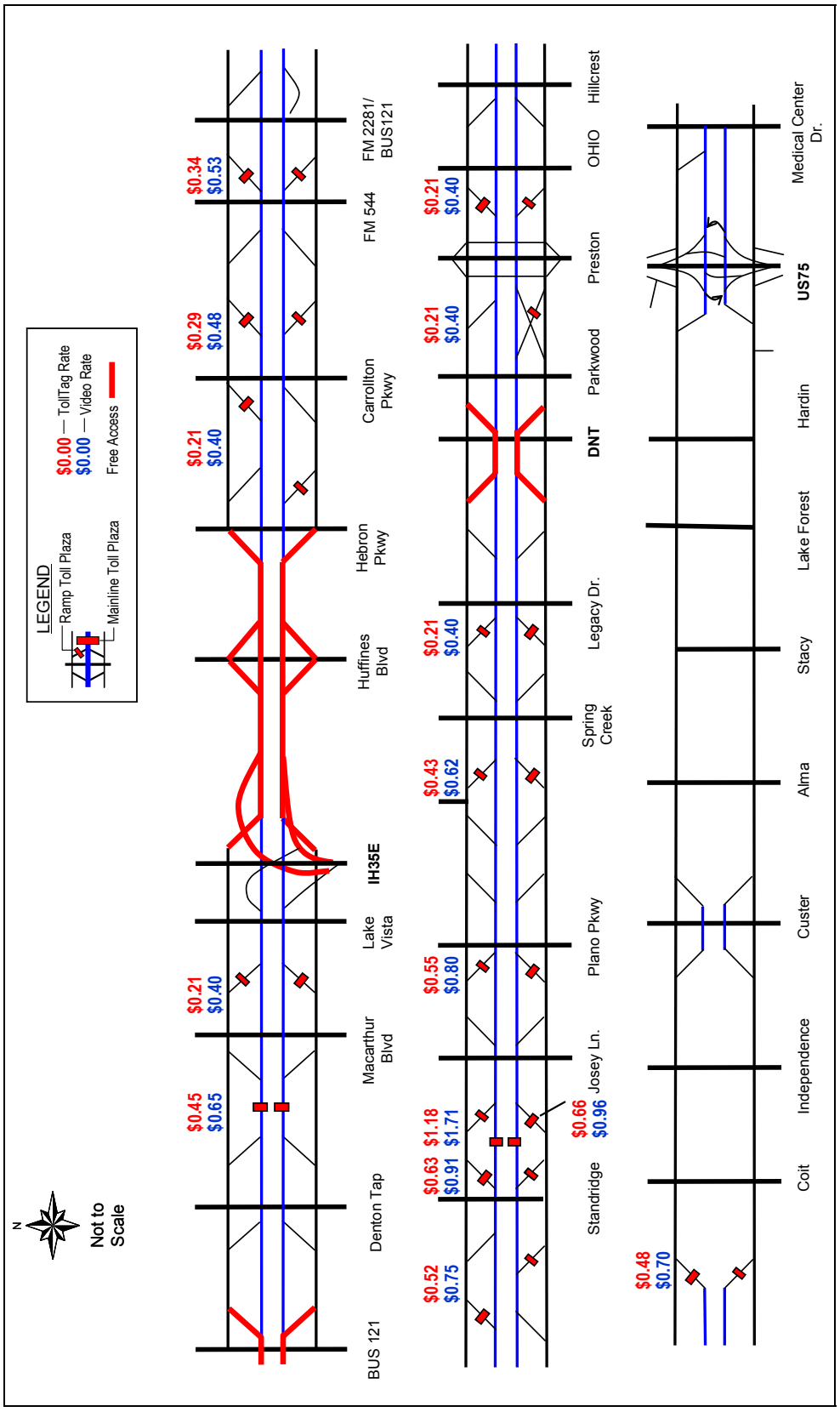


Figure 2-4. Current SRT Toll Collection System and Passenger Car Toll Rates

NTTAS TOLL RATES

The existing toll schedule that went into effect on September 29, 2007 where the passenger car tolls on mainlane plazas on the DNT and PGBT is $0.70 for TollTag users and $1.00 for cash users on all of the mainlane plazas except MLP 4 where the toll is $1.05 for TollTag users and $1.30 for cash users. Ramp location tolls range from $0.30 to $0.70 for TollTag patrons and from $0.40 to $1.00 for cash users as shown in Table 2-4. NTTA has adopted an axle-based vehicle classification system. For example, tolls charged to vehicles with five axles on PGBT and DNT is four times the toll charged to vehicles with two axles. Currently, MLP 1 on the DNT and all the plazas on the PGBT operate under cashless (ZipCash) toll collection system, where the license plates of vehicles without TollTags using these facilities are photographed and are invoiced at a higher toll than the TollTag toll.

On the SRT, tolls range from $0.21 to $1.18 at the Josey Lane mainlane gantry for users paying by TollTag. SRT was constructed as an all electronic facility utilizing the ZipCash toll collection system and never accepted cash payments. ZipCash tolls range from $0.40 to $1.71 at the Josey Lane mainlane gantry. Gantry tolls are calculated based upon the influence distance served by the specific tolling location.

As shown in Table 2-4, currently there is no cash differential for TollTag and cash patrons for the AATT and MCLB and ZipCash has yet to be deployed on these two facilities.

TollTag Program

In July 1989, a voluntary subscription electronic toll collection (ETC) system based on automatic vehicle identification (AVI) was installed on DNT. Prior to August 1, 1999 the program, known as TollTag, charged patrons a slightly higher toll and a monthly service fee. Subsequent to August 1, 1999, TollTag and cash patrons were assessed tolls under the revised cash differential, $0.60/$0.75 toll rate scenario. On January 1, 2002, this same $0.60/$0.75 toll rate scenario was implemented on the PGBT. Since its introduction, the TollTag program has gained substantial popularity by assisting in the reduction of patron delay at toll plazas. Approximately 15,000 TollTags were in circulation in 1989, which more than doubled to approximately 32,000 by the end of 1990 and reached the milestone of one million in November 2005. As of May 2009, about 1.6 million TollTags were in circulation.

Comparison of Per-Mile Toll Rates

The average per-mile toll rates for passenger cars on the DNT, PGBT and SRT are compared with other representative urban toll facilities throughout the United States in Figure 2-5. In general, toll rates on the NTTAS fall within the range of rates on other urban toll facilities. Currently, the average per-mile toll rate is approximately 11 cents/mile on the DNT and PGBT for TollTag users and 13.9 cents/mile on the SRT. The TollTag rate on the DNT, PGBT and SRT is expected to increase to 14.5 cents/mile in September 2009.

Table 2-4

Existing NTTAS Toll Rates

Dallas North Tollway

Toll Plaza	Two-Axle Passenger Cars and Trucks		Three-Axle Vehicles and Vehicle Combinations		Four-Axle Vehicles and Vehicle Combinations		Five-Axle Vehicles and Vehicle Combinations		Six or More Axle Vehicles and Special Permits	
	TollTag	Cash	TollTag	Cash	TollTag	Cash	TollTag	Cash	TollTag	Cash
Mainlane Plaza 1*	$0.70	$1.00	$1.40	$2.00	$2.10	$3.00	$2.80	$4.00	$3.50	$5.00
Mockingbird Lane	$0.65	$0.80	$1.30	$1.60	$1.95	$2.40	$2.60	$3.20	$3.25	$4.00
Northwest Highway	$0.45	$0.55	$0.90	$1.10	$1.35	$1.65	$1.80	$2.20	$2.25	$2.75
Royal Lane	$0.30	$0.40	$0.60	$0.80	$0.90	$1.20	$1.20	$1.60	$1.50	$2.00
Spring Valley Road	$0.30	$0.40	$0.60	$0.80	$0.90	$1.20	$1.20	$1.60	$1.50	$2.00
Belt Line Road	$0.35	$0.45	$0.70	$0.90	$1.05	$1.35	$1.40	$1.80	$1.75	$2.25
Mainlane Plaza 2	$0.70	$1.00	$1.40	$2.00	$2.10	$3.00	$2.80	$4.00	$3.50	$5.00
Keller Springs Road	$0.30	$0.40	$0.60	$0.80	$0.90	$1.20	$1.20	$1.60	$1.50	$2.00
Frankford Road	$0.30	$0.40	$0.60	$0.80	$0.90	$1.20	$1.20	$1.60	$1.50	$2.00
FM 544	$0.30	$0.40	$0.60	$0.80	$0.90	$1.20	$1.20	$1.60	$1.50	$2.00
Mainlane Plaza 3	$0.70	$1.00	$1.40	$2.00	$2.10	$3.00	$2.80	$4.00	$3.50	$5.00
Parker Road	$0.30	$0.40	$0.60	$0.80	$0.90	$1.20	$1.20	$1.60	$1.50	$2.00
Spring Creek Parkway	$0.30	$0.40	$0.60	$0.80	$0.90	$1.20	$1.20	$1.60	$1.50	$2.00
Gaylord Parkway	$0.30	$0.40	$0.60	$0.80	$0.90	$1.20	$1.20	$1.60	$1.50	$2.00
Lebanon Road	$0.30	$0.40	$0.60	$0.80	$0.90	$1.20	$1.20	$1.60	$1.50	$2.00
Stone Brook Parkway	$0.30	$0.40	$0.60	$0.80	$0.90	$1.20	$1.20	$1.60	$1.50	$2.00
Cotton Gin Rd./Main St.	$0.40	$0.50	$0.80	$1.00	$1.20	$1.50	$1.60	$2.00	$2.00	$2.50
Mainlane Plaza 4	$1.05	$1.30	$2.10	$2.60	$3.15	$3.90	$4.20	$5.20	$5.25	$6.50
Eldorado Parkway(FM 2934)	$0.30	$0.40	$0.60	$0.80	$0.90	$1.20	$1.20	$1.60	$1.50	$2.00

President George Bush Turnpike

Toll Plaza	Two-Axle Passenger Cars and Trucks		Three-Axle Vehicles and Vehicle Combinations		Four-Axle Vehicles and Vehicle Combinations		Five-Axle Vehicles and Vehicle Combinations		Six or More Axle Vehicles and Special Permits	
	TollTag	Cash	TollTag	Cash	TollTag	Cash	TollTag	Cash	TollTag	Cash
North Garland Avenue	$0.30	$0.40	$0.60	$0.80	$0.90	$1.20	$1.20	$1.60	$1.50	$2.00
Campbell Road	$0.30	$0.40	$0.60	$0.80	$0.90	$1.20	$1.20	$1.60	$1.50	$2.00
East Renner Road	$0.40	$0.50	$0.80	$1.00	$1.20	$1.50	$1.60	$2.00	$2.00	$2.50
Mainlane Plaza 6	$0.70	$1.00	$1.40	$2.00	$2.10	$3.00	$2.80	$4.00	$3.50	$5.00
Shiloh Road	$0.30	$0.40	$0.60	$0.80	$0.90	$1.20	$1.20	$1.60	$1.50	$2.00
West Renner Road	$0.30	$0.40	$0.60	$0.80	$0.90	$1.20	$1.20	$1.60	$1.50	$2.00
Independence Parkway	$0.30	$0.40	$0.60	$0.80	$0.90	$1.20	$1.20	$1.60	$1.50	$2.00
Coit Road	$0.30	$0.40	$0.60	$0.80	$0.90	$1.20	$1.20	$1.60	$1.50	$2.00
Mainlane Plaza 7	$0.70	$1.00	$1.40	$2.00	$2.10	$3.00	$2.80	$4.00	$3.50	$5.00
Preston Road	$0.30	$0.40	$0.60	$0.80	$0.90	$1.20	$1.20	$1.60	$1.50	$2.00
Midway Road	$0.30	$0.40	$0.60	$0.80	$0.90	$1.20	$1.20	$1.60	$1.50	$2.00
Marsh Lane	$0.30	$0.40	$0.60	$0.80	$0.90	$1.20	$1.20	$1.60	$1.50	$2.00
Mainlane Plaza 8	$0.70	$1.00	$1.40	$2.00	$2.10	$3.00	$2.80	$4.00	$3.50	$5.00
Kelly Boulevard	$0.40	$0.50	$0.80	$1.00	$1.20	$1.50	$1.60	$2.00	$2.00	$2.50
Josey Lane	$0.30	$0.40	$0.60	$0.80	$0.90	$1.20	$1.20	$1.60	$1.50	$2.00
Mainlane Plaza 9	$0.70	$1.00	$1.40	$2.00	$2.10	$3.00	$2.80	$4.00	$3.50	$5.00
Belt Line Road North	$0.30	$0.40	$0.60	$0.80	$0.90	$1.20	$1.20	$1.60	$1.50	$2.00
Royal Lane	$0.30	$0.40	$0.60	$0.80	$0.90	$1.20	$1.20	$1.60	$1.50	$2.00
Belt Line Road South	$0.70	$1.00	$1.40	$2.00	$2.10	$3.00	$2.80	$4.00	$3.50	$5.00
Mainlane Plaza 10	$0.70	$1.00	$1.40	$2.00	$2.10	$3.00	$2.80	$4.00	$3.50	$5.00

Sam Rayburn Tollway

Toll Plaza	Two-Axle Passenger Cars and Trucks		Three-Axle Vehicles and Vehicle Combinations		Four-Axle Vehicles and Vehicle Combinations		Five-Axle Vehicles and Vehicle Combinations		Six or More Axle Vehicles and Special Permits	
	TollTag	Video	TollTag	Video	TollTag	Video	TollTag	Video	TollTag	Video
Denton Tap Mainlane Plaza	$0.45	$0.65	$0.90	$1.30	$1.35	$1.95	$1.80	$2.60	$2.25	$3.25
MacArthur Blvd	$0.21	$0.40	$0.42	$0.80	$0.63	$1.20	$0.84	$1.60	$1.05	$2.00
Carrollton Parkway	$0.21	$0.40	$0.42	$0.80	$0.63	$1.20	$0.84	$1.60	$1.05	$2.00
FM 544	$0.29	$0.48	$0.58	$0.96	$0.87	$1.44	$1.16	$1.92	$1.45	$2.40
FM 2281	$0.34	$0.53	$0.68	$1.06	$1.02	$1.59	$1.36	$2.12	$1.70	$2.65
Standridge Drive (West of Plaza)	$0.52	$0.75	$1.04	$1.50	$1.56	$2.25	$2.08	$3.00	$2.60	$3.75
Josey Lane (West of Plaza)	$0.63	$0.91	$1.26	$1.82	$1.89	$2.73	$2.52	$3.64	$3.15	$4.55
Josey Lane Mainlane Plaza	$1.18	$1.71	$2.36	$3.42	$3.54	$5.13	$4.72	$6.84	$5.90	$8.55
Standridge Drive (East of Plaza)	$0.66	$0.96	$1.32	$1.92	$1.98	$2.88	$2.64	$3.84	$3.30	$4.80
Josey Lane (East of Plaza)	$0.55	$0.80	$1.10	$1.60	$1.65	$2.40	$2.20	$3.20	$2.75	$4.00
Plano Parkway	$0.43	$0.62	$0.86	$1.24	$1.29	$1.86	$1.72	$2.48	$2.15	$3.10
Spring Creek Parkway	$0.21	$0.40	$0.42	$0.80	$0.63	$1.20	$0.84	$1.60	$1.05	$2.00
Preston Road	$0.21	$0.40	$0.42	$0.80	$0.63	$1.20	$0.84	$1.60	$1.05	$2.00
Ohio Drive	$0.21	$0.40	$0.42	$0.80	$0.63	$1.20	$0.84	$1.60	$1.05	$2.00
Coit Road	$0.48	$0.70	$0.96	$1.40	$1.44	$2.10	$1.92	$2.80	$2.40	$3.50

Other Facilities

Toll Plaza	Two-Axle Passenger Cars and Trucks		Three-Axle Vehicles and Vehicle Combinations		Four-Axle Vehicles and Vehicle Combinations		Five-Axle Vehicles and Vehicle Combinations		Six or More Axle Vehicles and Special Permits	
	TollTag	Cash/Video	TollTag	Cash/Video	TollTag	Cash/Video	TollTag	Cash/Video	TollTag	Cash/Video
AATT Main Plaza	$0.50	$0.50	$0.50	$0.50	$0.50	$0.50	$0.50	$0.50	$0.50	$0.50
MCLB Main Plaza	$0.50	$0.50	$0.75	$0.75	$1.00	$1.00	$1.25	$1.25	$1.50	$1.50

* Tolls on Main Lane Plaza 1 of the DNT are collected either through TollTag or ZipCash. There is no cash toll collection.

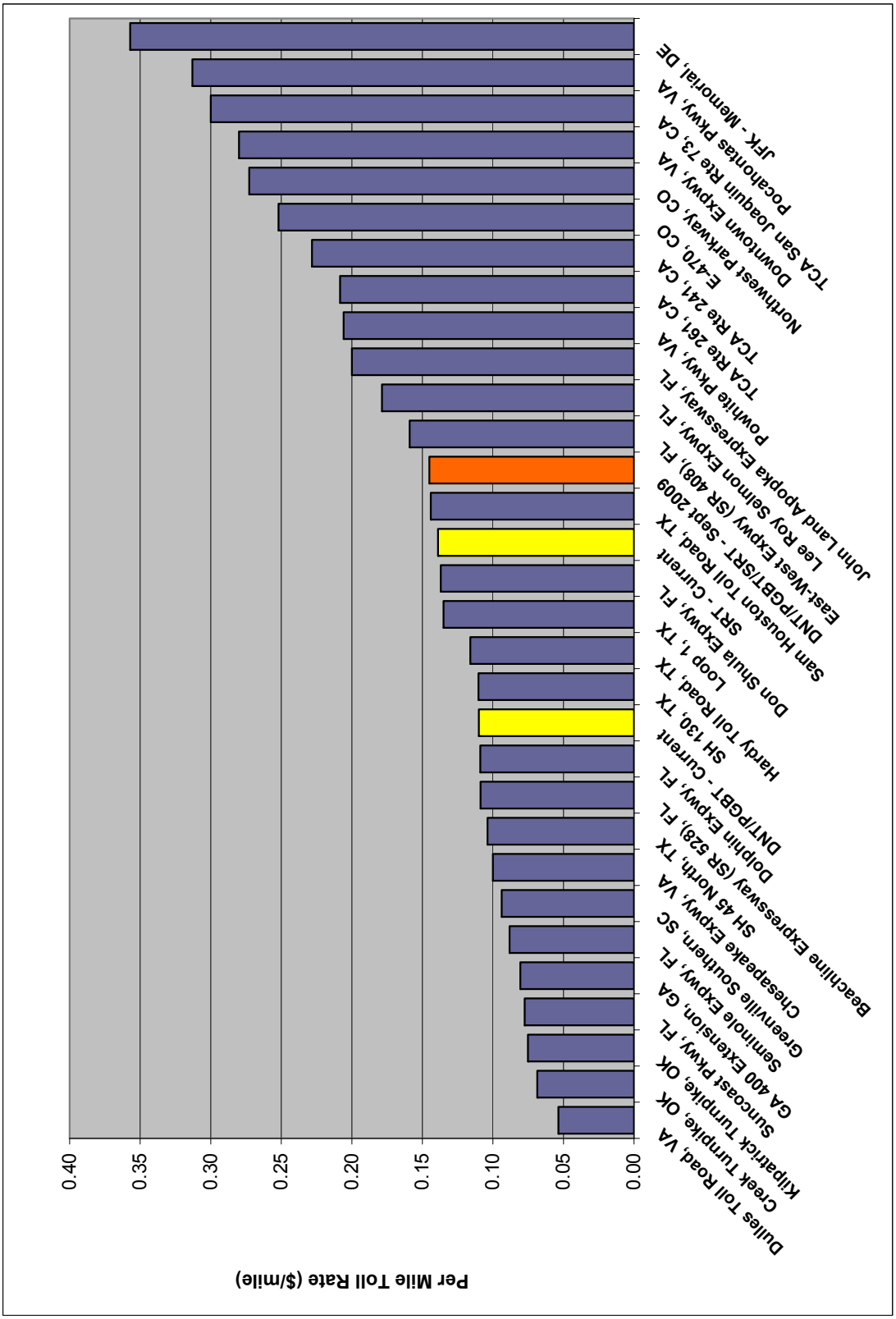


Figure 2-5. Per mile Toll Rate Comparison

ANNUAL TRANSACTION AND TOLL REVENUE TRENDS

WSA evaluated historical transaction and toll revenue trends on the NTTAS. This evaluation was used to provide a general understanding of the current, as well as historic, transaction and toll revenue performance of the NTTAS facilities. The analysis provided useful insight into the effect that major toll configuration changes, such as the addition of extension projects, have had on NTTAS transactions and toll revenue trends.

TRENDS IN AVERAGE DAILY TRANSACTIONS AND TOLL REVENUE

Trends in annual average daily transactions and toll revenue from 2005 to 2008 for the NTTAS facilities are presented in Table 2-5 and are based on unaudited transaction and revenue data from NTTA. The revenue data shown in Table 2-5 represents the "potential revenue." The actual revenue collected in any year would be slightly lower than that due to revenue leakage. In 2008, daily transactions averaged 566,340 on the DNT. From 2005 to 2008, annual average daily transactions have grown 3.1 percent per year. The annual growth of the toll revenue is about 9.4 percent. A total of over $132 million was collected on the DNT in 2008. As the facility grows and development expands northward, both transactions and toll revenues will likely remain robust.

As shown in Table 2-5, the opening of each additional segment of the PGBT had substantial impacts on the facility's annual growth. After completion of Segment IV in September 2005, the PGBT has grown at 21.6 percent between 2005 and 2006. PGBT continued to grow at 3.8 percent between 2006 and 2007. Trends in annual toll revenue on PGBT show similar patterns. However, transactions on the PGBT showed a modest decline in 2008 due to both the economic downturn and the opening of the SRT.

The AATT, as indicated in Table 2-5 has experienced both increases and declines in transactions and toll revenue growth over the past three years. There has been decrease in transactions between 2005 and 2006 which could be attributed to the opening of the Arapaho Road bridge in January 2006. The opening of the Arapaho Road bridge created a toll-free competing alternative parallel route for eastbound and westbound traffic along the AATT corridor.

Since its opening in November 1979, the MCLB has been subject to alternative periods of both positive and negative transactions and toll revenue growth, as is evident in Table 2-5. Perhaps the most direct influential factor in MCLB's performance has been the uncertainty associated with the development of the former Naval Air Station Dallas (NASD). After a phased closure beginning in 1993 mandated by Congress, all operations at the NASD officially ceased in September 1998 and were transferred to the Naval Air Station Joint Reserve Base (NASJRB) in Fort Worth. Developers have continued to show interest in developing the property; however, due to various permitting and zoning difficulties, development has not materialized. The MCLB transactions decreased by 5.4 percent between 2005 and 2006 and the annual toll revenue went down by 5.4 percent. There has been relatively little change in the traffic and revenue on the MCLB since 2006.

Table 2-6 and 2-7 show the monthly transactions and potential revenue for each facility from January 2005 until May 2009. As can be seen, there is a considerable drop in transactions in the latter half of 2008 and early 2009 due to the current economic downturn. SRT transactions are included from September 2008. Comparing September 2008 to May 2009, transactions on SRT are 19.6 percent higher, showing the ramping up of traffic volumes on that facility.

Table 2-5
NTTAS Transaction and Toll Revenue Trends

		Dallas North Tollway				President George Bush Turnpike			
		Annual Average Daily Transactions		Annual Toll Revenue		Annual Average Daily Transactions		Annual Toll Revenue	
Year		Number	Percent Change	Revenue	Percent Change	Number	Percent Change	Revenue	Percent Change
2005	(1)	517,217	--	$101,298,239	--	397,486	--	$84,154,968	--
2006		520,711	0.7	$101,691,036	0.4	483,437	21.6	$103,135,535	22.6
2007	(2)	535,337	2.8	$109,555,156	7.7	501,638	3.8	$111,900,090	8.5
2008	(3)	566,340	5.8	$132,543,699	21.0	493,841	-1.6	$124,363,307	11.1
Average Annual Percent Change									
2005-2008		3.1		9.4		7.5		13.9	

	Addison Airport Toll Tunnel				Mountain Creek Lake Bridge			
	Annual Average Daily Transactions		Annual Toll Revenue		Annual Average Daily Transactions		Annual Toll Revenue	
Year	Number	Percent Change	Revenue	Percent Change	Number	Percent Change	Revenue	Percent Change
2005	5,904	--	$1,067,822	--	8,848	--	$1,609,788	--
2006	5,799	-1.8	$1,048,720	-1.8	8,369	-5.4	$1,522,848	-5.4
2007	5,841	0.7	$1,056,979	0.8	8,383	0.2	$1,525,842	0.2
2008	5,618	-3.8	$1,021,095	-3.4	8,286	-1.1	$1,513,183	-0.8
Average Annual Percent Change								
2005-2008	-1.6		-1.5		-2.2		-2.0	

	Sam Rayburn Tollway			
	Annual Average Daily Transactions		Annual Toll Revenue	
Year	Number	Percent Change	Revenue	Percent Change
2005	--	--	--	--
2006	--	--	--	--
2007	--	--	--	--
2008	157,324	--	$15,151,744	--
Average Annual Percent Change				
2005-2008	--		--	

(1) Segment IV of PGBT opened to traffic on September 9, 2005
(2) DNT Phase 3 opened to traffic at the end of September 2007. Toll Rates on the NTTA System were increased at that time.
(3) Sam Rayburn Tollway Segment 2 opened to traffic in August 2008.

SOURCE: North Texas Tollway Authority (unaudited numbers)

Table 2-6
Monthly Toll Transaction Trends (DNT, PGBT, SRT, NTTAS)
2005-2009

Dallas North Tollway

Month	2005	Percent Change	2006	Percent Change	2007[2]	Percent Change	2008	Percent Change	2009
January	15,105,208	5.0	15,866,396	(7.1)	14,742,657	16.3	17,149,630	(3.9)	16,489,062
February	14,331,422	1.5	14,541,258	1.2	14,713,249	14.0	16,771,481	(3.7)	16,157,137
March	16,004,300	4.4	16,711,934	(0.2)	16,673,959	3.9	17,316,620	1.0	17,485,331
April	15,793,275	0.9	15,940,805	0.6	16,041,870	10.7	17,761,702	(1.0)	17,584,718
May	15,805,761	4.9	16,580,707	1.2	16,786,198	6.7	17,915,846	(1.1)	17,712,100
June	16,147,623	0.1	16,169,651	(0.7)	16,056,701	6.9	17,159,328	--	--
July	15,492,299	(0.8)	15,375,453	4.6	16,076,099	8.4	17,420,345	--	--
August	16,622,565	(1.4)	16,387,723	3.2	16,917,885	2.8	17,393,129	--	--
September	15,604,925	(1.0)	15,445,347	1.4	15,657,637	7.2	16,786,237	--	--
October	16,309,574	(0.9)	16,163,216	10.9	17,928,523	1.2	18,141,912	--	--
November	15,608,001	(2.9)	15,156,316	10.8	16,788,000	(3.4)	16,214,123	--	--
December	15,959,306	(1.5)	15,720,638	8.2	17,015,156	1.4	17,250,031	--	--
Total	188,784,259	0.7	190,059,444	2.8	195,397,934	6.1	207,280,384	--	85,428,348
Jan-May							86,915,279	(1.7)	85,428,348

President George Bush Turnpike

Month	2005[1]	Percent Change	2006	Percent Change	2007[2]	Percent Change	2008	Percent Change	2009
January	10,650,480	32.5	14,108,349	(1.4)	13,912,992	8.2	15,059,857	(8.4)	13,796,320
February	10,186,012	30.9	13,330,255	3.5	13,791,811	7.4	14,808,771	(8.8)	13,509,563
March	11,520,842	32.6	15,280,182	2.7	15,697,466	(3.0)	15,224,580	(2.9)	14,778,959
April	11,337,420	29.0	14,630,630	4.3	15,262,352	3.3	15,764,893	(5.9)	14,835,394
May	11,360,601	36.8	15,539,943	3.4	16,062,007	(1.4)	15,838,820	(5.8)	14,922,386
June	11,616,427	29.9	15,084,333	3.3	15,588,212	(2.3)	15,235,459	--	--
July	11,250,012	28.9	14,506,508	7.2	15,543,758	(0.9)	15,410,866	--	--
August	11,882,929	31.8	15,666,407	5.6	16,542,432	(7.8)	15,254,942	--	--
September	13,082,646	10.8	14,493,021	4.0	15,072,024	(3.1)	14,598,750	--	--
October	14,222,780	6.4	15,137,058	5.9	16,031,373	(3.8)	15,417,503	--	--
November	13,802,295	3.1	14,232,940	4.8	14,915,024	(8.0)	13,724,877	--	--
December	14,169,999	1.9	14,444,992	1.6	14,678,398	(1.9)	14,406,463	--	--
Total	145,082,443	21.6	176,454,618	3.8	183,097,849	(1.3)	180,745,781	--	71,842,622
Jan-May							76,696,921	(6.3)	71,842,622

Sam Rayburn Tollway

Month	2005	Percent Change	2006	Percent Change	2007[2]	Percent Change	2008[3]	Percent Change	2009
January	--	--	--	--	--	--	--	--	4,715,194
February	--	--	--	--	--	--	--	--	4,646,201
March	--	--	--	--	--	--	--	--	5,248,509
April	--	--	--	--	--	--	--	--	5,404,501
May	--	--	--	--	--	--	--	--	5,550,543
June	--	--	--	--	--	--	--	--	--
July	--	--	--	--	--	--	--	--	--
August	--	--	--	--	--	--	--	--	--
September	--	--	--	--	--	--	4,642,173	--	--
October	--	--	--	--	--	--	4,920,975	--	--
November	--	--	--	--	--	--	4,652,414	--	--
December	--	--	--	--	--	--	4,977,922	--	--
Total	--	--	--	--	--	--	19,193,484	--	25,564,948
Jan-May							0	--	25,564,948

NTTA System

Month	2005	Percent Change	2006	Percent Change	2007[2]	Percent Change	2008	Percent Change	2009
January	26,192,312	16.2	30,448,454	(4.5)	29,072,894	12.1	32,599,858	8.6	35,398,535
February	24,936,668	13.4	28,282,062	2.3	28,924,158	10.6	31,989,834	8.5	34,711,511
March	27,995,847	16.0	32,463,612	1.2	32,851,227	0.3	32,962,912	15.1	37,943,098
April	27,594,607	12.4	31,006,045	2.4	31,765,652	6.9	33,970,144	12.7	38,268,933
May	27,627,826	17.8	32,541,605	2.4	33,332,456	2.6	34,206,625	12.9	38,622,767
June	28,217,611	12.2	31,651,007	1.4	32,106,537	2.2	32,828,575	--	--
July	27,183,776	11.4	30,271,985	6.0	32,077,069	3.7	33,262,229	--	--
August	28,956,321	12.2	32,501,298	4.3	33,911,152	(2.4)	33,081,626	--	--
September	29,140,700	4.2	30,378,881	2.5	31,128,697	17.1	36,451,832	--	--
October	30,995,216	2.5	31,761,065	8.2	34,370,628	13.3	38,925,441	--	--
November	29,851,969	(0.2)	29,793,692	7.7	32,080,853	9.1	34,987,482	--	--
December	30,558,388	0.1	30,585,618	4.8	32,066,103	15.5	37,041,955	--	--
Total	339,251,241	9.6	371,685,324	3.2	383,687,426	7.5	412,308,513	--	184,944,844
Jan-May							165,729,373	11.6	184,944,844

(1) Segment IV of PGBT opened to traffic on September 9, 2005
(2) DNT Phase 3 opened to traffic at the end of September 2007. Toll Rates on the NTTA System were increased at that time.
(3) Sam Rayburn Tollway Segment 2 opened to traffic in August 2008.

SOURCE: North Texas Tollway Authority (unaudited numbers)

Table 2-7
Monthly Toll Revenue Trends (DNT, PGBT, SRT, NTTAS)
2005-2009

Dallas North Tollway

Month	2005	Percent Change	2006	Percent Change	2007[2]	Percent Change	2008	Percent Change	2009
January	$8,082,339	4.3	$8,428,013	(7.2)	$7,817,471	38.6	$10,832,252	(0.7)	$10,760,760
February	$7,689,855	1.2	$7,785,902	0.5	$7,821,208	35.2	$10,572,920	(0.1)	$10,565,063
March	$8,640,594	4.0	$8,986,817	(0.7)	$8,919,971	22.5	$10,927,556	4.8	$11,451,216
April	$8,510,520	0.6	$8,565,165	(0.1)	$8,557,397	31.2	$11,224,588	2.5	$11,506,060
May	$8,548,466	3.9	$8,884,007	0.8	$8,955,180	26.6	$11,339,604	2.2	$11,590,620
June	$8,689,712	(0.1)	$8,678,855	(1.2)	$8,578,320	27.2	$10,914,957	--	--
July	$8,359,219	(1.3)	$8,252,271	4.4	$8,618,292	29.2	$11,136,497	--	--
August	$8,927,228	(1.8)	$8,765,120	3.2	$9,043,777	22.7	$11,094,426	--	--
September	$8,348,542	(1.1)	$8,258,121	2.4	$8,458,417	26.7	$10,717,582	--	--
October	$8,713,945	(1.1)	$8,614,382	32.2	$11,389,386	4.5	$11,905,139	--	--
November	$8,328,698	(2.7)	$8,103,900	31.8	$10,679,394	(0.5)	$10,623,296	--	--
December	$8,459,120	(1.1)	$8,368,483	28.1	$10,716,344	5.0	$11,254,880	--	--
Total	$101,298,239	0.4	$101,691,036	7.7	$109,555,156	21.0	$132,543,699	--	$55,873,718
Jan-May							$54,896,921	1.8	$55,873,718

President George Bush Turnpike

Month	2005[1]	Percent Change	2006	Percent Change	2007[2]	Percent Change	2008	Percent Change	2009
January	$6,100,791	34.5	$8,208,105	(1.4)	$8,091,719	27.7	$10,334,989	(9.4)	$9,361,063
February	$5,866,568	31.6	$7,718,043	4.2	$8,038,542	26.5	$10,167,952	(9.4)	$9,216,906
March	$6,664,974	34.1	$8,935,058	3.1	$9,212,574	13.5	$10,457,454	(3.5)	$10,087,990
April	$6,574,836	30.3	$8,568,147	4.2	$8,927,788	21.4	$10,836,968	(6.8)	$10,104,907
May	$6,576,864	38.2	$9,090,178	3.3	$9,393,706	16.0	$10,898,364	(6.2)	$10,221,939
June	$6,732,752	31.9	$8,880,133	2.8	$9,129,059	15.3	$10,529,233	--	--
July	$6,518,533	30.7	$8,518,913	6.9	$9,110,148	17.1	$10,669,630	--	--
August	$6,871,572	33.0	$9,140,544	6.0	$9,687,621	8.6	$10,516,529	--	--
September	$7,602,050	11.8	$8,496,440	4.3	$8,858,650	13.3	$10,038,471	--	--
October	$8,327,660	6.1	$8,834,415	25.2	$11,058,354	(4.1)	$10,599,523	--	--
November	$8,094,871	2.8	$8,323,233	23.8	$10,300,698	(8.5)	$9,420,676	--	--
December	$8,223,497	2.4	$8,422,324	19.8	$10,091,230	(2.0)	$9,893,520	--	--
Total	$84,154,968	22.6	$103,135,535	8.5	$111,900,090	11.1	$124,363,307	--	$48,992,806
Jan-May							$52,695,726	(7.0)	$48,992,806

Sam Rayburn Tollway

Month	2005	Percent Change	2006	Percent Change	2007[2]	Percent Change	2008[3]	Percent Change	2009
January	--	--	--	--	--	--	--	--	$3,709,693
February	--	--	--	--	--	--	--	--	$3,683,225
March	--	--	--	--	--	--	--	--	$4,141,459
April	--	--	--	--	--	--	--	--	$4,261,792
May	--	--	--	--	--	--	--	--	$4,405,576
June	--	--	--	--	--	--	--	--	--
July	--	--	--	--	--	--	--	--	--
August	--	--	--	--	--	--	--	--	--
September	--	--	--	--	--	--	$3,677,437	--	--
October	--	--	--	--	--	--	$3,867,628	--	--
November	--	--	--	--	--	--	$3,681,623	--	--
December	--	--	--	--	--	--	$3,925,055	--	--
Total	--	--	--	--	--	--	$15,151,744	--	$20,201,745
Jan-May							$0	--	$20,201,745

NTTA System

Month	2005	Percent Change	2006	Percent Change	2007[2]	Percent Change	2008	Percent Change	2009
January	$14,400,295	17.2	$16,871,814	(4.5)	$16,116,597	32.5	$21,361,646	12.5	$24,029,703
February	$13,764,977	14.1	$15,708,228	2.3	$16,068,279	30.3	$20,944,838	13.0	$23,663,763
March	$15,539,703	16.8	$18,156,425	1.2	$18,371,272	17.5	$21,594,937	19.9	$25,895,075
April	$15,316,053	13.3	$17,349,555	2.1	$17,714,776	25.8	$22,282,452	17.1	$26,094,253
May	$15,354,802	18.4	$18,183,534	2.2	$18,589,747	20.8	$22,463,122	17.7	$26,436,296
June	$15,647,892	13.5	$17,756,380	1.0	$17,937,062	20.8	$21,660,374	--	--
July	$15,097,186	12.4	$16,964,439	5.8	$17,955,447	22.6	$22,020,105	--	--
August	$16,022,943	13.1	$18,128,160	4.6	$18,955,754	15.1	$21,826,975	--	--
September	$16,175,884	4.9	$16,973,559	3.2	$17,515,691	40.7	$24,645,180	--	--
October	$17,271,762	2.4	$17,678,098	28.1	$22,652,248	17.4	$26,594,104	--	--
November	$16,643,252	(0.1)	$16,628,247	27.3	$21,168,184	13.0	$23,922,900	--	--
December	$16,896,068	0.6	$16,999,700	23.5	$20,993,009	20.4	$25,276,397	--	--
Total	$188,130,817	10.2	$207,398,138	8.0	$224,038,067	22.6	$274,593,028	--	$126,119,091
Jan-May							$108,646,995	16.1	$126,119,091

(1) Segment IV of PGBT opened to traffic on September 9, 2005
(2) DNT Phase 3 opened to traffic at the end of September 2007. Toll Rates on the NTTA System were increased at that time.
(3) Sam Rayburn Tollway Segment 2 opened to traffic in August 2008.

SOURCE: North Texas Tollway Authority (unaudited numbers)

Annual toll revenue produced on the DNT and PGBT is generated mainly by transactions at the mainlane toll plazas. As shown in Figure 2-6, the four mainlane plazas on the DNT generate 77.7 percent of total annual toll revenue. The five mainlane plazas on the PGBT contribute 87.4 percent to total annual toll revenue. Figure 2-7 shows the transaction distribution for 2008 illustrating that the four mainlane plazas on the DNT generate 63.2 percent of the total transactions and five mainlane plazas on the PGBT contribute 75.1 percent of the total transactions.

TOLLTAG UTILIZATION TRENDS

As mentioned previously, the TollTag program has been successful in terms of increased participation since its introduction in July 1989. Current levels of TollTag utilization for NTTAS facilities are presented in Figure 2-8. The TollTag participation levels shown represent TollTag levels on an average weekday in 2006, 2007 and 2008 for all plazas combined.

As shown in Figure 2-8, TollTag share on the DNT increased from 76 percent in 2006 to 82 percent in first five months of 2009. On the PGBT, TollTag share increased from 71 percent to 79 percent in that same period. It is important to note that at selected mainlane toll plazas on both of these facilities, TollTag participation during peak periods approaches 90 percent on an average weekday. TollTag utilization on the AATT and MCLB is currently 84 percent and 19 percent, respectively. The SRT has about 73 percent TollTag transactions, and the system average is currently 79 percent.

Figure 2-9 shows the spatial distribution of TollTags across the Dallas Fort Worth region. Zip codes along the northern-most sections of the DNT have the highest concentration of the TollTags. Also, higher TollTag participation is seen in zip codes along the existing NTTA System corridors compared to the other parts of the region.

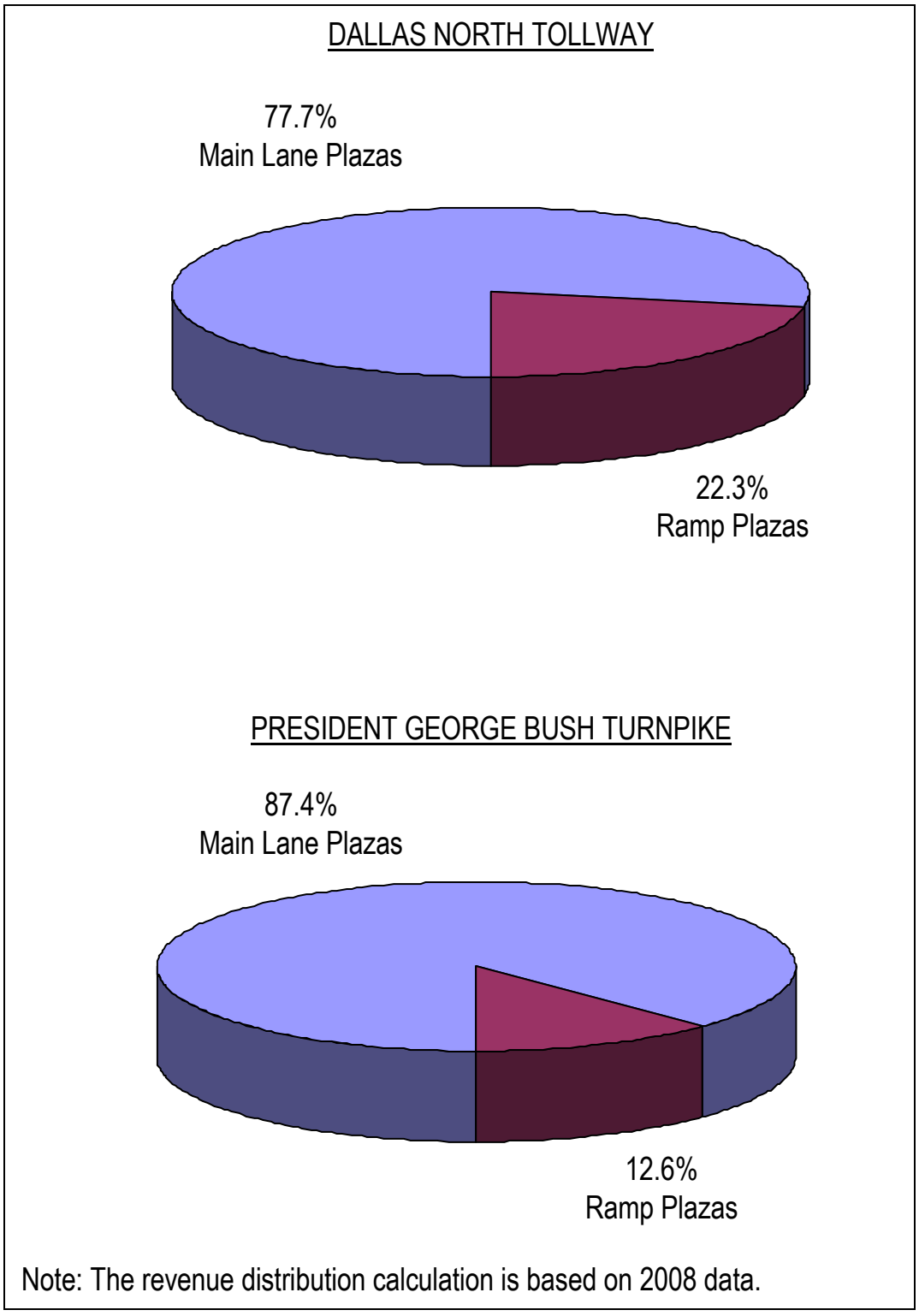


Figure 2-6. Toll Revenue Distribution: Mainlane vs. Ramp Toll Plazas

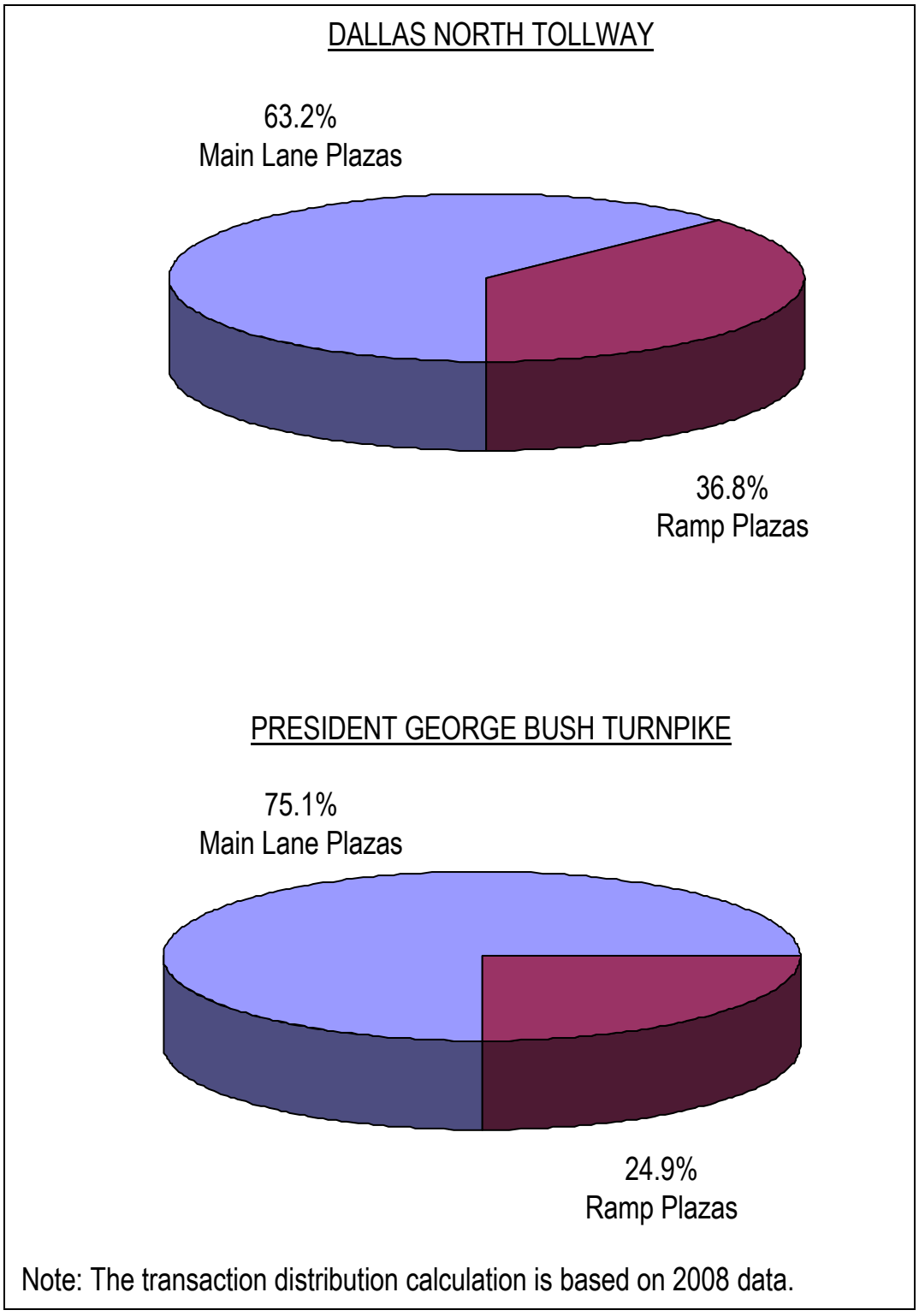


Figure 2-7. Transaction Distribution: Mainlane vs. Ramp Toll Plazas

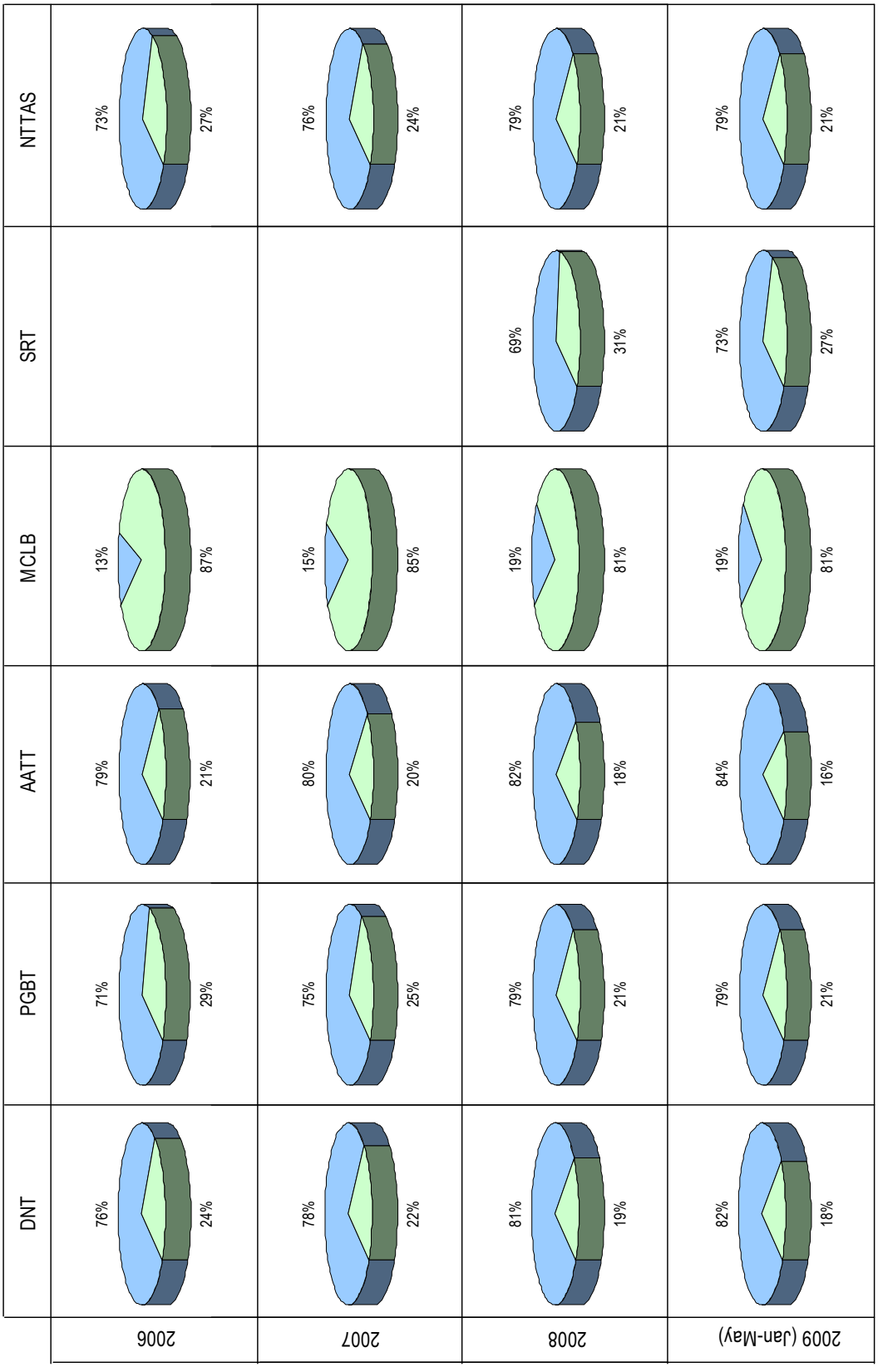


Figure 2-8. Current NTTAS Average Daily TollTag Utilization by Facility

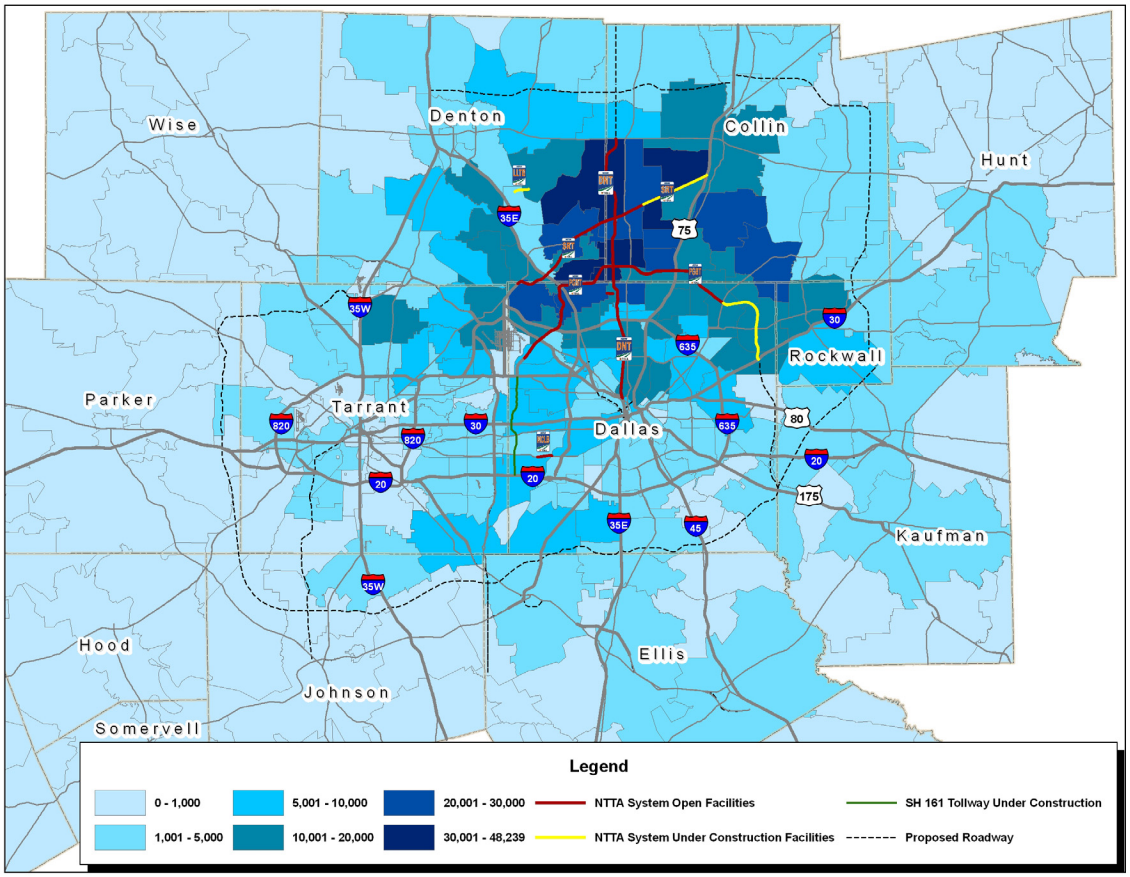


Figure 2-9 Current TollTag Utilization by Zip Code

MONTHLY TRANSACTION VARIATIONS

Average monthly transaction variations on the NTTAS facilities for 2008 are presented as an index of the monthly transactions, as illustrated in Table 2-8.

Table 2-8

2008 NTTAS Monthly Transaction Index

Month	DNT w/o Phase 3	PGBT	AATT	MCLB
January	100	100	101	86
February	98	98	100	94
March	101	101	102	98
April	103	105	106	104
May	104	105	107	106
June	99	101	101	103
July	101	102	102	101
August	100	101	99	105
September	97	97	98	102
October	105	102	103	106
November	94	91	88	97
December	99	96	94	98
Average	**100**	**100**	**100**	**100**

Note: SRT was only operational from late August 2008

The peak travel months on the DNT in 2008 were May and October, when transactions were four and five percent higher than the average month, respectively. The lightest travel month on the DNT was November, when monthly transactions were six percent below the average month in 2008. Traffic variations were below the average in 2008 during February, June, September, November and December (when monthly variations ranged from one to six percent below the average). Traffic variations were one to five percent greater than the average in the remaining months, with the exceptions of January and August, which equaled the monthly average.

The peak travel months on the PGBT in 2008 were April, May, July and October, which were all two to five percent higher than the monthly average. The lightest traveled month was November, when monthly transactions were nine percent below the average.

The peak travel months for AATT were April and May where traffic was six and seven percent above the average. The MCLB recorded its peak travel month in May and October, experiencing traffic six percent higher than the average. November was the lightest travel month on AATT with traffic twelve percent below the monthly average while January was the lightest travel month on MCLB with traffic fourteen percent below the average. Overall the seasonal variations on the major revenue generators, DNT and PGBT, are stable with less than about ten percent variation from the monthly average.

TRAFFIC COUNT PROGRAM

WSA embarked on a comprehensive traffic count program in the NTTA System area. This included counts along all NTTAS corridors. The traffic count program included a series of screenlines. The locations of the traffic count screenlines can be seen in Figure 2-10. Traffic counts were obtained from NTTA staff for all of the existing mainlane plazas and each of the ramp toll plazas on all NTTA facilities. Counts were gathered separately for TollTag and cash transactions.

To collect data for non-NTTA facilities along the screenlines and for the non-tolled ramps along the NTTA facilities, WSA engaged CJ Hensch & Associates, Inc. and GRAM Traffic Counting, Inc., both Dallas based Women-Owned Business Enterprise (WBE) firms. MCV Associates Inc. was also engaged to collect some of the traffic counts. All the counts at the non-tolled locations and on the screenlines were conducted for a continuous 48-hour period on interior weekdays only (Tuesday, Wednesday and Thursday).

By combining the two count programs, WSA was able to build an average weekday traffic profile for the NTTA System area. The average weekday profile also reflected AM, PM and off-peak period traffic conditions. The time of day traffic profile was then used to calibrate the TransCAD travel demand model. The screenline traffic profiles for each of the screenlines are shown in Figures 2-11 through 2-25.

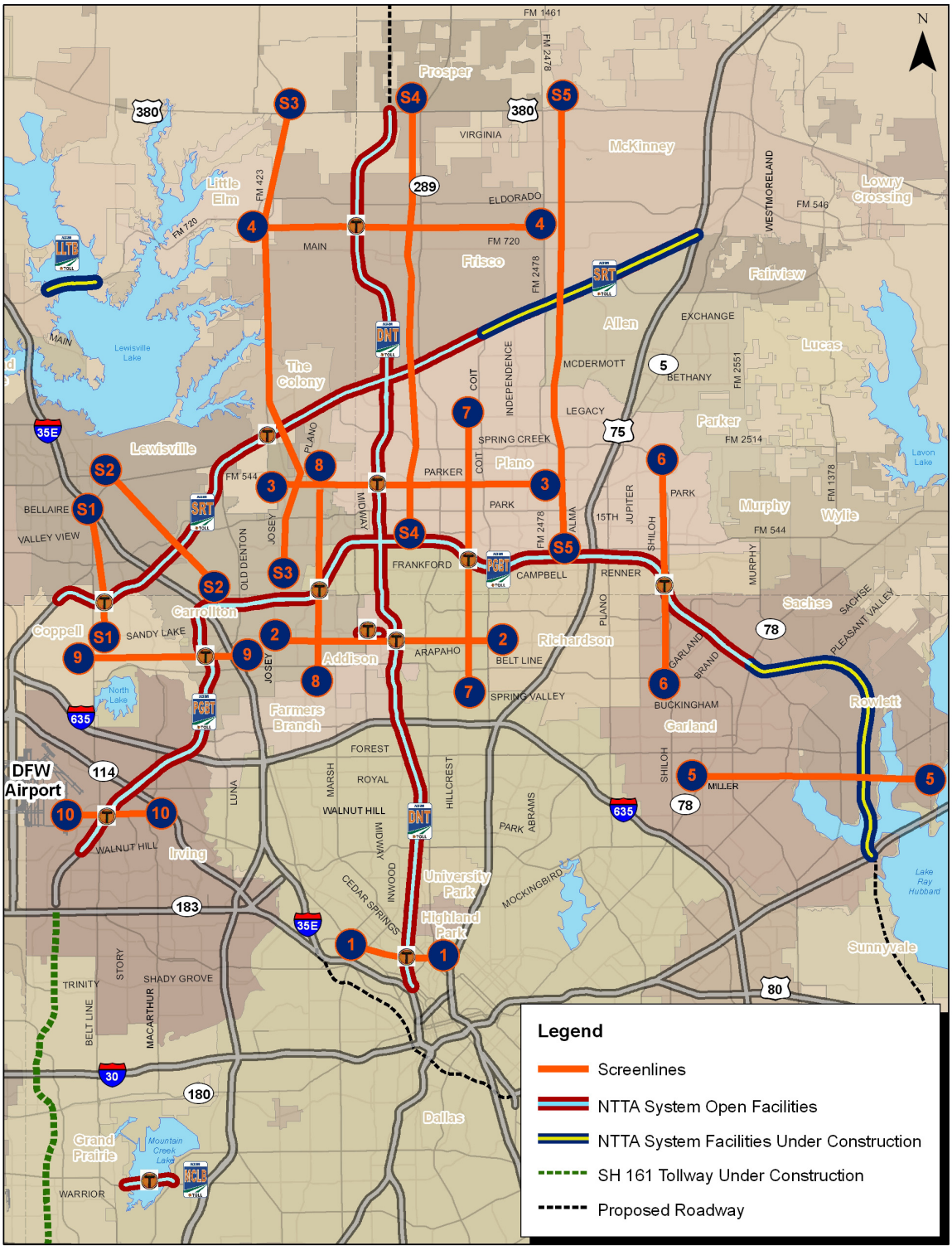


Figure 2-10. Traffic Count Screenlines

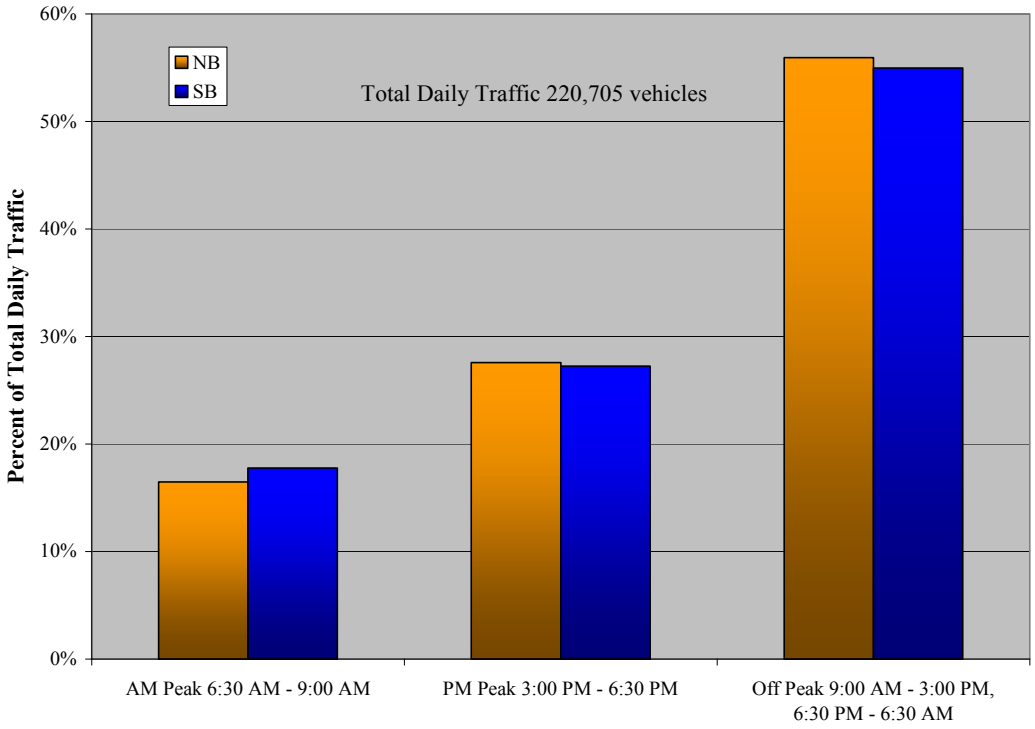


Figure 2-11. Traffic Profile – Screenline 1

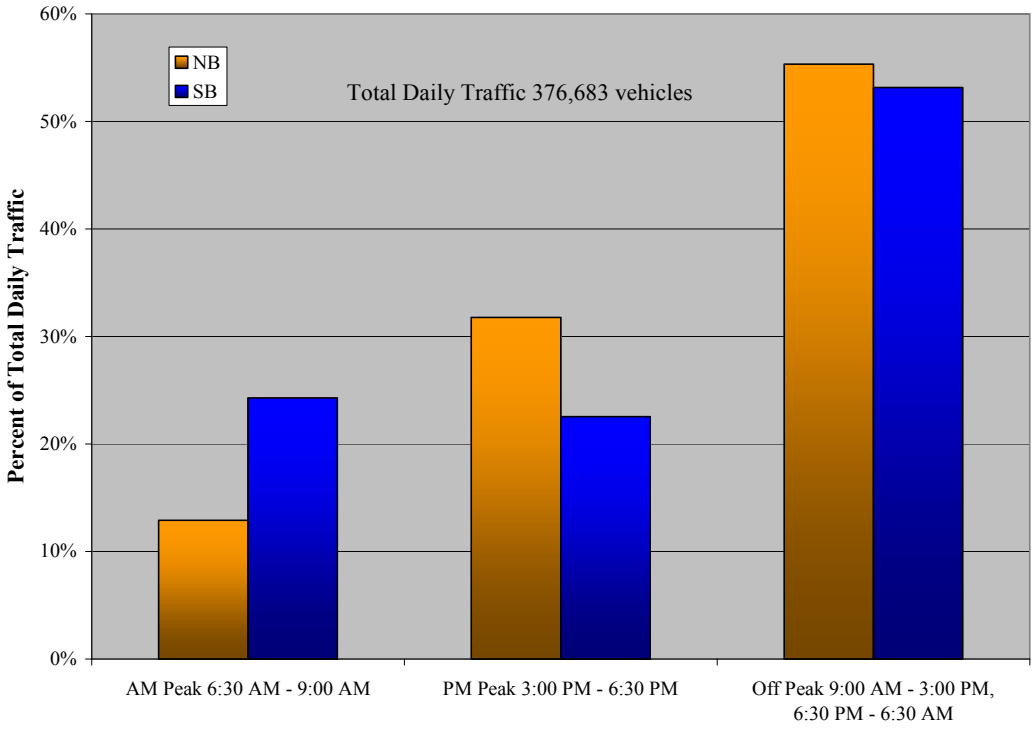


Figure 2-12. Traffic Profile – Screenline 2

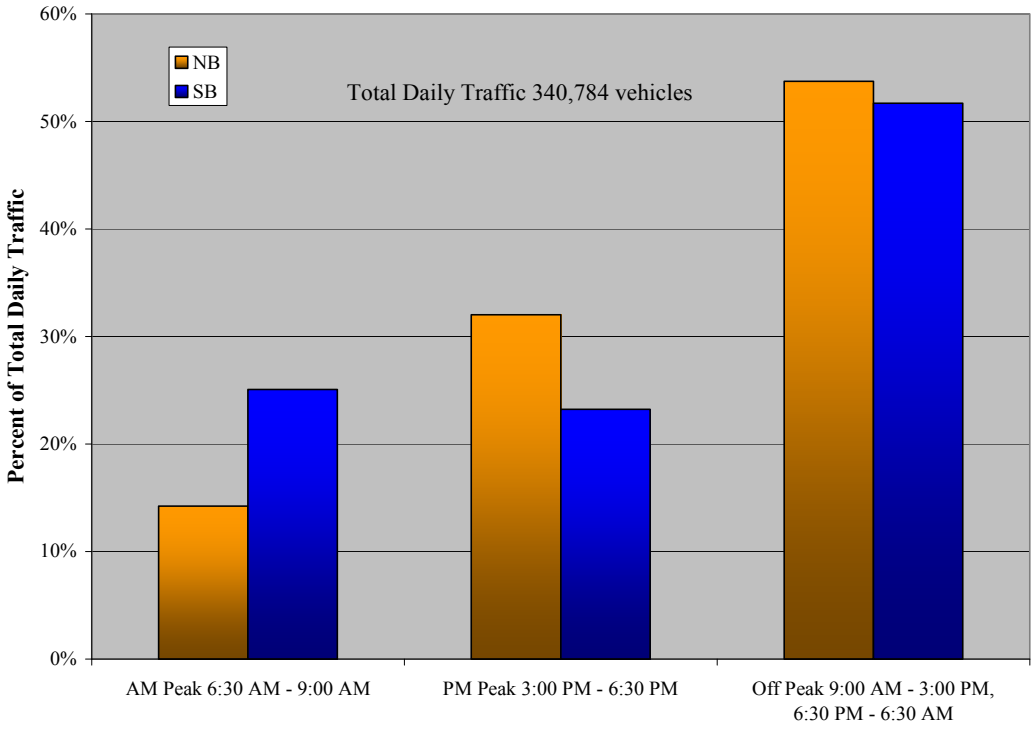


Figure 2-13. Traffic Profile – Screenline 3

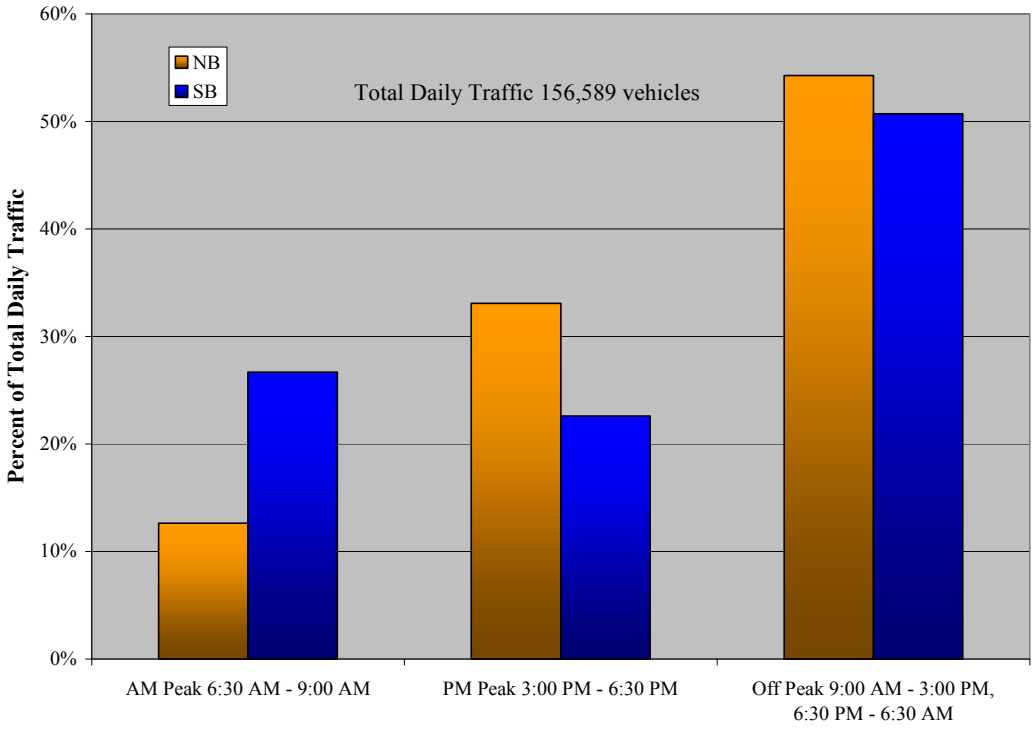


Figure 2-14. Traffic Profile – Screenline 4

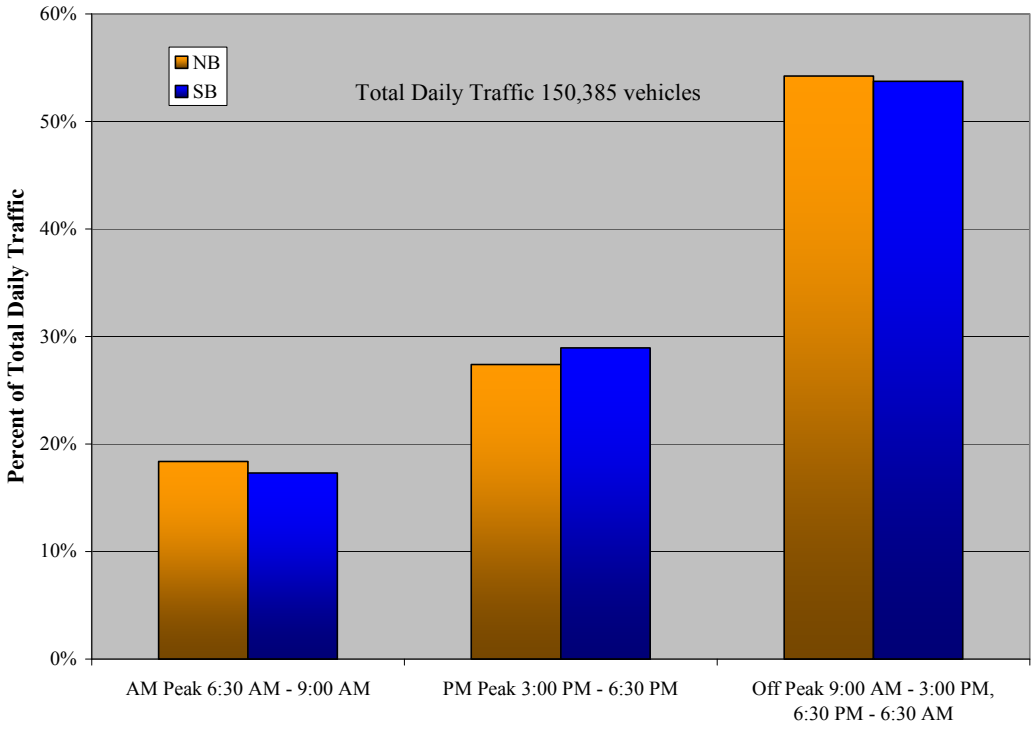


Figure 2-15. Traffic Profile – Screenline 5

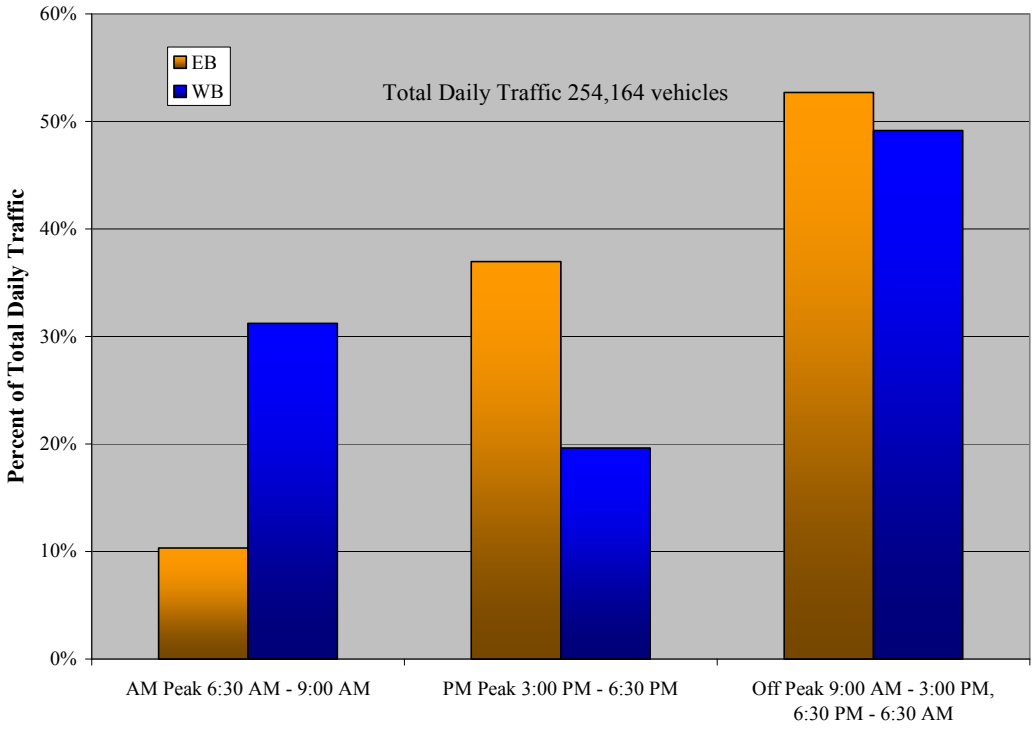


Figure 2-16. Traffic Profile – Screenline 6

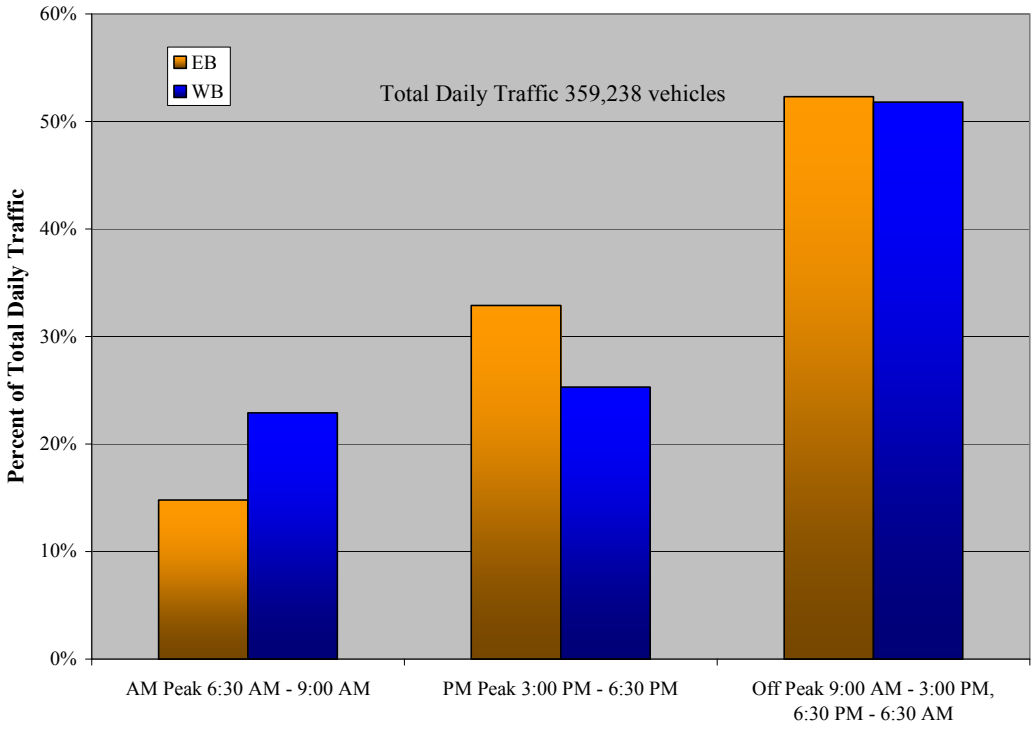


Figure 2-17. Traffic Profile – Screenline 7

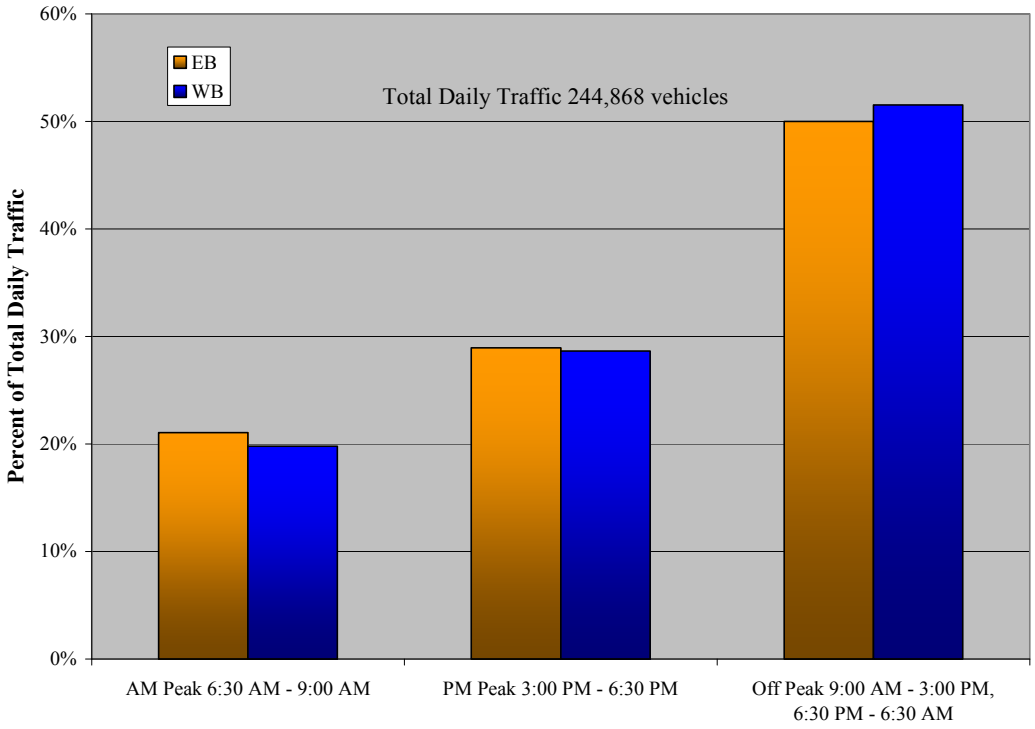


Figure 2-18. Traffic Profile – Screenline 8

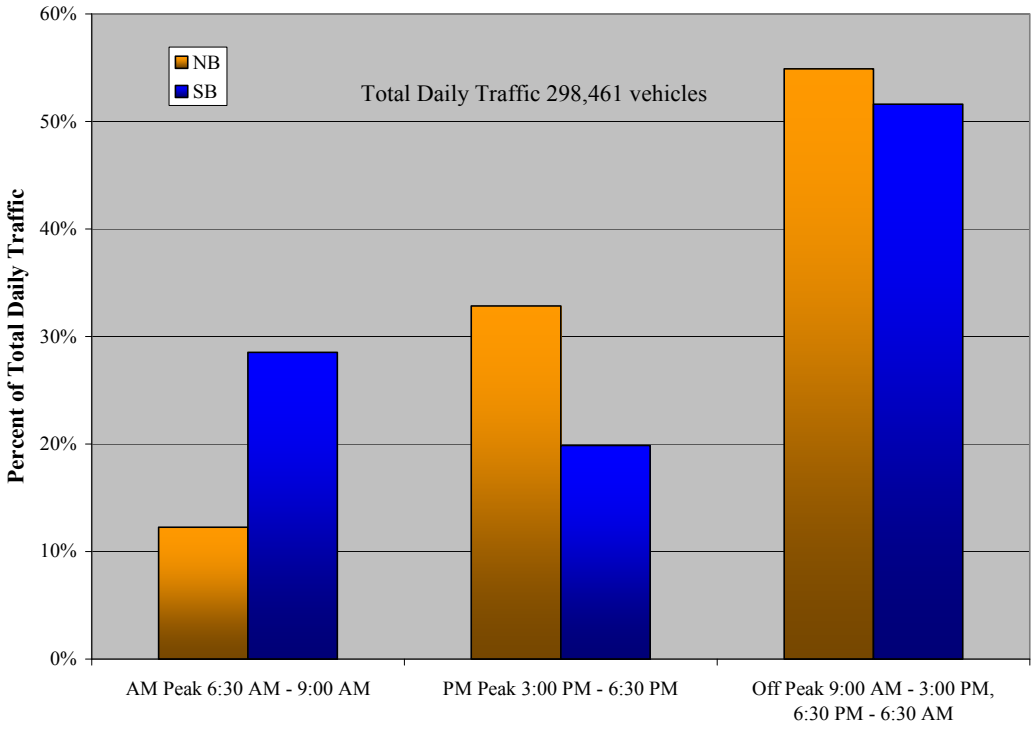


Figure 2-19. Traffic Profile – Screenline 9

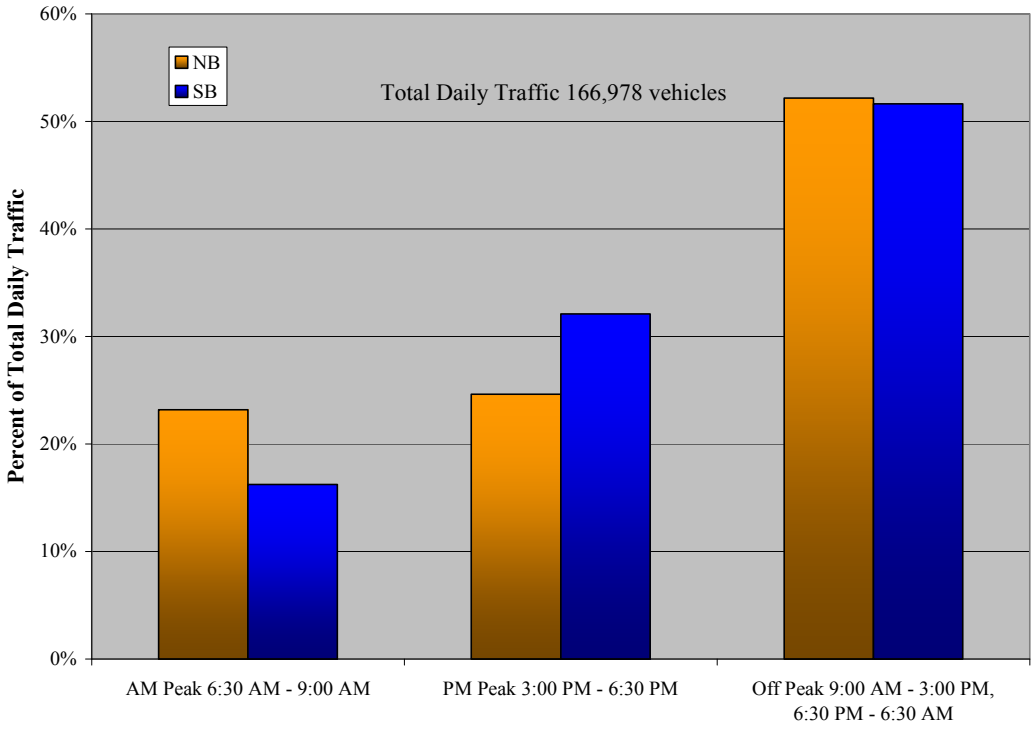


Figure 2-20. Traffic Profile – Screenline 10

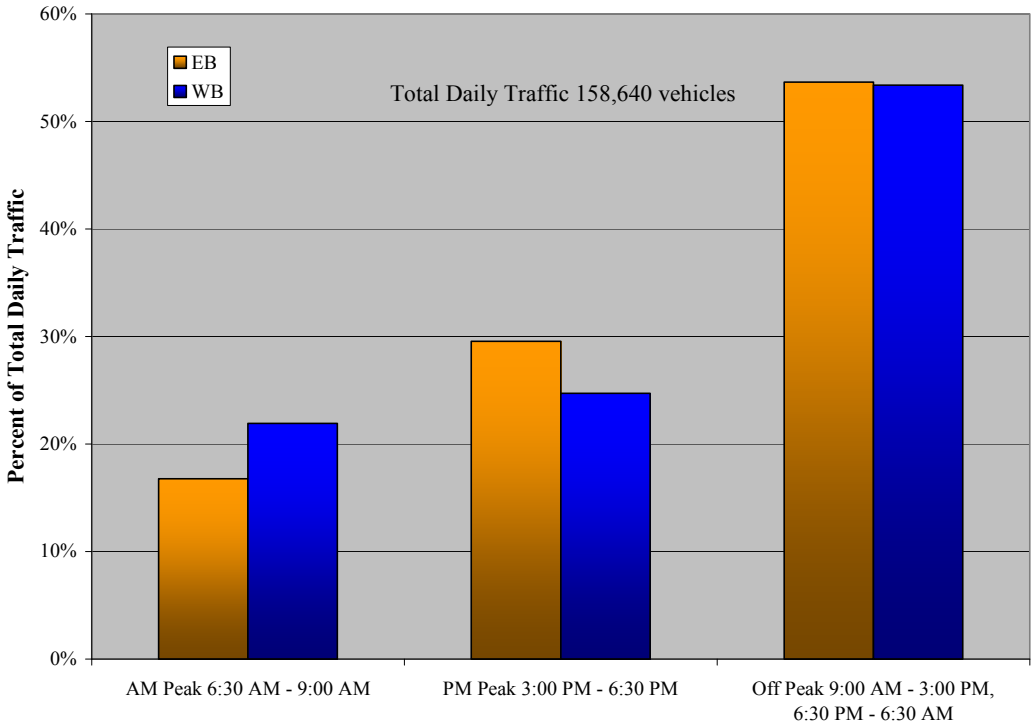


Figure 2-21. Traffic Profile – Screenline S1

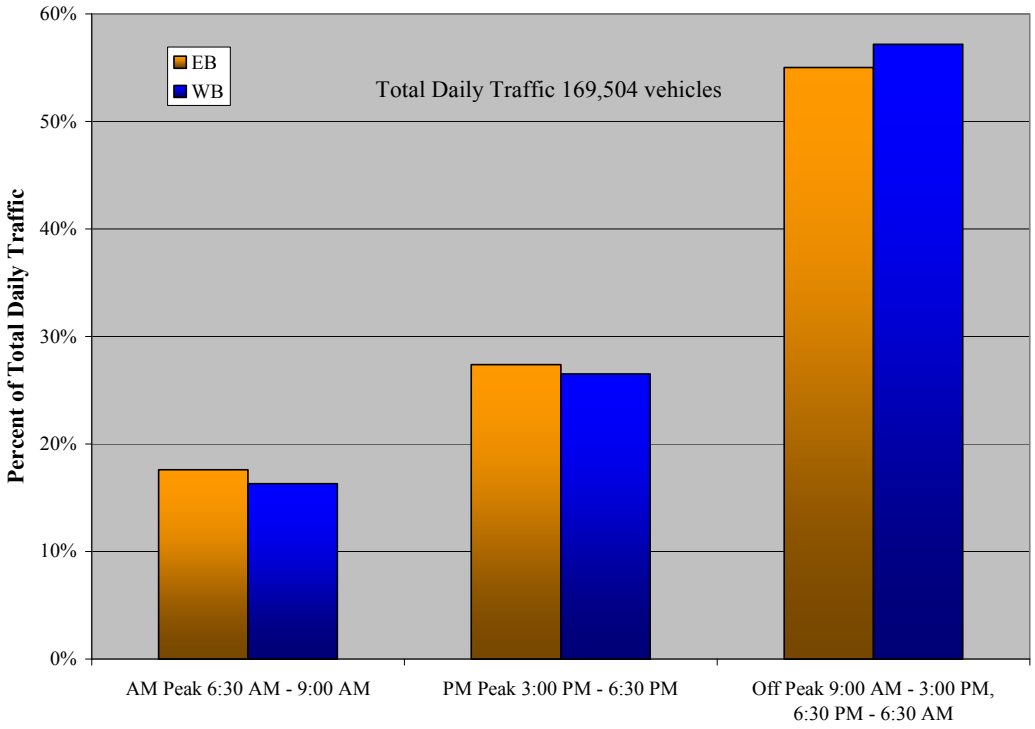


Figure 2-22. Traffic Profile – Screenline S2

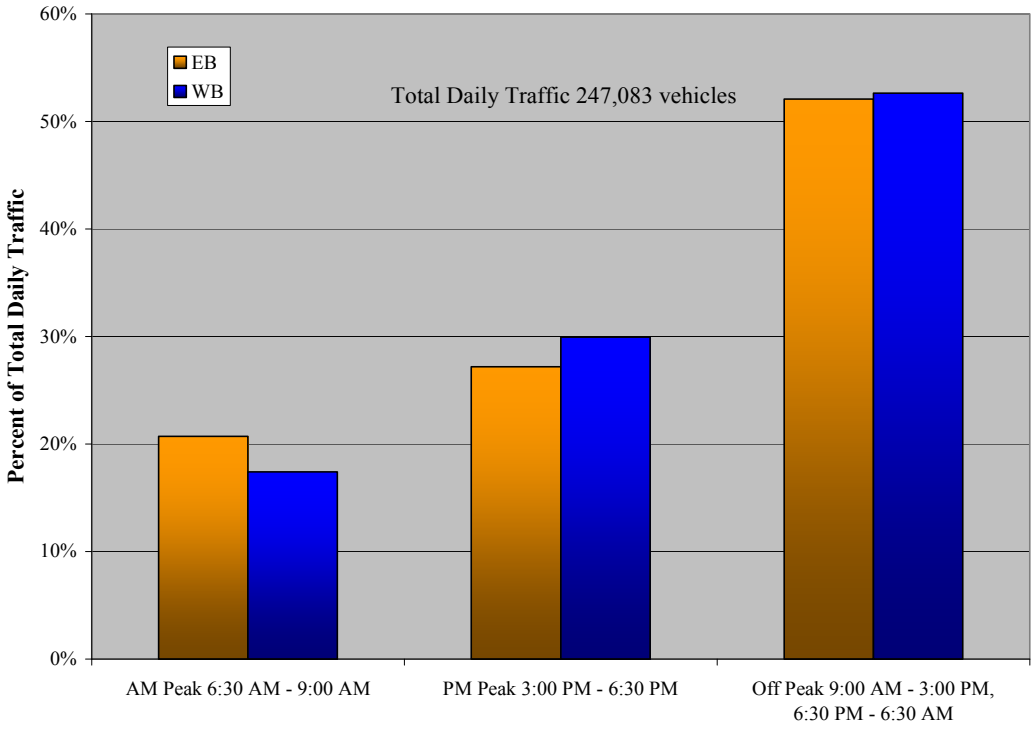


Figure 2-23. Traffic Profile – Screenline S3

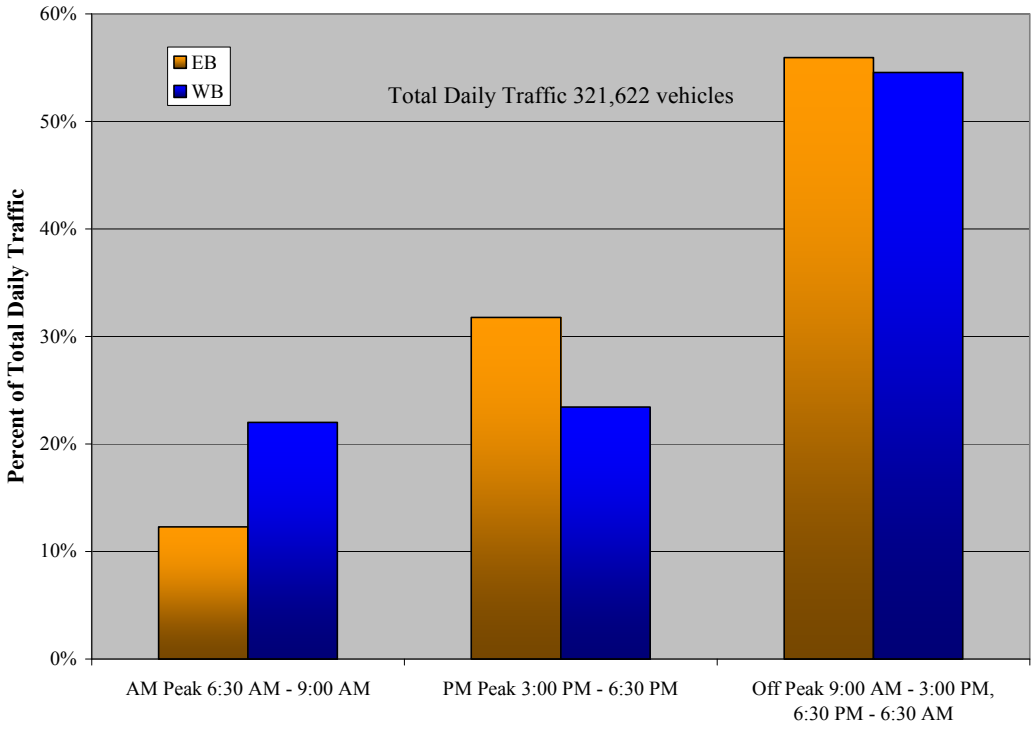


Figure 2-24. Traffic Profile – Screenline S4

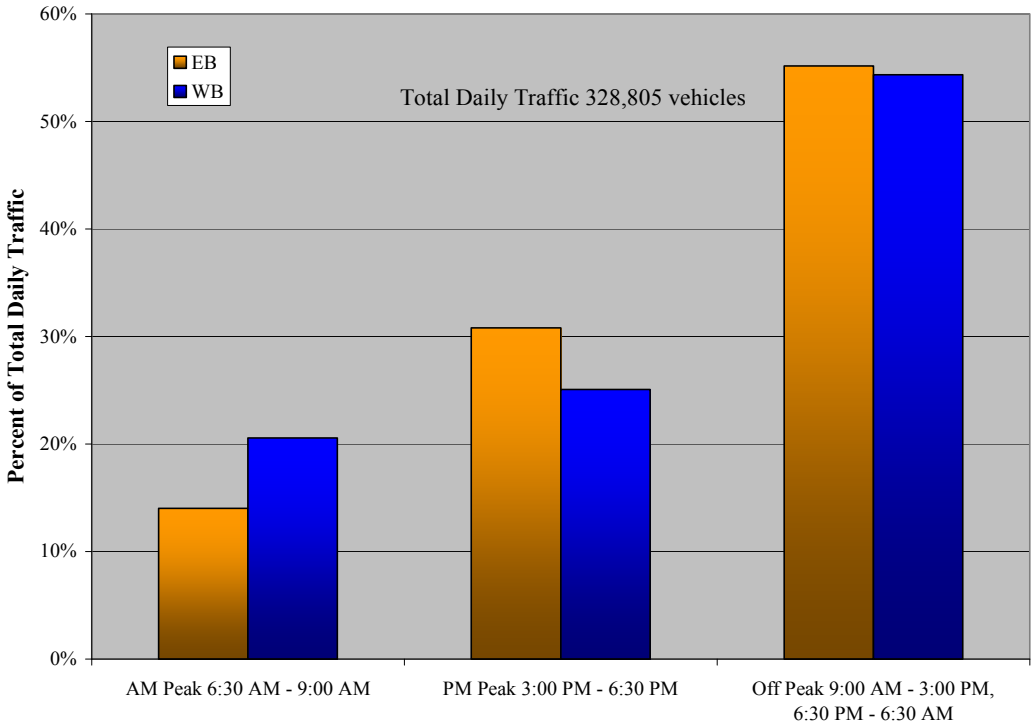


Figure 2-25. Traffic Profile – Screenline S5

Figures 2-26 through 2-28 show the profile for both travel directions on the DNT, PGBT and SRT for three time periods. The AM peak period is from 6:30 to 9:00 AM (2.5 hours), PM peak period is from 3:00 to 6:30 PM (3.5 hours), and off-peak (OP) period is from 9:00 AM to 3:00 PM and from 6:30 PM to 6:30 AM (18 hours).

Dallas North Tollway

The northbound traffic during the PM peak period is higher than that in the AM peak and reflects the movement of traffic in the employment centers located along the southern and central portions of the DNT to the growing residential suburbs located along the northern segments of the DNT. During the PM peak, the highest volumes of traffic occur between IH 635 and PGBT. A similar pattern is indicated during the off-peak period.

In the southbound direction, AM and PM peak traffic volumes seem to be similar south of Windhaven Parkway. However, it should be noted that the AM peak is comprised of two and half hours and the PM peak is comprised of three and half hours. If traffic for these two periods were broken out on an hourly basis, the AM peak hour volumes would be greater than the PM peak hour volumes, as would be expected. The highest levels of traffic are experienced between IH 635 and MLP 2.

President George Bush Turnpike

The eastbound travel direction indicates the PM peak period is higher than the AM peak period. This would also be expected because of the movements between employment centers along the DNT and the growing residential areas of Collin County. Many PGBT patrons traveling to and from work access the DNT via the PGBT as is reflected by the high levels of traffic that occur between DNT and US 75 during peak periods.

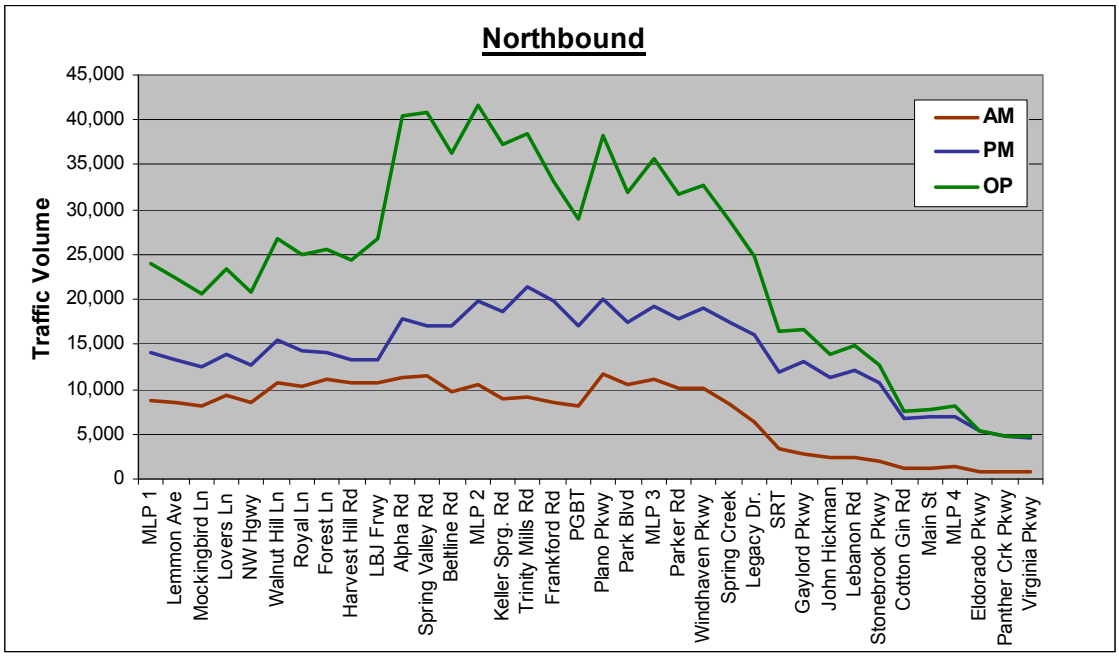
As is the case with the DNT southbound direction, AM and PM peak traffic volumes on the PGBT in the westbound direction seem to be similar. This again can be attributed to the different number of hours which comprise the AM and PM peak periods. The highest volume in the westbound direction is also recorded between US 75 and the DNT.

Sam Rayburn Tollway

The eastbound travel direction indicates the PM peak period is higher than the AM peak period. In the westbound direction, the AM peak period is higher than the PM peak period. There is a noticeable spike in both directions for all time periods between Hebron Parkway and IH 35E. This spike is due to the fact that this section of the SRT is toll-free.

AVERAGE WEEKDAY TRANSACTIONS

Figures 2-29 and 2-30 show 2008 average weekday transactions at all toll plazas on the DNT and PGBT. As can be seen in Figure 2-29, the highest number of transactions compared to any other plaza on the NTTAS is handled by MLP 2 near Keller Springs Road, where average weekday transactions reached 146,100 vehicles. MLP 3, located at Parker Road, handled 134,700 transactions on an average weekday in 2008. MLP 7 near Coit Road averaged 130,000 transactions per weekday in 2008, as shown in Figure 2-30. This plaza carries the highest number of transactions among all plazas on the PGBT.



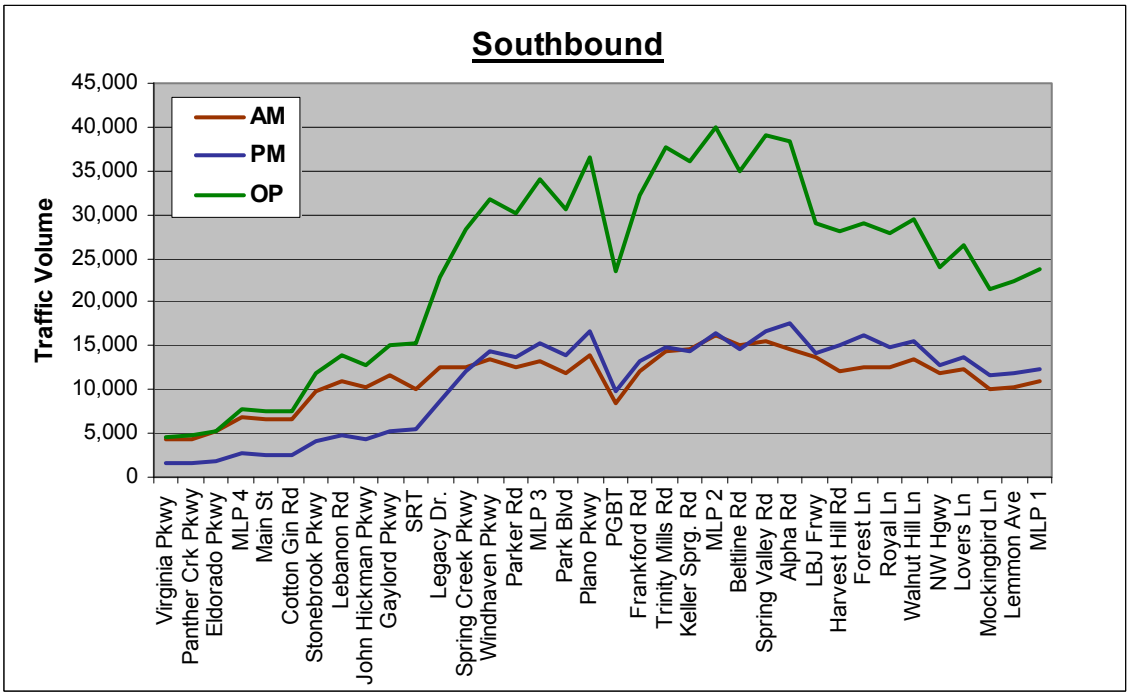
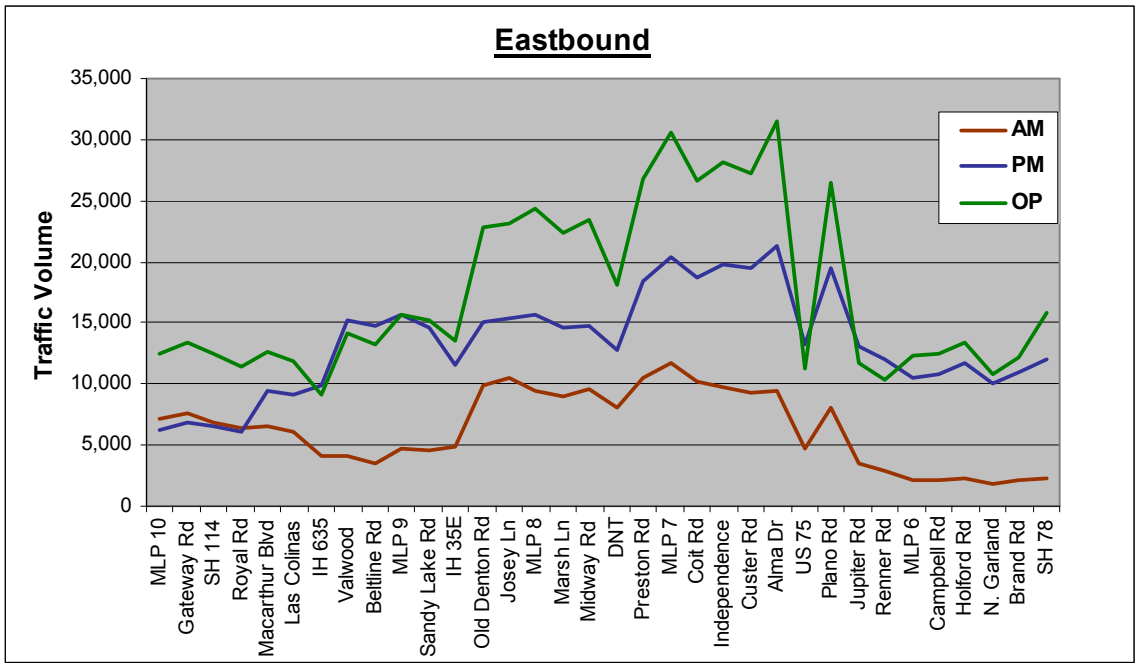


Figure 2-26. DNT Traffic Volume Profile



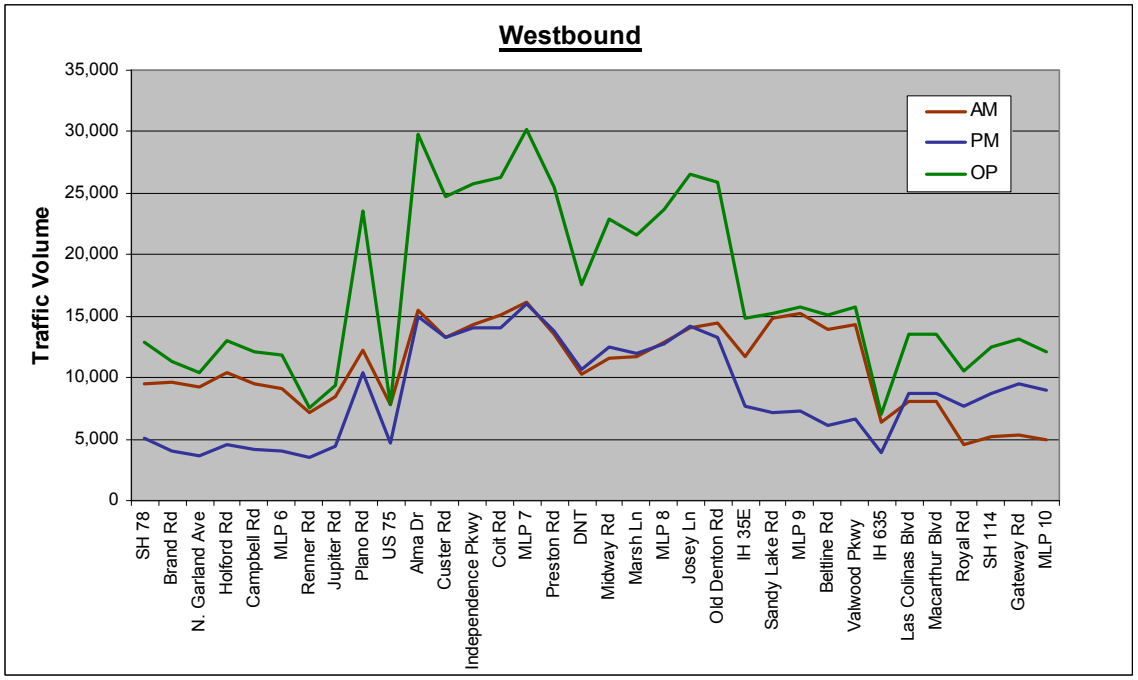


Figure 2-27. PGBT Traffic Volume Profile

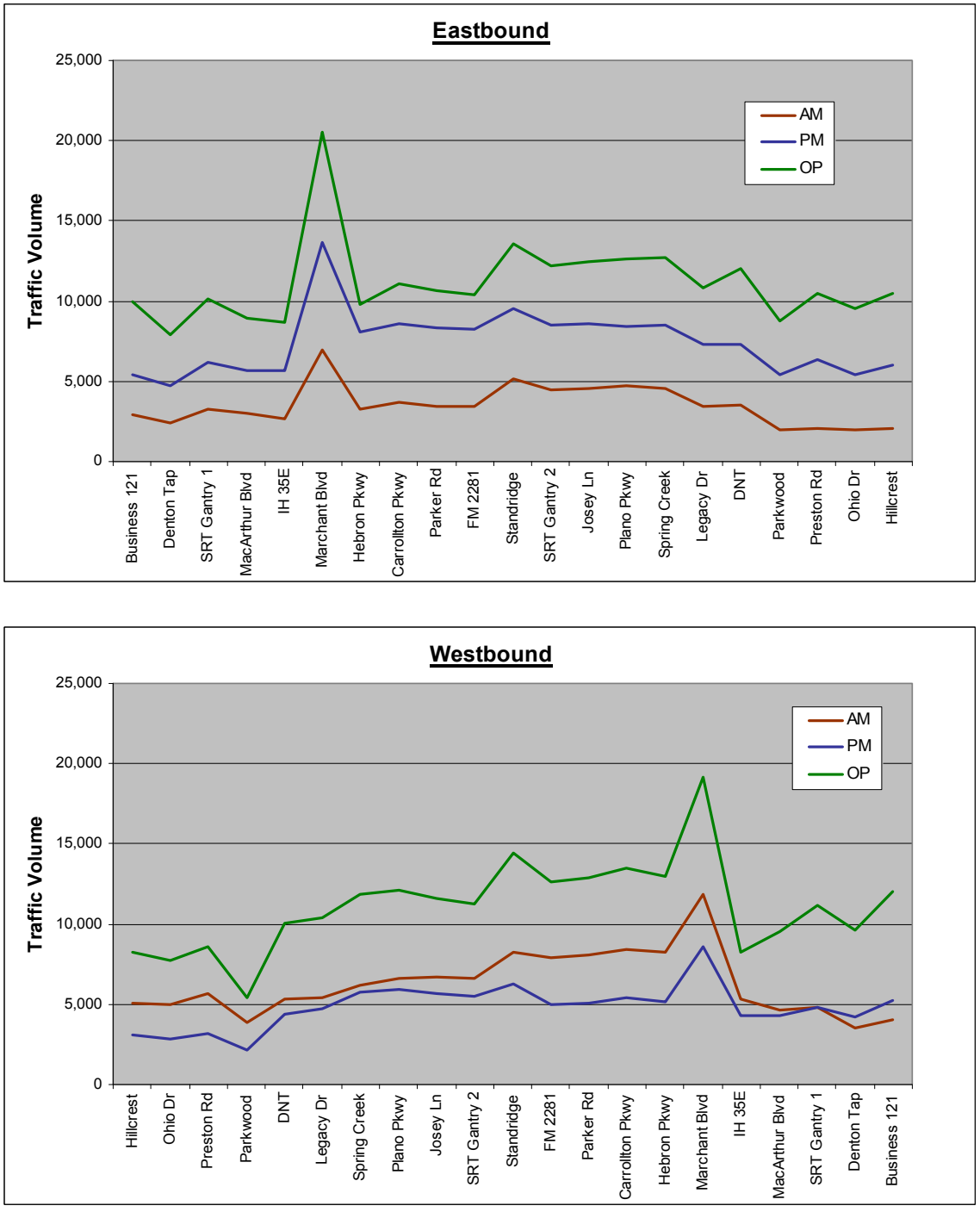


Figure 2-28. SRT Traffic Volume Profile

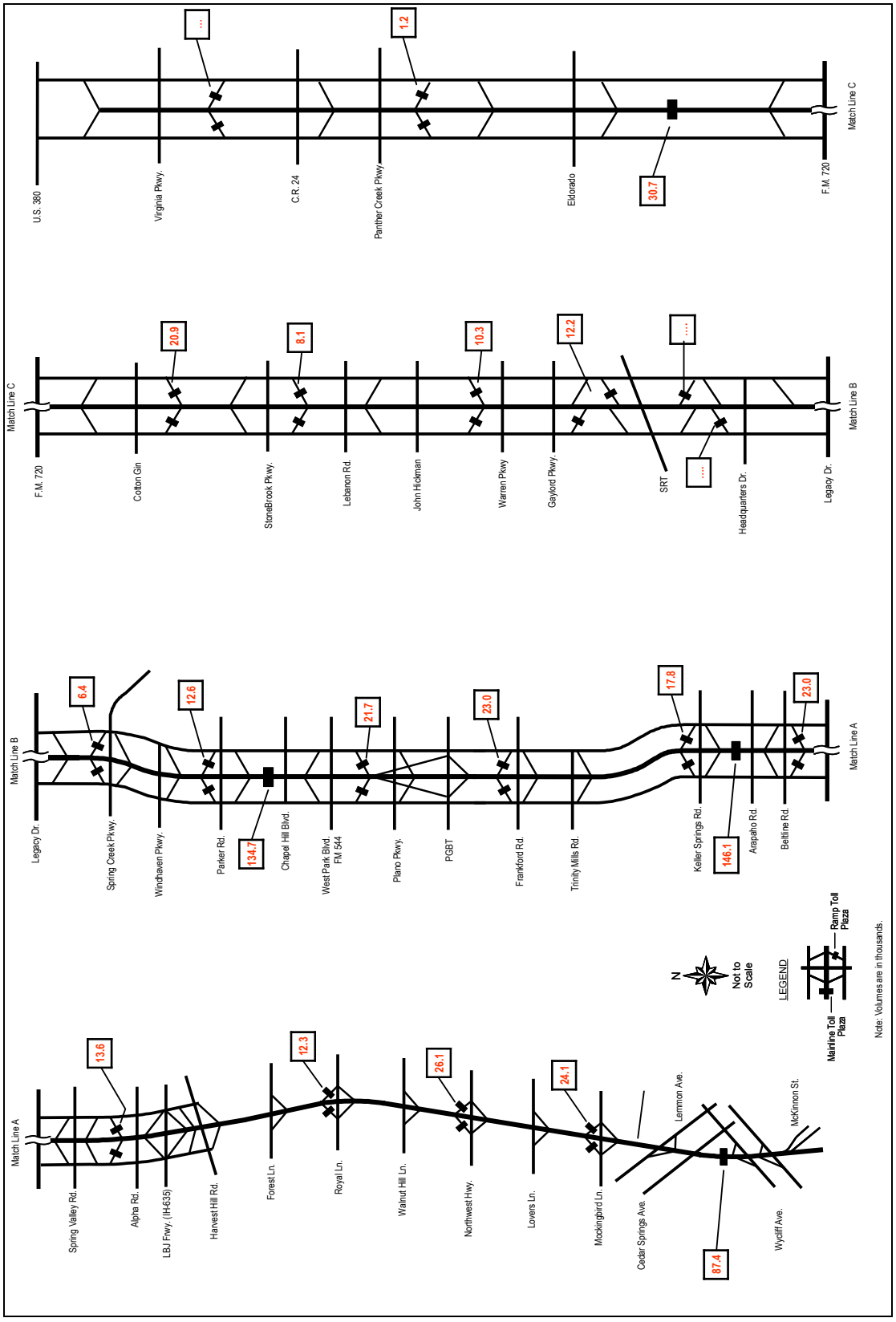


Figure 2-29. 2008 DNT Average Weekday Transactions at Toll Plazas (in thousands)

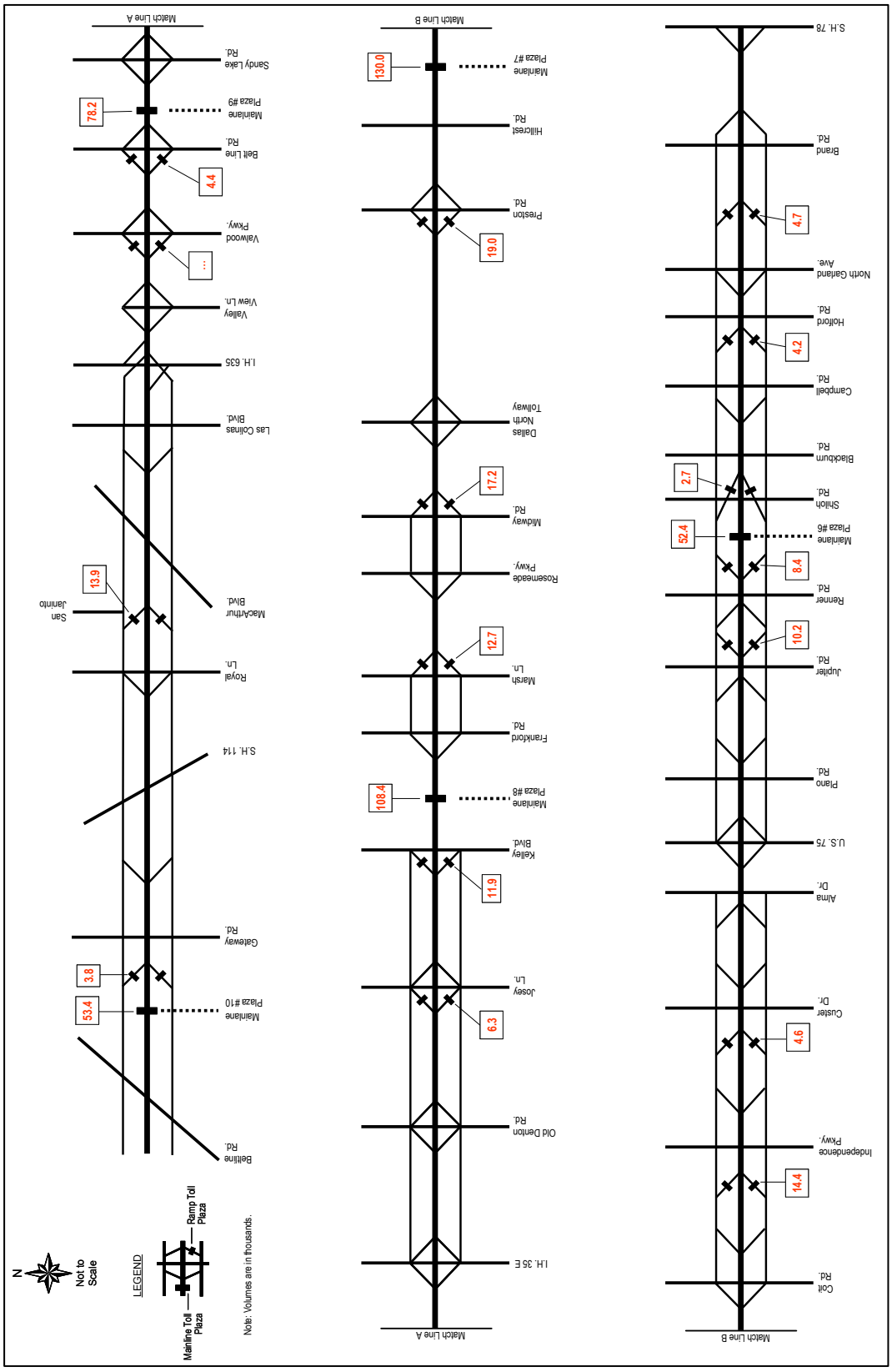


Figure 2-30. 2008 PGBT Average Weekday Transactions at Toll Plazas (in thousands)

SPEED AND DELAY CHARACTERISTICS

A series of speed/delay runs were conducted at several locations within the NTTA System area. The speed/delay runs were conducted between 6:00-10:00 AM and 3:00-7:00 PM on the interior weekdays of Tuesday, Wednesday and Thursday in February of 2009. Travel speeds were recorded every five-hundredths of a mile, thus providing detailed information regarding peak period average travel speeds in the study area. In the process of collecting speed data, WSA staff gathered additional information regarding the number of lanes, speed limits, school zone locations, type of facility (divided vs. undivided) traffic signal locations and other geometric characteristics of the facilities surveyed. This information was used to calibrate the output speeds from the travel demand model to the existing conditions on those highway facilities. Figure 2-31 shows the facilities driven for the reconnaissance studies. In total, thirteen routes were selected and driven. A series of moving vehicle travel-time runs were conducted in the NTTAS corridors to provide a profile of the fluctuation in operating speed throughout the corridor and the relationship between demand and congestion levels.

In addition, travel time runs were conducted on several local arterials that compete directly with NTTAS facilities. The results are presented graphically in Figures 2-32 through 2-35. The figures illustrate the typical peak period speeds in each direction on the facilities for both the AM and PM peak periods. As expected, the DNT routes exhibit their slowest speeds in the southbound AM and northbound PM directions. The PGBT routes, on the other hand, exhibit their slowest speeds in the westbound AM and eastbound PM directions. Currently, the SRT operates well during both the AM and PM peak periods, although there is some noticeable delay where the mainlanes end at Coit Road.

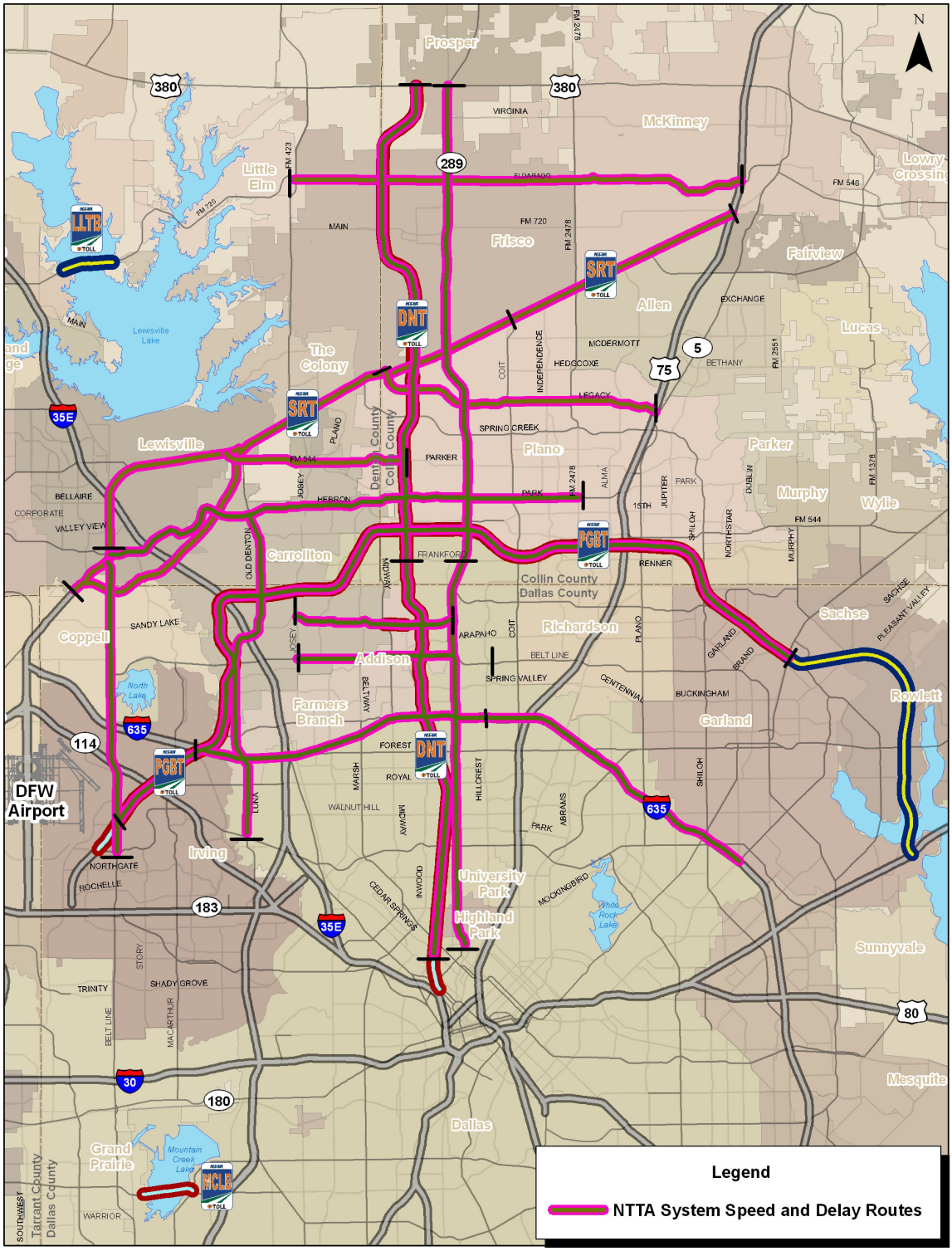


Figure 2-31. Reconnaissance/Travel Time Routes

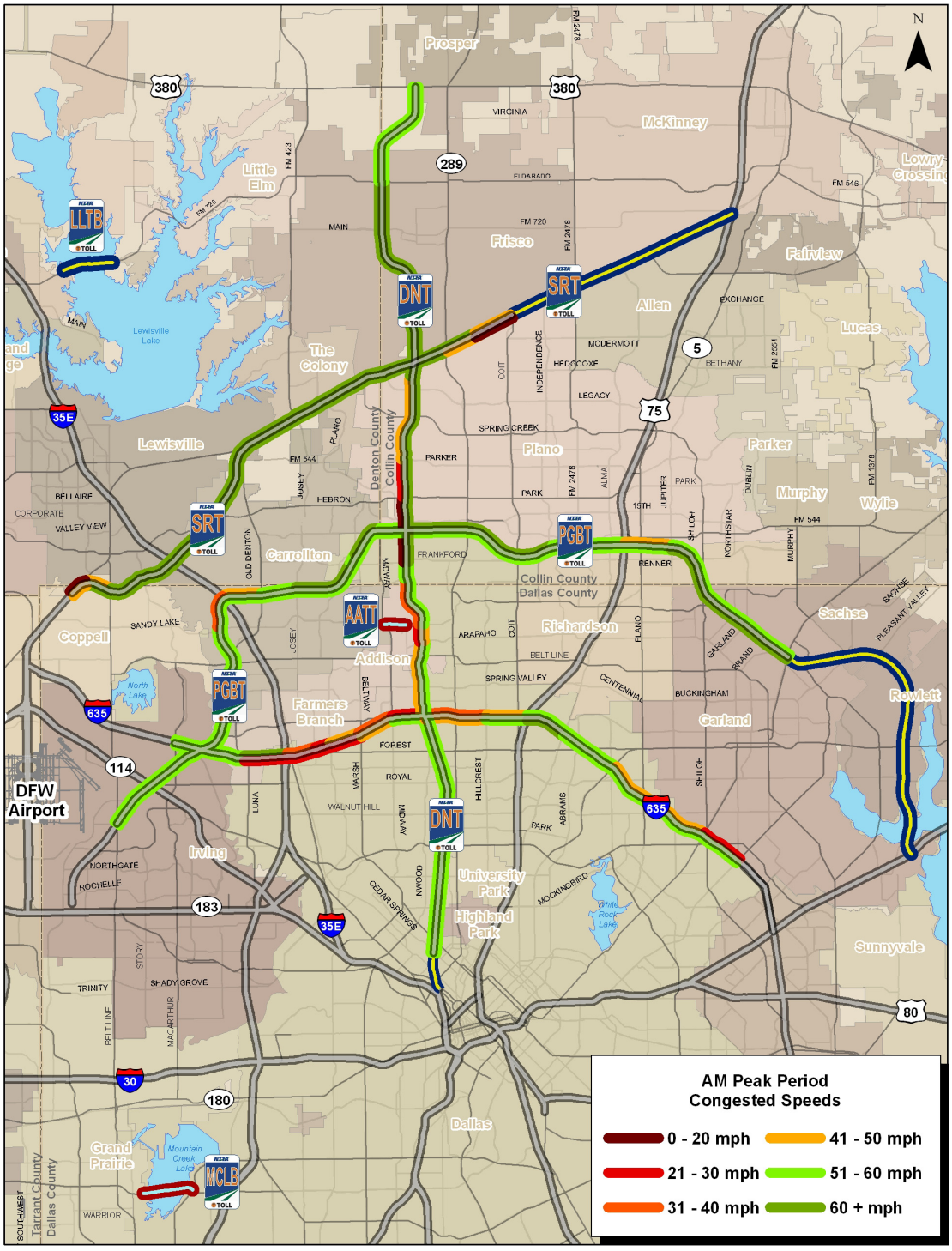


Figure 2-32. NTTAS Speed-Delay Results: AM Peak Period – Freeways

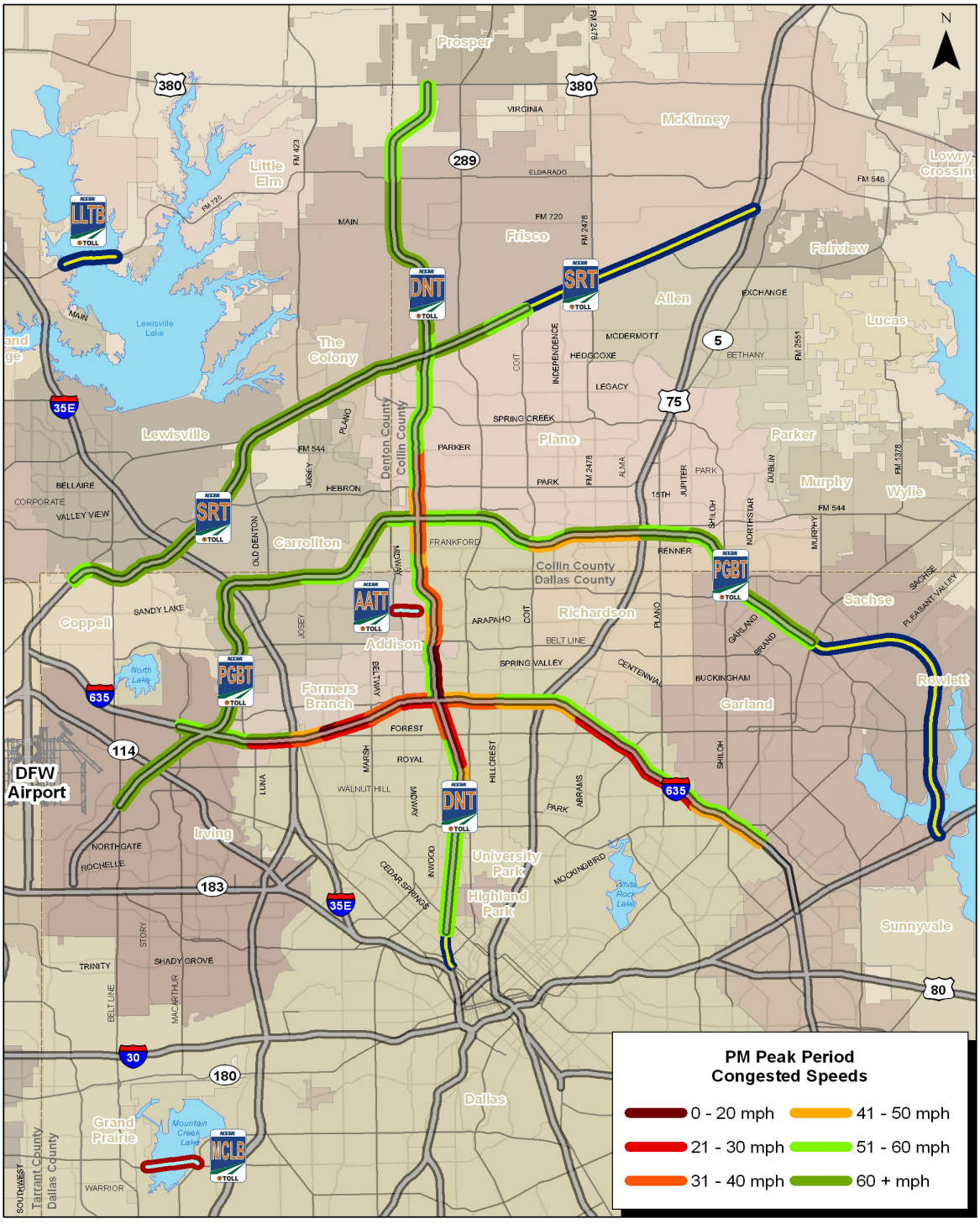


Figure 2-33. NTTAS Speed-Delay Results: PM Peak Period – Freeways

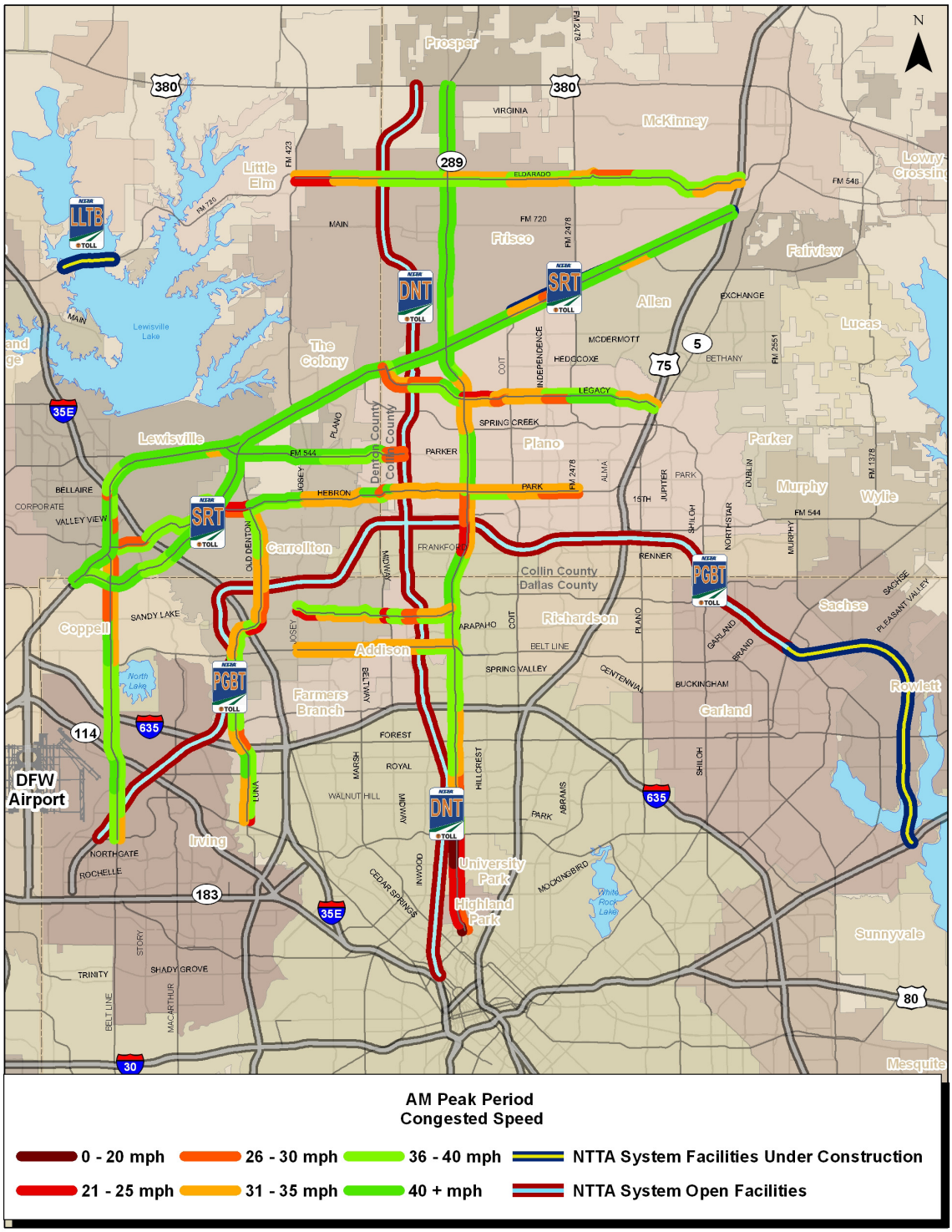


Figure 2-34. NTTAS Speed-Delay Results: AM Peak Period – Arterials

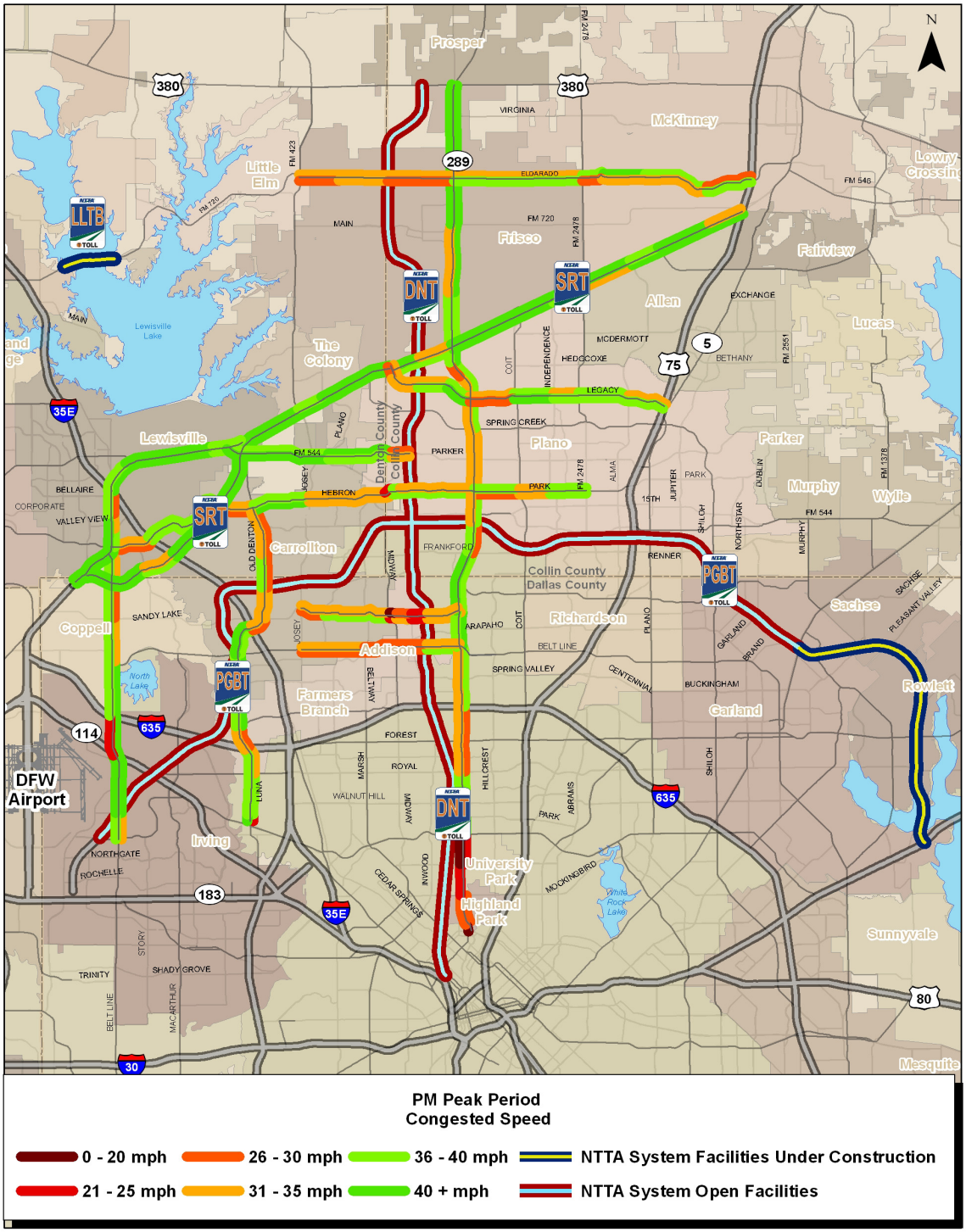


Figure 2-35. NTTAS Speed-Delay Results: PM Peak Period – Arterials

CHAPTER 3

DALLAS – FORT WORTH AREA TRANSPORTATION EXISTING AND PLANNED IMPROVEMENTS

The purpose of this chapter is to provide a background of the existing and future transportation improvements surrounding the North Texas Tollway Authority System (NTTAS) in the Dallas-Fort Worth Metropolitan Area (DFWMA). The information described in this section draws from the Metropolitan Transportation Plan (MTP) Mobility 2030 – 2009 Update developed by the North Central Texas Council of Governments (NCTCOG), the metropolitan planning organization (MPO) for the DFWMA. As the MPO, NCTCOG is primarily responsible for conducting the multimodal long-range regional planning process for transportation in the region.

The MTP for the DFWMA serves as a guideline for the region's planned investment in the transportation infrastructure and services over the next twenty-two years. The MTP developed by NCTCOG is required to be financially constrained and balanced to the region's anticipated revenue streams over a minimum time horizon of twenty years. The MTP 2030 – 2009 Update was approved by the Regional Transportation Council (RTC, the MPO policy body for DFWMA) in April 2009. The financial plan illustrates that the region could anticipate investing $71 billion for the transportation infrastructure improvements including freeway, tollway, transit, bicycle and pedestrian facilities, congestion mitigation strategies, managed HOV lanes and many others.

As the fifth largest region in the nation, the DFWMA had a population of 5 million in 2000 and is expected to have an estimated 9 million by 2030. Total employment is also expected to increase from 3.1 million in 2000 to 5.4 million by 2030. Chapter 5 provides detailed information regarding the demographic growth characteristics of the region.

TRAFFIC CONGESTION TRENDS

Figure 3-1 provides an illustration of the areas that were expected to experience congested traffic conditions during the peak periods in 2007 according to the MTP report. Figure 3-1 also provides an estimate of the congestion levels by 2030 with currently planned transportation infrastructure. Figure 3-1 also illustrates that by 2030 severe congestion will affect several areas near the NTTAS.

The MTP 2030 – 2009 Update estimated that the region-wide annual cost of congestion during 2007 was close to $4.2 billion and would possibly reach $6.5 billion by 2030. This increase of 55 percent from 2007 levels is in spite of approximately $71 billion programmed for infrastructure investment through the year 2030.

FREEWAY AND TOLLWAY SYSTEM

Figure 3-2 provides an illustration of the freeway and tollway corridors that were adopted as part of the MTP. The identification of these facilities is very important to this study because additional freeway and arterial improvements could materially impact the traffic and toll revenue on the NTTAS. Facilities providing improved accessibility to the corridor could provide positive impacts to the NTTAS while competing/alternative routes could dampen the NTTAS traffic and revenue potential. Improvements to existing highway system facilities and new roadways that could potentially have an effect on the traffic and toll revenue for the NTTA System include:

- IH 635 main lanes/managed lanes improvement, from PGBT to US 80
- US 75 main lanes/managed lanes improvement, from Bethany Drive to IH 635
- IH 35E main lanes/managed lanes improvements, from US 380 to IH 20
- SH 161 main lanes improvements, from Belt Line Road to SH 183, and
- US 380 arterial improvements in Denton and Collin Counties

Additional toll roads programmed for the region during the next 20 years are marked in green in Figure 3-2. Among them are the following:

- PGBT Eastern Extension*, from SH 78 to IH 30
- Trinity Parkway, from IH 35E to US 175
- SRT*, from Coit Road to US 75
- SH 161*, from SH 183 to IH 20
- Loop 9, in Collin, Rockwall, Kaufman, Dallas, Ellis, Johnson, Parker, Wise, and Denton Counties
- SH 360, from Green Oaks to US 67
- SH 170, from Loop 9 to SH 114, and
- Southwest Parkway/Chisholm Trail Parkway, from IH 30 to US 67

* Currently under construction

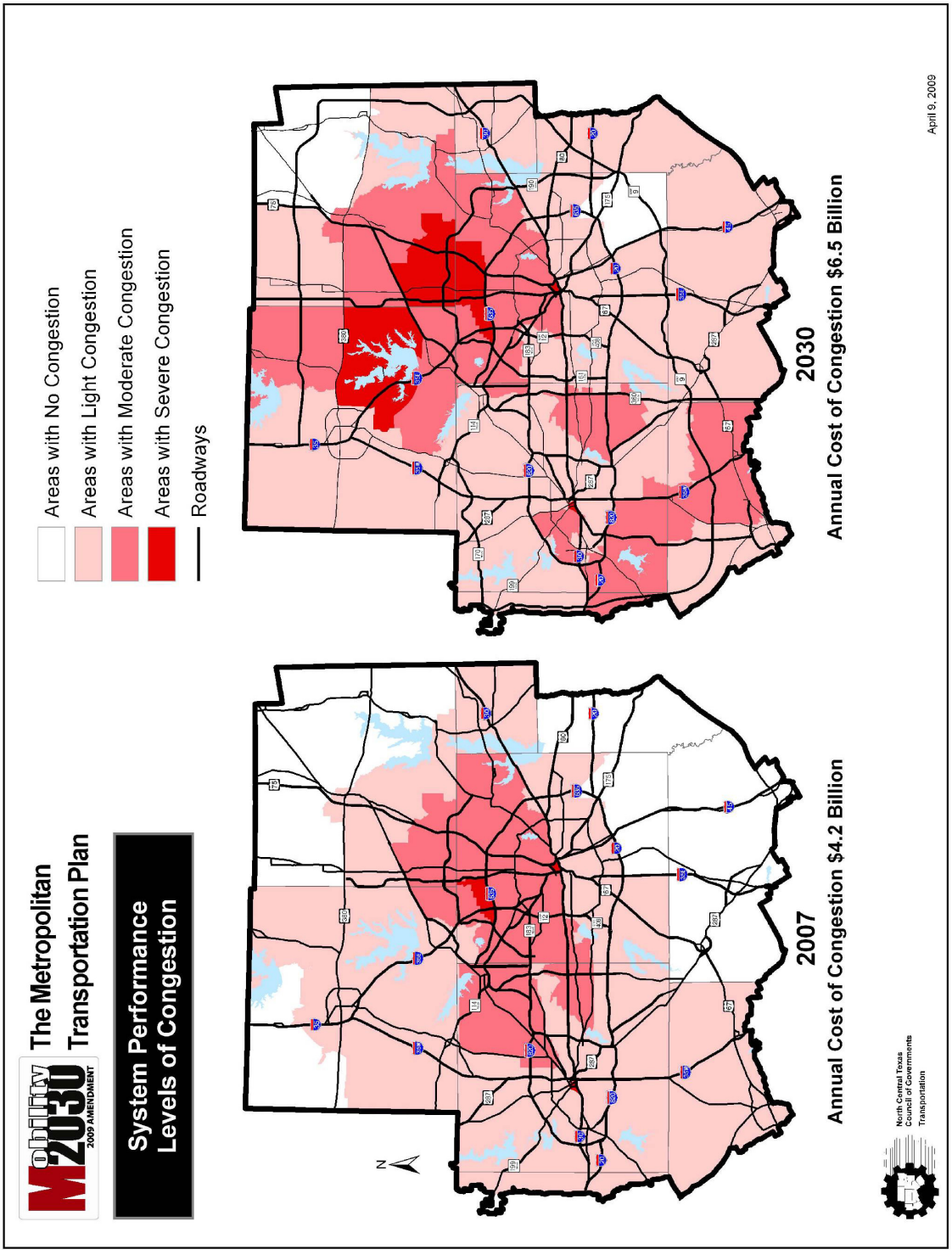


Figure 3-1. 2007 and 2030 Congestion Levels
Source: North Central Texas Council of Governments

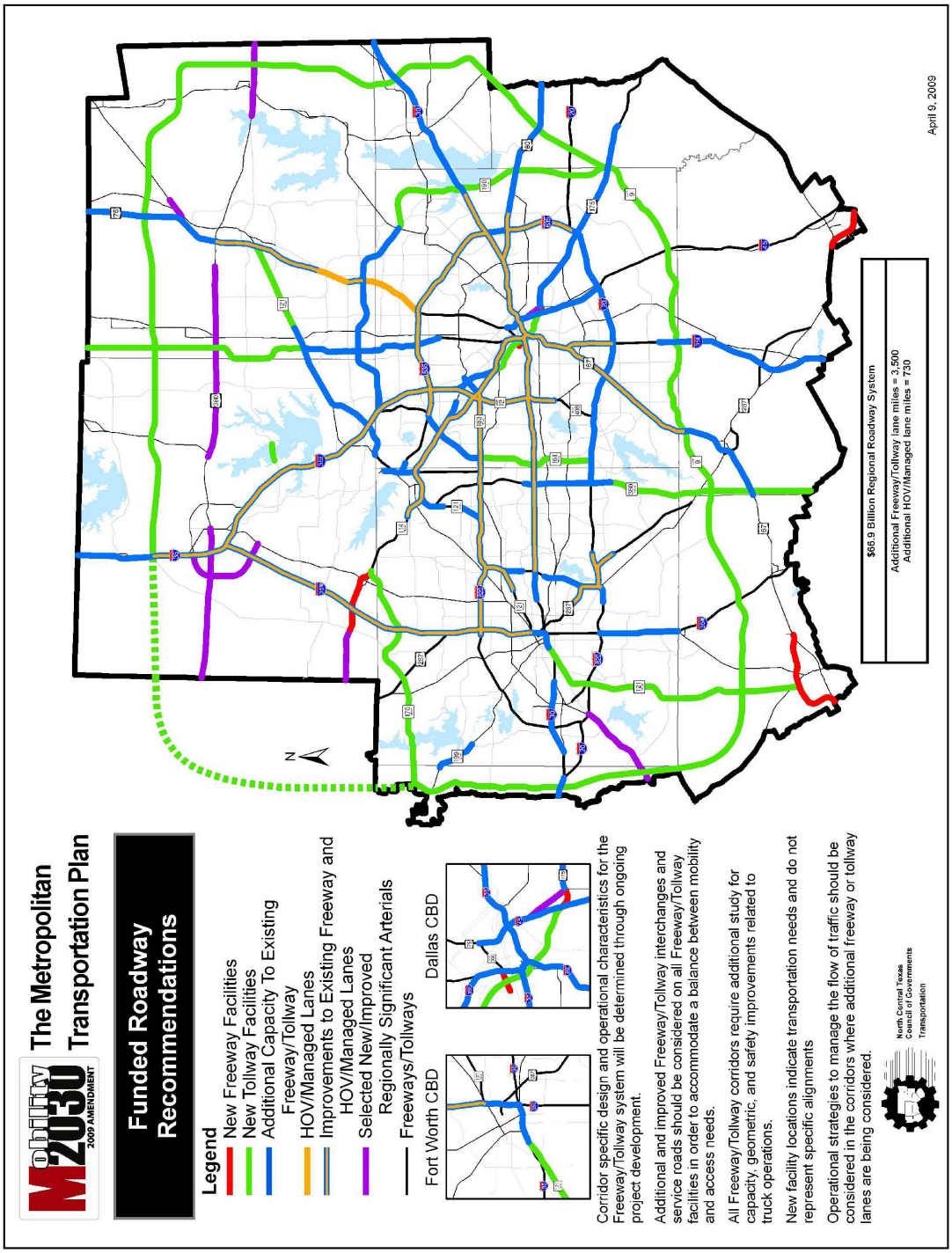


Figure 3-2. 2030 Freeway and Tollway System
Source: North Central Texas Council of Governments

RAIL TRANSIT SYSTEM

Transit service in the DFWMA is provided primarily by Dallas Area Rapid Transit (DART), the Fort Worth Transportation Authority (The T) and the Denton County Transportation Authority (DCTA). The existing DART light-rail system consists of two lines operational and one line under construction. The Red Line begins in South Dallas in Westmoreland Avenue and ends at the Parker Road station in Plano; the Blue Line extends from Ledbetter Drive in South Dallas to Downtown Garland; and the Orange Line will run parallel with the Green Line through Downtown Dallas to Bachman Station in Northwest Dallas. From Bachman Station, the Orange Line will run northwest to the Las Colinas Urban Center in 2011 and Dallas/Fort Worth International Airport in 2013. Trinity Railway Express (TRE) is a regional rail facility that connects Dallas and Fort Worth central business districts with stations in the mid-cities.

Figure 3-3 illustrates the proposed rail system as developed by NCTCOG in cooperation with the transit agencies. The transportation system defined in the MTP 2030 – 2009 Update and described above is reflected in the trip tables used to estimate the traffic and toll revenue for the NTTA System. The trip tables and networks were obtained from NCTCOG to reflect all the planned transportation infrastructure development included in the MTP 2030 – 2009 Update.

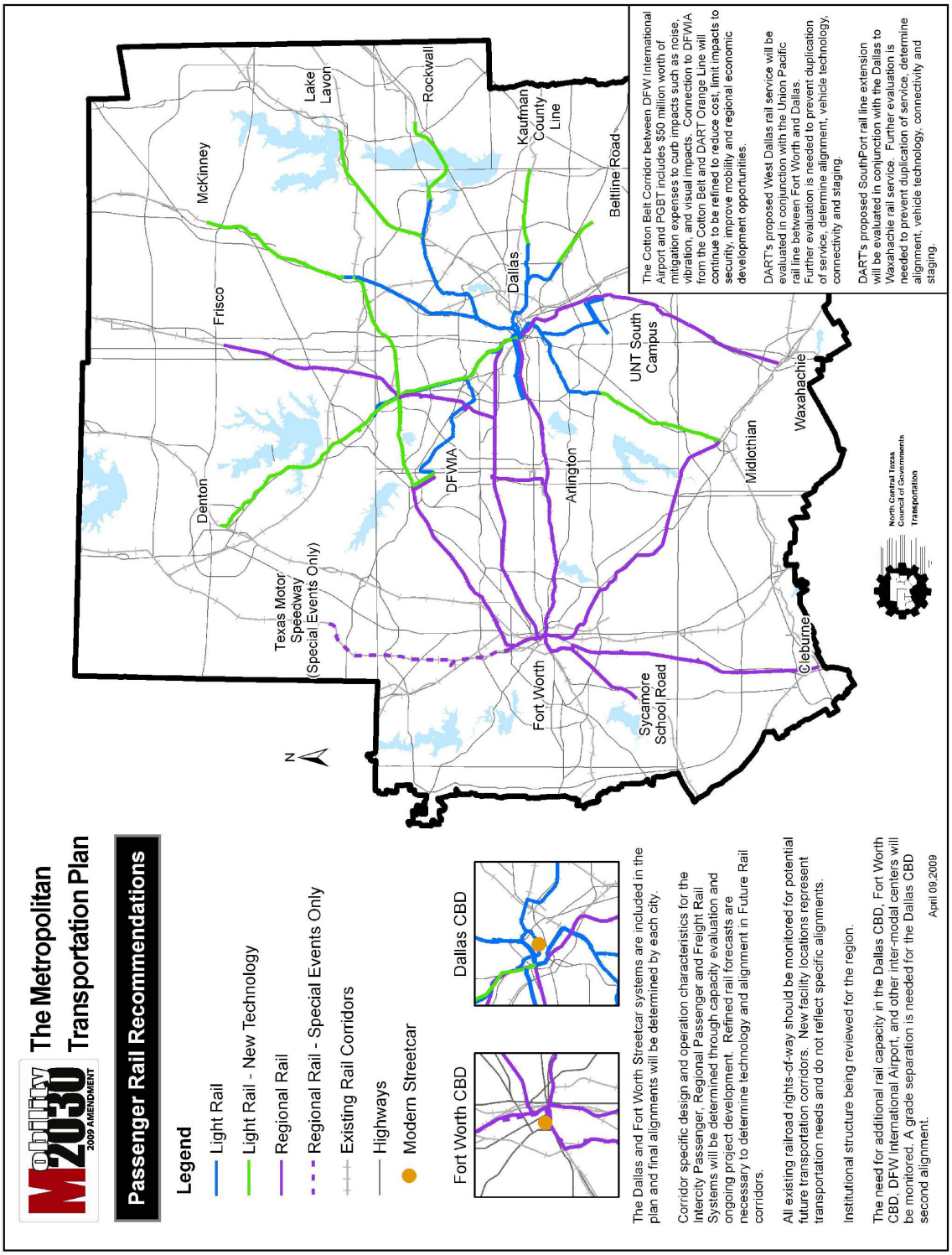


Figure 3-3. 2030 Future Rail System
Source: North Central Texas Council of Governments

CHAPTER 4

SUMMARY OF MOTORIST TRAVEL PATTERN SURVEYS AND TRIP CHARACTERISTICS

A comprehensive program of travel pattern and characteristic surveys was utilized in this study, and this chapter provides a detailed summary for the North Texas Tollway Authority System (NTTAS), including the DNT, PGBT and SRT corridors. A more detailed summary of the complete origin/destination (O/D) work programs can be found in documents titled "Technical Memorandum, Summary of Survey Results, NTTA Origin and Destination Survey Work Program," dated September 2002, and "Data Collection Project: SH 121 between US 75 and Denton Creek," dated October 2006. The locations used for these surveys can be seen in Figure 4-1.

DNT AND PGBT CORRIDOR SURVEYS

A detailed motorist travel pattern and trip characteristic survey is essential in the development and calibration of the model databases that assist in the calculation of traffic and toll revenue. The North Texas Tollway Authority (NTTA) authorized WSA to conduct a comprehensive O/D survey on the existing DNT and PGBT facilities in April 2002. In addition, other corridors for which projects were being contemplated were also surveyed. These included the DNT Extension Phase 3, the PGBT Eastern Extension (PGBT EE), the Lewisville Lake Toll Bridge (LLTB) and the Southwest Parkway in Fort Worth.

SURVEY STATION LOCATIONS

Pertinent O/D information was obtained from 56 survey sites that were selected throughout the metroplex. These locations were strategically identified for their relevance to the specific project corridor. The locations are represented graphically in Figure 4-1.

The survey stations located along the DNT and PGBT were chosen specifically because of their relevance to the NTTAS as well as the PGBT Segment IV traffic and revenue study that was underway at the time.

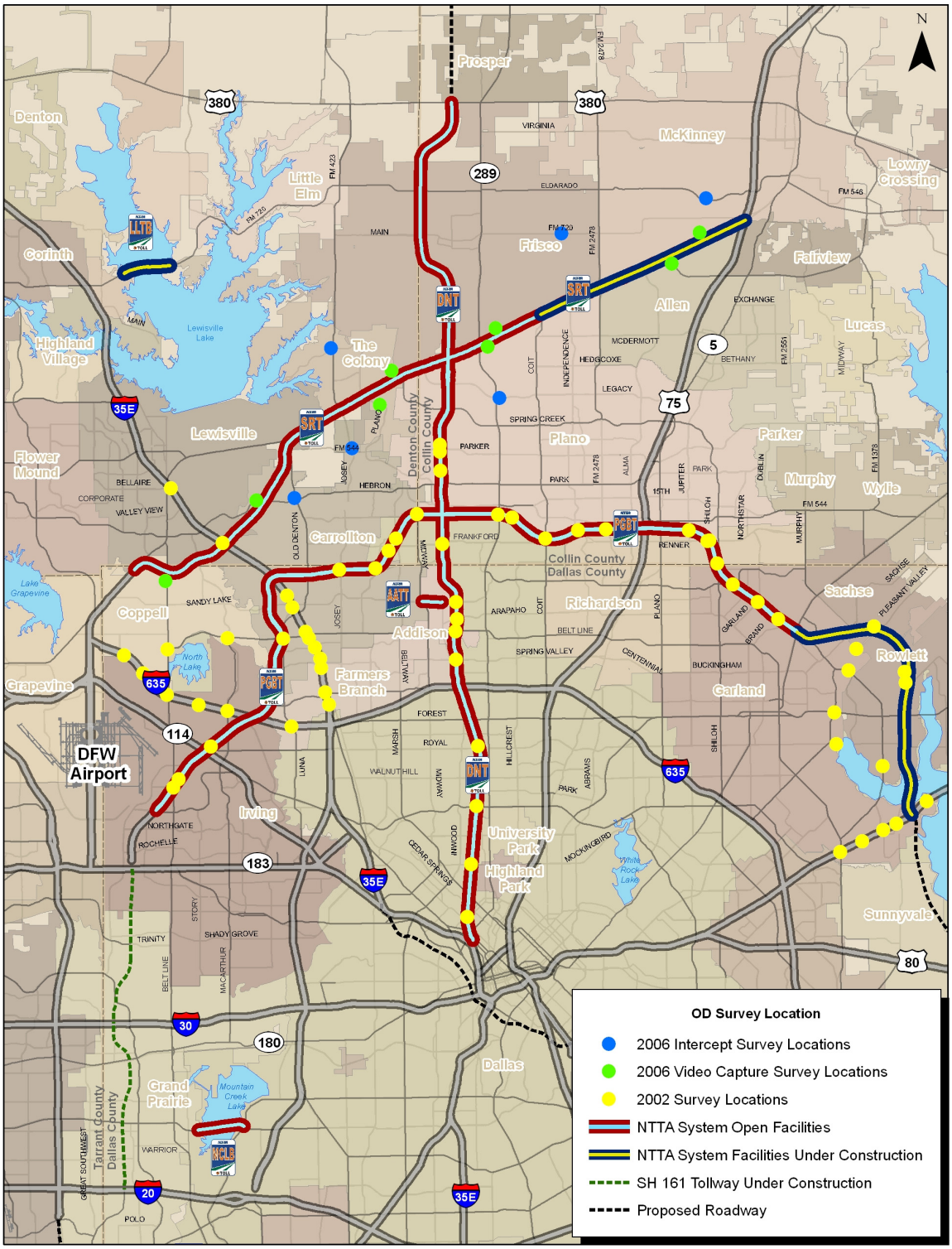


Figure 4-1. O/D Survey Locations

SURVEY METHODOLOGY

Under the design of the comprehensive survey program, two (2) different travel markets were "sampled." The first group was made up of motorists traveling on existing arterial streets and non-tolled ramps in each of the project corridors. The second group consisted of motorists who passed through one or more toll plaza locations along the existing DNT and PGBT. An explanation of the specific survey methodology employed for each type of station is described in the following sections.

Existing Arterial and Non-Tolled Ramp Locations

At these locations, a mailback survey approach was employed. Under this approach, survey sites were set up utilizing a series of warning signs and traffic cones, which ultimately brought motorists to a stop. Each motorist was then handed a postage-paid, pre-addressed mailback survey card as they passed through the survey station and requested to complete the form and return via US mail as soon as possible. The specific cards utilized in this process are shown in Figure 4-2, Figure 4-3 and Figure 4-4 for each of the specific corridors. As shown, each card requested specific information regarding the O/D of the specific trip as well as information related to trip purpose, frequency, occupancy and other characteristics related to the driver.

Toll Plaza Locations

The mailback format was also utilized at toll plaza locations surveyed along the existing DNT and PGBT. Survey questionnaires were distributed to cash patrons at each of the entry ramp plazas. In addition, questionnaires were distributed to cash vehicles in the northbound direction at Main Lane Plazas (MLP) 1 and 3, and in the southbound direction at MLP 2 on the DNT. The cash patrons passing through PGBT main lane plaza locations received questionnaires in the southbound direction at MLP 6, westbound direction at MLP 7, eastbound at MLP 8 and northbound at MLP 10.

TollTag account surveys were conducted using a less invasive method. TollTag users were selected randomly from NTTA's Toll Tag customer database to assure a statistically random process. A survey questionnaire was then sent to their respective addresses asking them to provide information about their most recent trip on the DNT or PGBT before mailing it back for processing. The survey instruments distributed to the TollTag customers are shown in Figure 4-5 and Figure 4-6 for both the DNT and PGBT customer base.

NORTH TEXAS TOLLWAY AUTHORITY

Station | Day | Dir. | Hour

DEAR MOTORIST:

This survey is being undertaken to obtain important information about travel patterns needed for planning local highway improvements. You are asked to complete and mail this postage-paid questionnaire at your earliest convenience. Your cooperation will help the North Texas Tollway Authority serve you better and will lead to improved travel in the future. Please help make this mailback survey successful by returning the completed form today.

1. Where did you begin this particular trip in this direction? Include nearest intersection, street address, or other explanation, e.g., airport, shopping malls, etc. Please be as specific as possible.

Major Intersection or Street Address

City County State Zip Code

2. Where will this particular trip (in this direction) end? Include nearest intersection, street address, or other explanation, e.g., airport, shopping malls, etc. (Should not be the same as answer to Question 1)

Major Intersection or Street Address

City County State Zip Code

3. Please identify type of vehicle you were driving. (Circle one)

1. Passenger cars and all other 2- axle vehicles
2. Motorcycles
3. Trucks with more than 2-axles
4. Others _____

4. What was the purpose of this trip when given this card? (Circle one)

1. Journey To or From Work
2. Company Business
3. Personal Business
4. School
5. Shopping
6. Recreation
7. Social

5. How often each week do you use this roadway to make this trip in <u>this direction</u> for the above purpose? (Circle one)

Less than 1 1 2 3 4 5 More than 5

6. How many people were in your vehicle, including the driver? (Circle one)

1 2 3 4 5 6 or more

7. Please indicate the range of your annual household income. (Circle one)

1. Less than $30,000
2. $30,000 - $60,000
3. $60,001 - $90,000
4. $90,001 - $130,000
5. $130,001 - $160,000
6. More than $160,000

8. Do you currently participate in the NTTA's TollTag Program? (Circle one)

1. Yes 2. No

The North Texas Tollway Authority would like to express its appreciation for your participation in responding to this survey.

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Figure 4-2. Off Turnpike Handout Cash Survey Form

NORTH TEXAS TOLLWAY AUTHORITY

Station | Day | Dir. | Hour

DEAR CUSTOMER:
This survey is being undertaken to obtain important information about travel patterns needed for planning local highway improvements. You are asked to complete and mail this postage-paid questionnaire at your earliest convenience. Your cooperation will help the North Texas Tollway Authority serve you better and will lead to improved travel in the future. Please help make this mailback survey successful by returning the completed form today.

7

8

1. Where did you begin this particular trip in this direction? Include nearest intersection, street address, or other explanation, e.g., airport, shopping malls, etc. Please be as specific as possible.

Major Intersection or Street Address

City | County | State | Zip Code

9

10

2. Where will this particular trip (in this direction) end? Include nearest intersection, street address, or other explanation, e.g., airport, shopping malls, etc. (Should not be the same as answer to Question 1)

Major Intersection or Street Address

City | County | State | Zip Code

11

3. Please identify type of vehicle you were driving. (Circle one)

1. Passenger cars and all other 2- axle vehicles
2. Motorcycles
3. Trucks with more than 2-axles
4. Others _____

12

4. What was the purpose of this trip when given this card? (Circle one)

1. Journey To or From Work
2. Company Business
3. Personal Business
4. School
5. Shopping
6. Recreation
7. Social

5. How often each week do you use this roadway to make this trip in this direction for the above purpose? (Circle one)

Less than 1 | 1 | 2 | 3 | 4 | 5 | More than 5

13

6. How many people were in your vehicle, including the driver? (Circle one)

1 | 2 | 3 | 4 | 5 | 6 or more

7. How much time do you think you saved using the Tollway for this one-way trip? _____ Minutes

14

8. How would you rate travel on the Dallas North Tollway as compared to travel on existing alternative routes? (Circle one)

1. Good
2. Fair
3. Poor

15

9. Which location did you use to enter the Dallas North Tollway? (Circle one)

1. Headquarters Dr./ Frontage Rd.
2. Legacy Dr.
3. Spring Creek Pkwy.
4. Windhaven Pkwy.
5. W. Parker Rd.
6. W. Park Blvd.
7. President George Bush Tpke.(PGBT)
8. Plano Pkwy.
9. Frankford Rd.
10. Trinity Mills Rd.
11. Keller Springs Rd.
12. Belt Line Rd.
13. Spring Valley Rd.
14. Alpha Rd.
15. I.H. 635 (LBJ)
16. Harvest Hill Rd.
17. Forest Ln.
18. Royal Ln.
19. Walnut Hill Ln.
20. N.W. Hwy.
21. Lovers Ln.
22. Mockingbird Ln.
23. Lemmon Ave.
24. Main Lane Plaza 1 (Downtown)

16

10. Which location did you use to exit the Dallas North Tollway? (Circle one)

1. Headquarters Dr./ Frontage Rd.
2. Legacy Dr.
3. Spring Creek Pkwy.
4. Windhaven Pkwy.
5. W. Parker Rd.
6. W. Park Blvd.
7. President George Bush Tpke.(PGBT)
8. Plano Pkwy.
9. Frankford Rd.
10. Trinity Mills Rd.
11. Keller Springs Rd.
12. Belt Line Rd.
13. Spring Valley Rd.
14. Alpha Rd.
15. I.H. 635 (LBJ)
16. Harvest Hill Rd.
17. Forest Ln.
18. Royal Ln.
19. Walnut Hill Ln.
20. N.W. Hwy.
21. Lovers Ln.
22. Mockingbird Ln.
23. Lemmon Ave.
24. Main Lane Plaza 1 (Downtown)

17

11. Please indicate the range of your annual household income. (Circle one)

1. Less than $30,000
2. $30,000 - $60,000
3. $60,001 - $90,000
4. $90,001 - $130,000
5. $130,001 - $160,000
6. More than $160,000

18

The North Texas Tollway Authority would like to express its appreciation for your participation in responding to this survey.

April / May 2002

Figure 4-3. DNT Handout Cash Survey Form

NORTH TEXAS TOLLWAY AUTHORITY

Station | Day | Dir. | Hour

DEAR CUSTOMER:

This survey is being undertaken to obtain important information about travel patterns needed for planning local highway improvements. You are asked to complete and mail this postage-paid questionnaire at your earliest convenience. Your cooperation will help the North Texas Tollway Authority serve you better and will lead to improved travel in the future. Please help make this mailback survey successful by returning the completed form today.

1. Where did you begin this particular trip in this direction? Include nearest intersection, street address, or other explanation, e.g., airport, shopping malls, etc. Please be as specific as possible.

Major Intersection or Street Address

City County State Zip Code

2. Where will this particular trip (in this direction) end? Include nearest intersection, street address, or other explanation, e.g., airport, shopping malls, etc. (Should not be the same as answer to Question 1)

Major Intersection or Street Address

City County State Zip Code

3. Please identify type of vehicle you were driving. (Circle one)

1. Passenger cars and all other 2- axle vehicles
2. Motorcycles
3. Trucks with more than 2-axles
4. Others _____

4. What was the purpose of this trip when given this card? (Circle one)

1. Journey To or From Work
2. Company Business
3. Personal Business
4. School
5. Shopping
6. Recreation
7. Social

5. How often each week do you use this roadway to make this trip in <u>this direction</u> for the above purpose? (Circle one)

Less than 1 1 2 3 4 5 More than 5

6. How many people were in your vehicle, including the driver? (Circle one)

1 2 3 4 5 6 or more

7. How much time do you think you saved using the Turnpike for this one-way trip? _____ Minutes

8. How would you rate travel on the President George Bush Turnpike as compared to travel on existing alternative routes? (Circle one)

1. Good 2. Fair 3. Poor

9. Which location did you use to enter the President George Bush Turnpike? (Circle one)

1. Northeast Pkwy.
2. SH 78
3. Brand Rd.
4. N. Garland Ave.
5. Campbell Rd.
6. Lookout Dr./Telecom Pkwy.
7. Renner Rd.
8. Jupiter Rd.
9. Plano Rd.
10. U.S. 75
11. Custer Pkwy.
12. Alma Rd.
13. Independence Pkwy.
14. Coit Rd.
15. Preston Rd.
16. Dallas North Twy. (DNT)
17. Midway Rd.
18. Marsh Lane/Frankford Rd.
19. Kelly Blvd./
20. Josey Ln
21. Old Denton Rd.
22. I.H. 35E
23. I.H. 635 (LBJ)
24. Las Colinas Blvd.
25. MacArthur Blvd.
26. S.H. 114
27. Belt Line Rd.
28. Main Lane Plaza 10 (S.H. 161)

10. Which location did you use to exit the President George Bush Turnpike? (Circle one)

1. Northeast Pkwy.
2. SH 78
3. Brand Rd.
4. N. Garland Ave.
5. Campbell Rd.
6. Shiloh Rd./Lookout Dr.
7. Renner Rd.
8. Jupiter Rd.
9. Ave. K
10. U.S. 75
11. Alma Rd.
12. Custer Pkwy.
13. Independence Pkwy.
14. Coit Rd.
15. Preston Rd.
16. Dallas North Twy. (DNT)
17. Midway Rd.
18. Marsh Lane/Frankford Rd.
19. Kelly Blvd.
20. Josey Ln.
21. Old Denton Rd.
22. I.H. 35E
23. I.H. 635 (LBJ)
24. Las Colinas Blvd.
25. S.H. 114
26. MacArthur Blvd.
27. Belt Line Rd.
28. Main Lane Plaza 10 (S.H. 161)

11. Please indicate the range of your annual household income. (Circle one)

1. Less than $30,000
2. $30,000 - $60,000
3. $60,001 - $90,000
4. $90,001 - $130,000
5. $130,001 - $160,000
6. More than $160,000

The North Texas Tollway Authority would like to express its appreciation for your participation in responding to this survey.

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Figure 4-4. PGBT Handout Cash Survey Form

NORTH TEXAS TOLLWAY AUTHORITY

Station				**Day**	**Dir.**	**Hour**	

DEAR CUSTOMER:

This survey is being undertaken to obtain important information about travel patterns needed for planning local highway improvements. You are asked to complete and mail this postage-paid questionnaire at your earliest convenience. Your cooperation will help the North Texas Tollway Authority serve you better and will lead to improved travel in the future. Please help make this mailback survey successful by returning the completed form today.

Can you please provide the following information about your most recent one-way weekday (Mon-Fri) trip on the Dallas North Tollway.

1. Where did you begin this particular trip in this direction? Include nearest intersection, street address, or other explanation, e.g., airport, shopping malls, etc. Please be as specific as possible.

Major Intersection or Street Address

City County State Zip Code

2. Where will this particular trip (in this direction) end? Include nearest intersection, street address, or other explanation, e.g., airport, shopping malls, etc. (Should not be the same as answer to Question 1)

Major Intersection or Street Address

City County State Zip Code

3. Please identify type of vehicle you were driving. (Circle one)

1. Passenger cars and all other 2- axle vehicles
2. Motorcycles
3. Trucks with more than 2-axles
4. Others _____

4. What was the purpose of this trip when given this card? (Circle one)

1. Journey To or From Work
2. Company Business
3. Personal Business
4. School
5. Shopping
6. Recreation
7. Social

5. How often each week do you use this roadway to make this trip in <u>this direction</u> for the above purpose? (Circle one)

Less than 1 1 2 3 4 5 More than 5

6. How many people were in your vehicle, including the driver? (Circle one) 1 2 3 4 5 6 or more

7. How much time do you think you saved using the Tollway for this one-way trip? _____ Minutes

8. How would you rate travel on the Dallas North Tollway as compared to travel on existing alternative routes? (Circle one) 1. Good 2. Fair 3. Poor

9. Which location did you use to enter the Dallas North Tollway? (Circle one)

1. Headquarters Dr./ Frontage Rd.
2. Legacy Dr.
3. Spring Creek Pkwy.
4. Windhaven Pkwy.
5. W. Parker Rd.
6. W. Park Blvd.
7. President George Bush Tpke.(PGBT)
8. Plano Pkwy.
9. Frankford Rd.
10. Trinity Mills Rd.
11. Keller Springs Rd.
12. Belt Line Rd.
13. Spring Valley Rd.
14. Alpha Rd.
15. I.H. 635 (LBJ)
16. Harvest Hill Rd.
17. Forest Ln.
18. Royal Ln.
19. Walnut Hill Ln.
20. N.W. Hwy.
21. Lovers Ln.
22. Mockingbird Ln.
23. Lemmon Ave.
24. Main Lane Plaza 1 (Downtown)

10. Which location did you use to exit the Dallas North Tollway? (Circle one)

1. Headquarters Dr./ Frontage Rd.
2. Legacy Dr.
3. Spring Creek Pkwy.
4. Windhaven Pkwy.
5. W. Parker Rd.
6. W. Park Blvd.
7. President George Bush Tpke.(PGBT)
8. Plano Pkwy.
9. Frankford Rd.
10. Trinity Mills Rd.
11. Keller Springs Rd.
12. Belt Line Rd.
13. Spring Valley Rd.
14. Alpha Rd.
15. I.H. 635 (LBJ)
16. Harvest Hill Rd.
17. Forest Ln.
18. Royal Ln.
19. Walnut Hill Ln.
20. N.W. Hwy.
21. Lovers Ln.
22. Mockingbird Ln.
23. Lemmon Ave.
24. Main Lane Plaza 1 (Downtown)

11. Please indicate the range of your annual household income. (Circle one)

1. Less than $30,000
2. $30,000 - $60,000
3. $60,001 - $90,000
4. $90,001 - $130,000
5. $130,001 - $160,000
6. More than $160,000

12. Please indicate the time period in which this one-way trip occurred. (Circle one)

7 a.m. – 9 a.m. 9 a.m. – 4 p.m. 4 p.m. – 6 p.m. 6 p.m. – 7 a.m.

13. Please indicate the day on which this one-way trip occurred. (Circle one)

Monday Tuesday Wednesday Thursday Friday

The North Texas Tollway Authority would like to express its appreciation for your participation in responding to this survey.

April / May 2002

Figure 4-5. DNT TollTag Mail-out Survey Form

NORTH TEXAS TOLLWAY AUTHORITY

Station | Day | Dir. | Hour

DEAR CUSTOMER:

This survey is being undertaken to obtain important information about travel patterns needed for planning local highway improvements. You are asked to complete and mail this postage-paid questionnaire at your earliest convenience. Your cooperation will help the North Texas Tollway Authority serve you better and will lead to improved travel in the future. Please help make this mailback survey successful by returning the completed form today.

Can you please provide the following information about your most recent one-way weekday (Mon-Fri) trip on the President George Bush Turnpike.

1. Where did you begin this particular trip in this direction? Include nearest intersection, street address, or other explanation, e.g., airport, shopping malls, etc. Please be as specific as possible.

Major Intersection or Street Address

City County State Zip Code

2. Where will this particular trip (in this direction) end? Include nearest intersection, street address, or other explanation, e.g., airport, shopping malls, etc. (Should not be the same as answer to Question 1)

Major Intersection or Street Address

City County State Zip Code

3. Please identify type of vehicle you were driving. (Circle one)

1. Passenger cars and all other 2- axle vehicles
2. Motorcycles
3. Trucks with more than 2-axles
4. Others _____

4. What was the purpose of this trip when given this card? (Circle one)

1. Journey To or From Work
2. Company Business
3. Personal Business
4. School
5. Shopping
6. Recreation
7. Social

5. How often each week do you use this roadway to make this trip in this direction for the above purpose? (Circle one)

Less than 1 1 2 3 4 5 More than 5

6. How many people were in your vehicle, including the driver? (Circle one) 1 2 3 4 5 6 or more

7. How much time do you think you saved using the Turnpike for this one-way trip? _____ Minutes

8. How would you rate travel on the President George Bush Turnpike as compared to travel on existing alternative routes? (Circle one) 1. Good 2. Fair 3. Poor

9. Which location did you use to enter the President George Bush Turnpike? (Circle one)

1. Northeast Pkwy.
2. SH 78
3. Brand Rd.
4. N. Garland Ave.
5. Campbell Rd.
6. Lookout Dr./Telecom Pkwy.
7. Renner Rd.
8. Jupiter Rd.
9. Plano Rd.
10. U.S. 75
11. Custer Pkwy.
12. Alma Rd.
13. Independence Pkwy.
14. Coit Rd.
15. Preston Rd.
16. Dallas North Twy. (DNT)
17. Midway Rd.
18. Marsh Lane/Frankford Rd.
19. Kelly Blvd./
20. Josey Ln
21. Old Denton Rd.
22. I.H. 35E
23. I.H. 635 (LBJ)
24. Las Colinas Blvd.
25. MacArthur Blvd.
26. S.H. 114
27. Belt Line Rd.
28. Main Lane Plaza 10 (S.H. 161)

10. Which location did you use to exit the President George Bush Turnpike? (Circle one)

1. Northeast Pkwy.
2. SH 78
3. Brand Rd.
4. N. Garland Ave.
5. Campbell Rd.
6. Shiloh Rd./Lookout Dr.
7. Renner Rd.
8. Jupiter Rd.
9. Ave. K
10. U.S. 75
11. Alma Rd.
12. Custer Pkwy.
13. Independence Pkwy.
14. Coit Rd.
15. Preston Rd.
16. Dallas North Twy. (DNT)
17. Midway Rd.
18. Marsh Lane/Frankford Rd.
19. Kelly Blvd.
20. Josey Ln.
21. Old Denton Rd.
22. I.H. 35E
23. I.H. 635 (LBJ)
24. Las Colinas Blvd.
25. S.H. 114
26. MacArthur Blvd.
27. Belt Line Rd.
28. Main Lane Plaza 10 (S.H. 161)

11. Please indicate the range of your annual household income. (Circle one)

1. Less than $30,000
2. $30,000 - $60,000
3. $60,001 - $90,000
4. $90,001 - $130,000
5. $130,001 - $160,000
6. More than $160,000

12. Please indicate the time period in which this one-way trip occurred. (Circle one)

7 a.m. – 9 a.m. 9 a.m. – 4 p.m. 4 p.m. – 6 p.m. 6 p.m. – 7 a.m.

13. Please indicate the day on which this one-way trip occurred. (Circle one)

Monday Tuesday Wednesday Thursday Friday

The North Texas Tollway Authority would like to express its appreciation for your participation in responding to this survey.

April / May 2002

Figure 4-6. PGBT TollTag Mail-out Survey Form

Under both survey approaches, patrons were asked specifics concerning their trip origin and destination for the most recent trip. Information regarding trip purpose, trip frequency and vehicle occupancy were obtained. The hour, day and direction of each survey were indicated on the questionnaire in addition to several questions concerning the perceived time savings and sufficiency of travel on the facility. At all locations, survey operations were conducted for a continuous 12-hour period from 7:00 a.m. to 7:00 p.m. on weekdays only.

SUMMARY OF RESULTS

A significant number of statistical facts concerning the customer base of motorists who utilize the DNT and PGBT in their daily travels were obtained as a direct result of the survey effort.

The remaining sections of this chapter are intended to provide a summary of some of the statistical results of the survey effort. It should be recognized that there are many ways in which the material can be presented. WSA has chosen to provide graphics which are representative of the type of information that is now available to the NTTA staff as they review the characteristics of their specific customer base.

Survey Sample Size

As shown in Tables 4-1 and 4-2, there were a significant number of motorists contacted during the course of this undertaking. The percent sampled varied by survey location and by patron type. The TollTag patrons typically had a significant interest in responding, with 14.2 percent and 11.6 percent of those particular customers on DNT and PGBT respectively responding to the questioning process overall, compared to just 5.8 percent of the cash customers contacted on the DNT and 13.4 percent of the PGBT cash customers.

Finally, the overall survey effort provided a significant database from which the appropriate trip tables can be constructed to reflect the current usage patterns of the highway system in the NTTAS as well as in the potential expansion corridors. The information was coded using a Geographical Information System (GIS) method to accurately represent the trip origin and destination locations of the trips reported.

Table 4-1
Proposed Motorist Survey Sample Size
NTTA 2002 O-D Survey Program
DALLAS NORTH TOLLWAY

STATION NUMBER	LOCATION	DESCRIPTION	SURVEY DIRECTION	DAY OF SURVEY	DATE OF SURVEY	PASSING CASH TRAFFIC	NUMBER OF SURVEYS DISTRIBUTED	CODED CASH SURVEYS	CODED CASH SURVEYS AS A PERCENT OF SURVEYS DISTRIBUTED
D1	MPL 1	MPL 1	NB	Friday	4-05-02	11,310	9,050	508	5.6
D2	DNT	MOCKINGBIRD LN ON-RAMP	NB	Friday	4-05-02	2,300	1,838	125	6.8
D3	DNT	NORTHWEST HWY ON-RAMP	NB	Thursday	4-04-02	1,696	1,812	133	7.3
D4	DNT	ROYAL LN ON-RAMP	NB	Thursday	4-04-02	534	515	22	4.3
D5	DNT	SPRING VALLEY RD ON-RAMP	SB	Thursday	4-04-02	1,140	1,067	55	5.2
D6	DNT	BELT LINE RD ON-RAMP	SB	Thursday	4-04-02	2,468	2,025	111	5.5
D7	MPL 2	MPL2	SB	Thursday	4-04-02	13,487	7,550	518	6.9
D8	DNT	KELLER SPRINGS ON-RAMP	NB	Wednesday	4-03-02	693	741	40	5.4
D9	DNT	FRANKFORD RD ON-RAMP	NB	Wednesday	4-03-02	1,214	1,261	92	7.3
D10	DNT	PARK BLVD W ON-RAMP	SB	Wednesday	4-03-02	1,427	1,090	53	4.9
D11	MPL 3	MPL 3	NB	Wednesday	4-03-02	7,025	6,150	263	4.3
D12	DNT	PARKER RD ON-RAMP	NB	Wednesday	4-03-02	324	303	10	3.3
	TOTAL	HANDOUTS				43,618	33,402	1,930	5.8
	TOLLTAG	MAILOUTS					83,000	11,816	14.2

Table 4-2
Proposed Motorist Survey Sample Size
NTTA 2002 O-D Survey Program
PRESIDENT GEORGE BUSH TURNPIKE

STATION NUMBER	LOCATION	DESCRIPTION	SURVEY DIRECTION	DAY OF SURVEY	DATE OF SURVEY	PASSING CASH TRAFFIC	NUMBER OF SURVEYS DISTRIBUTED	CODED CASH SURVEYS	CODED CASH SURVEYS AS A PERCENT OF SURVEYS DISTRIBUTED
B2	PGBT	BRAND ON-RAMP	EB	Friday	4-12-02	7,227	3,449	354	10.3
B3	PGBT	GARLAND AVE ON-RAMP	EB	Monday	4-08-02	144	136	6	4.4
B4	PGBT	CAMPBELL ON-RAMP	EB	Monday	4-08-02	468	482	40	8.3
B5	PGBT	E. RENNER RD ON-RAMP	SB	Monday	4-08-02	528	370	52	14.1
B6	MLP 6	MLP 6	SB	Monday	4-08-02	5,683	5,244	142	2.7
B7	PGBT	SHILOH RD ON-RAMP	WB	Monday	4-08-02	743	833	57	6.8
B8	PGBT	W. RENNER RD ON-RAMP	WB	Tuesday	4-09-02	352	359	27	7.5
B9	PGBT	JUPITER RD ON-RAMP	WB	Tuesday	4-09-02	17,052	3,999	473	11.8
B10	PGBT	CUSTER PKWY ON-RAMP	EB	Tuesday	4-09-02	8,277	6,554	902	13.8
B11	PGBT	INDEPENDENCE PKWY ON-RAMP	EB	Tuesday	4-09-02	220	352	26	7.4
B12	PGBT	COIT RD ON-RAMP	EB	Tuesday	4-09-02	1,425	1,300	107	8.2
B13	MLP 7	MLP 7	WB	Wednesday	4-10-02	10,517	8,287	530	6.4
B14	PGBT	PRESTON RD ON-RAMP	WB	Wednesday	4-10-02	1,220	856	52	6.1
B15	PGBT	MIDWAY RD ON-RAMP	EB	Wednesday	4-10-02	1,546	1,433	105	7.3
B16	PGBT	MARSH RD ON-RAMP	EB	Wednesday	4-10-02	1,316	1,241	133	10.7
B17	MLP 8	MLP 8	EB	Wednesday	4-10-02	7,841	4,719	416	8.8
B18	PGBT	KELLY ON-RAMP	WB	Thursday	4-11-02	1,050	1,129	87	7.7
B19	PGBT	JOSEY ON-RAMP	WB	Thursday	4-11-02	434	406	24	5.9
B20	PGBT	ROYAL LN ON-RAMP	NB	Thursday	4-11-02	284	375	32	8.5
B21	PGBT	BELT LINE RD ON-RAMP	NB	Thursday	4-11-02	375	333	38	11.4
B22	MLP 10	MLP 10	NB	Thursday	4-11-02	3,452	3,478	314	9.0
B23	IH35E	WHITLOCK LN ON-RAMP	NB	Friday	4-19-02	4,207	3,633	544	15.0
B24	IH35E	SANDY LAKE RD ON-RAMP	SB	Friday	4-19-02	6,395	4,617	573	12.4
B25	IH35E	BELT LINE RD ON-RAMP	NB	Friday	4-19-02	7,007	1,389	154	11.1
B26	IH35E	BELT LINE RD ON-RAMP	SB	Monday	4-22-02	6,514	4,654	203	4.4
B27	IH35E	CROSBY ON-RAMP	SB	Monday	4-22-02	4,583	4,008	567	14.1
B28	IH35E	VALWOOD PKWY ON-RAMP	NB	Monday	4-22-02	4,266	4,086	702	17.2
B29	IH35E	VALWOOD PKWY ON-RAMP	SB	Tuesday	4-23-02	7,380	4,491	442	9.8
B30	IH35E	VALLEY VIEW LN ON-RAMP	NB	Tuesday	4-23-02	3,500	3,042	606	19.9
B31	IH35E	VALLEY VIEW LN ON-RAMP	SB	Tuesday	4-23-02	4,982	4,121	561	13.6
B32	LBJ (IH635)	ROYAL LN ON-RAMP	EB	Wednesday	4-24-02	2,429	2,311	407	17.6
B33	LBJ (IH635)	FREEPORT PKWY ON-RAMP	EB	Wednesday	4-24-02	4,339	3,683	642	17.4
B34	LBJ (IH635)	BELTLINE RD ON-RAMP	EB	Wednesday	4-24-02	9,430	5,155	1,003	19.5
B35	LBJ (IH635)	OLYMPUS BLVD ON-RAMP	EB	Thursday	4-25-02	529	658	106	16.1
B36	LBJ (IH635)	MACARTHUR BLVD N ON-RAMP	EB	Thursday	4-25-02	9,992	6,046	924	15.3
B37	LBJ (IH635)	LUNA RD ON-RAMP	EB	Thursday	4-25-02	5,561	4,463	654	14.7
B38	BELT LINE RD/DENTON TAP	S. OF BELTLINE RD E	NB	Monday	4-29-02	19,008	8,985	1,697	18.9
B39	MACARTHUR BLVD N	S. OF BELTLINE RD E	NB	Tuesday	4-30-02	11,032	9,172	1,695	18.5
B40	LUNA RD	S OF BELTLINE RD W	NB	Tuesday	4-30-02	10,897	6,788	1,682	24.8
B41	IH35E	FRANKFORD RD ON-RAMP	SB	CANCELLED		0		0	
B42	IH35E	VISTA RIDGE BLVD E ON-RAMP	SB	Friday	5-10-02	21,124	3,048	365	12.0
B43	IH35E	CORPORATE E ON-RAMP	SB	CANCELLED		0		0	
B44	IH35E	BELLAIRE BLVD ON-RAMP	SB	Wednesday	5-08-02	4,509	2,990	327	10.9
B45	IH35E	SH121 ON-RAMP	SB	CANCELLED		0		0	
	TOTAL	HANDOUTS				217,838	132,675	17,771	13.4
	TOLLTAG	MAILOUTS					70,000	8,128	11.6

Trip Characteristic Summary

A profile of trip characteristics was developed for the DNT and PGBT patrons. The 2002 DNT and PGBT survey trip characteristics summary is disaggregated by cash and TollTag as well as mainlane and ramp toll plaza location. Characteristic summaries are presented for trip purpose, trip frequency and vehicle occupancy and are graphically illustrated in Figures 4-7 through 4-12.

DNT and PGBT Trip Purpose Distribution

As shown in Figures 4-7 and 4-8, a majority of the motorists on the NTTAS facilities use them for journey to/from work. This is true across plaza type regardless of whether the individual is a cash customer or a TollTag user. The next most dominant trip purposes are "company business" and "personal business." Hence, it can be said that the NTTA's predominant customer base uses the facilities for work related trips during the peak periods.

DNT and PGBT Trip Frequency Distribution

As shown in Figures 4-9 and 4-10, the average NTTA customer is a frequent user of the NTTAS facilities. The figures show that a significant number of the users of the NTTA facilities during the peak period use them five or more times per week. This suggests that the DNT and PGBT provide an excellent alternative for the journey to/from work market.

DNT and PGBT Vehicle Occupancy Distribution

Figures 4-11 and 4-12 display the occupancy rates for the various types of users of the NTTAS. The obvious conclusion from the charts is that the overwhelming majority of NTTA customers drive alone. In almost all of the cases, the single occupant vehicle distribution is above 70 percent. Almost 90 percent of the vehicles that use the NTTAS have occupancy of either one or two. Average vehicle occupancy levels on the DNT and PGBT range from a low of 1.20 persons per vehicle on the DNT to a high of 1.47 persons per vehicle on the PGBT.

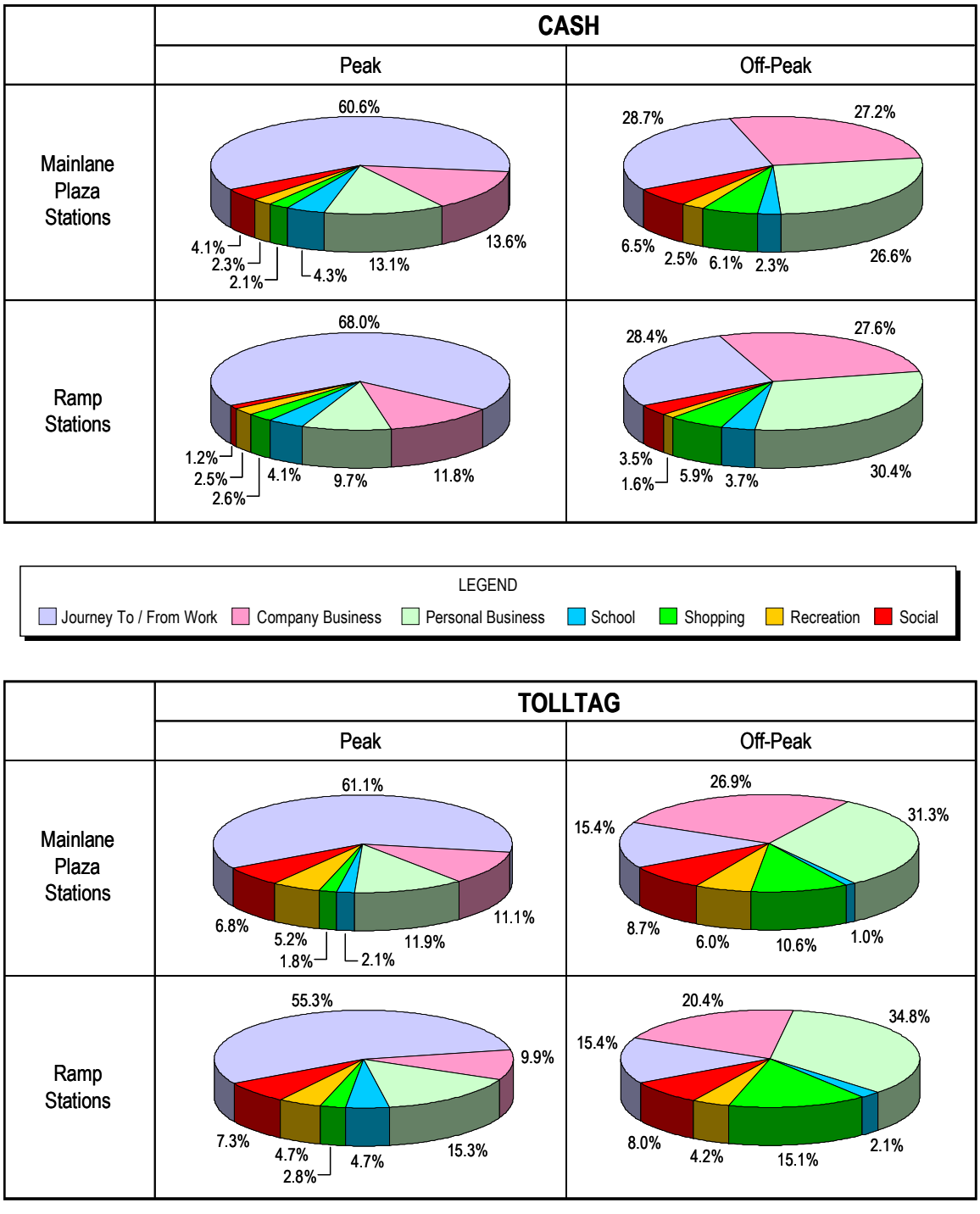


Figure 4-7. DNT Trip Purpose Distribution

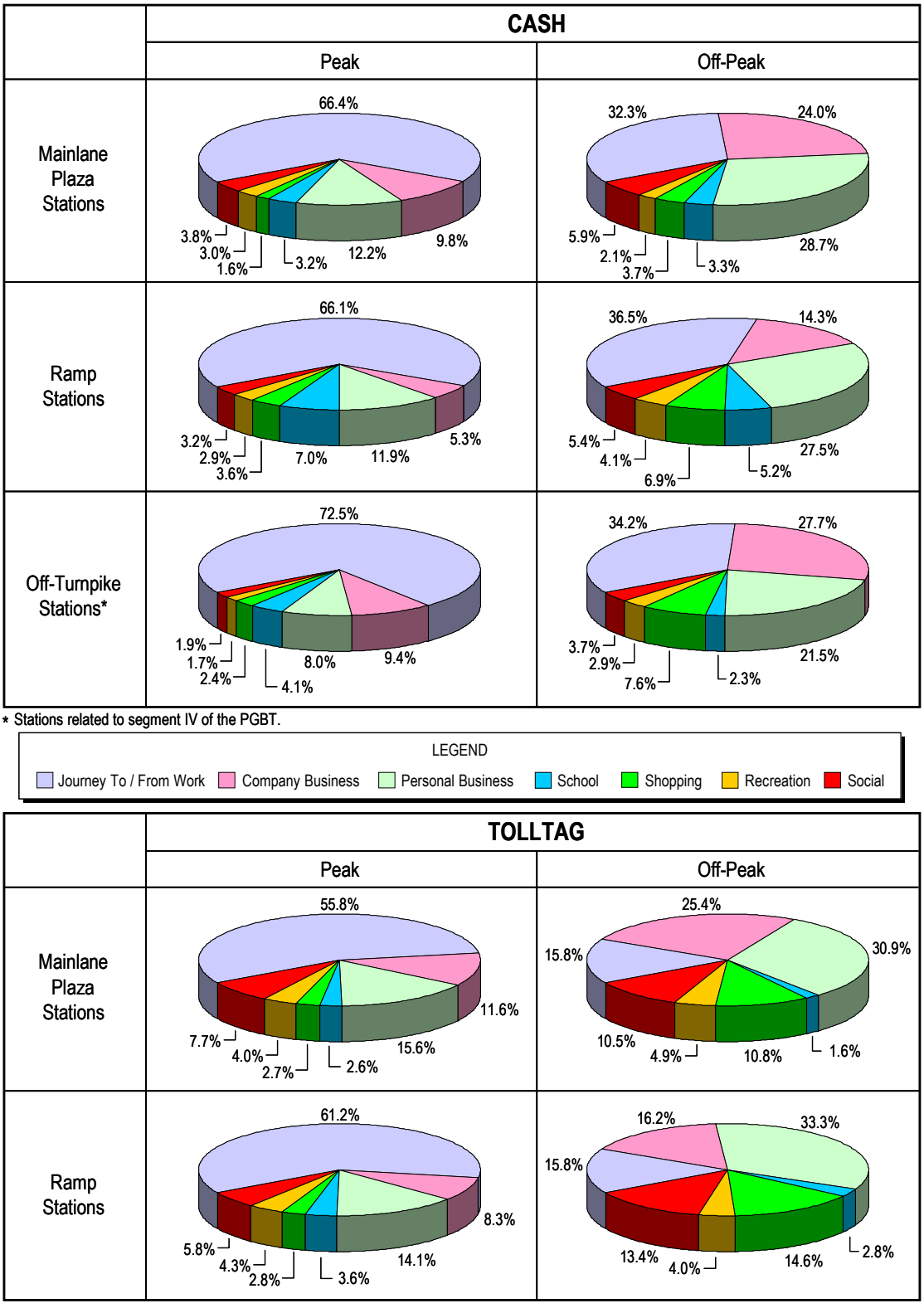


Figure 4-8. PGBT Trip Purpose Distribution

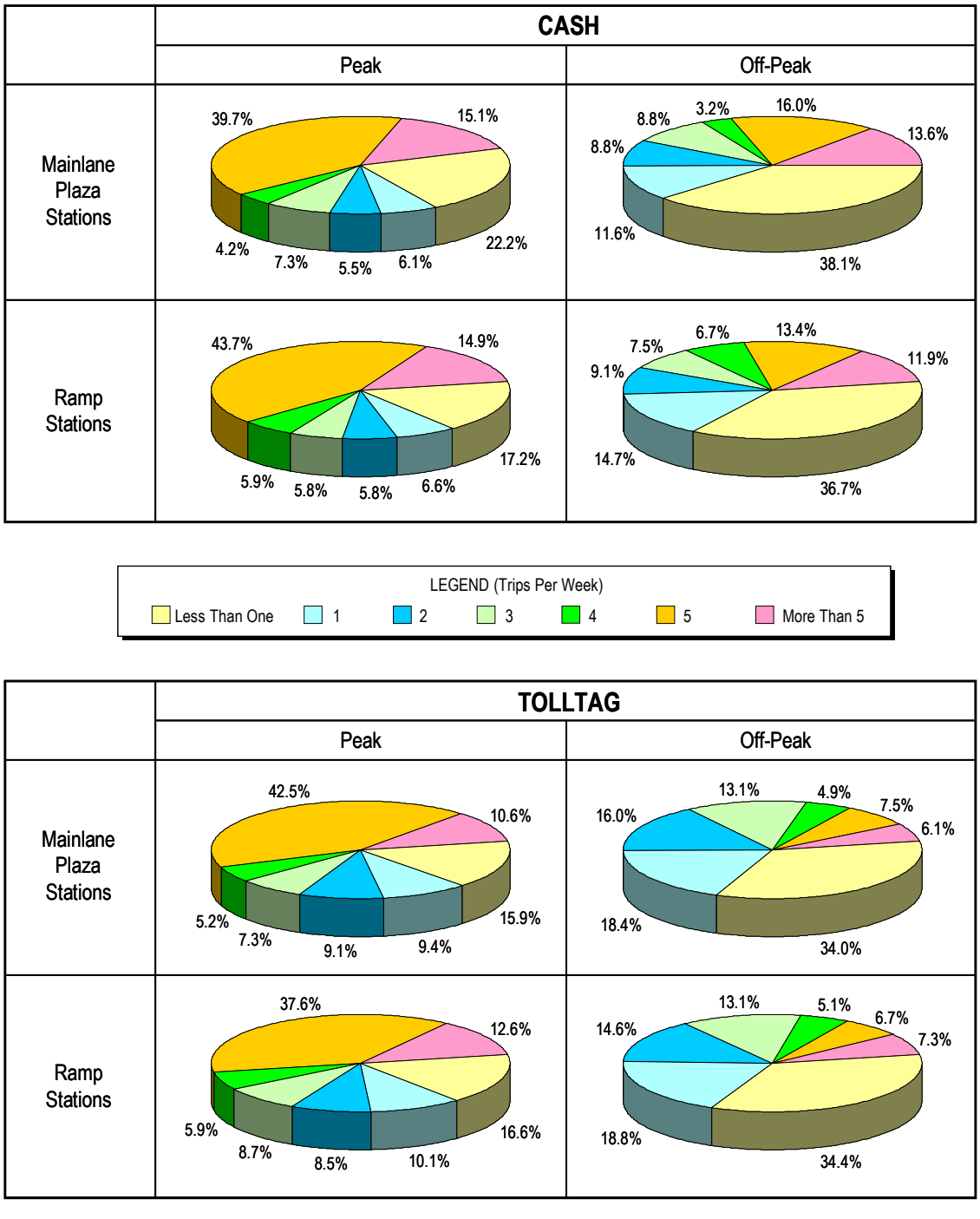
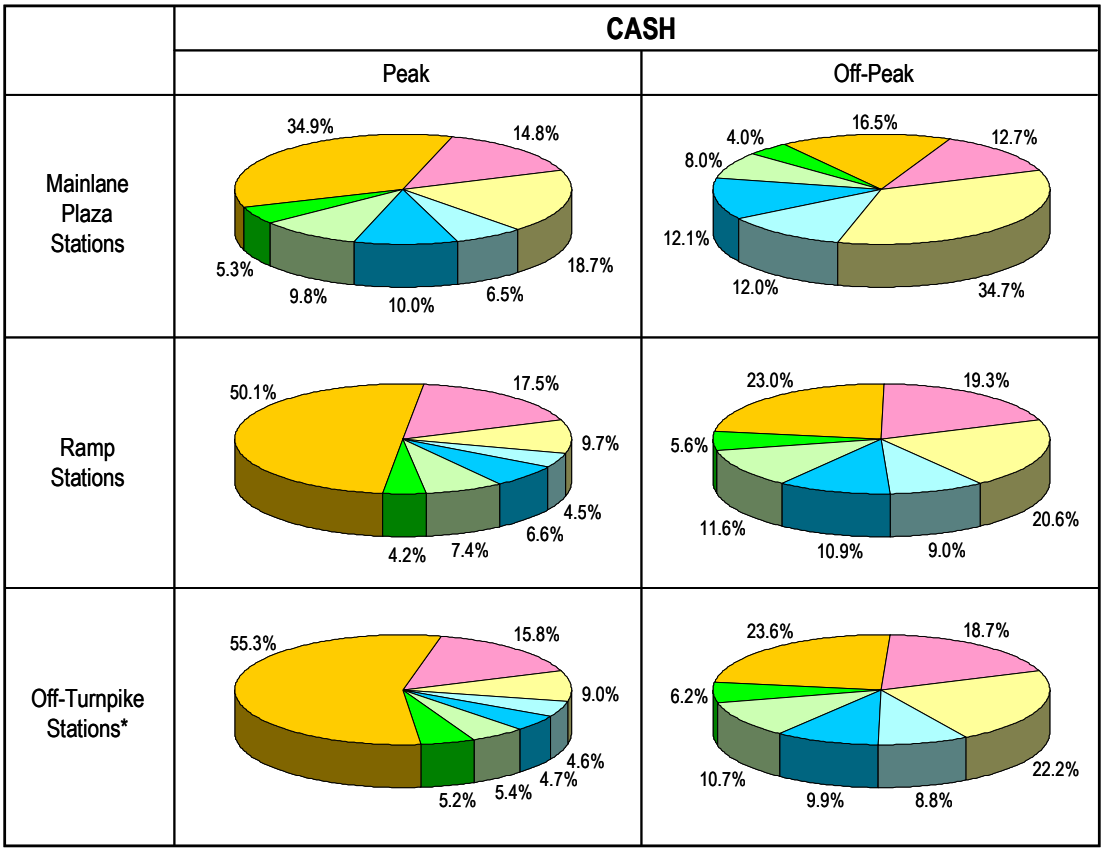
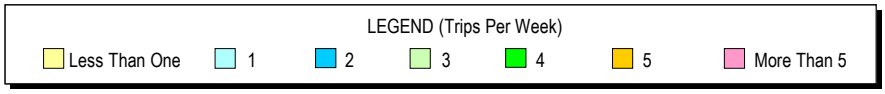


Figure 4-9. DNT Trip Frequency Distribution



* Stations related to segment IV of the PGBT.



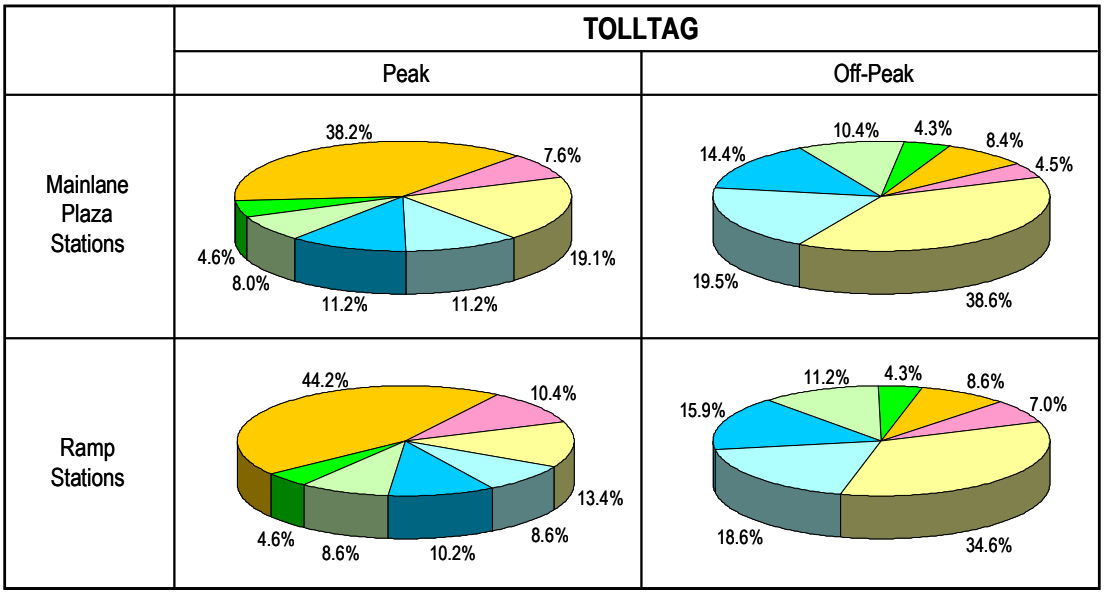
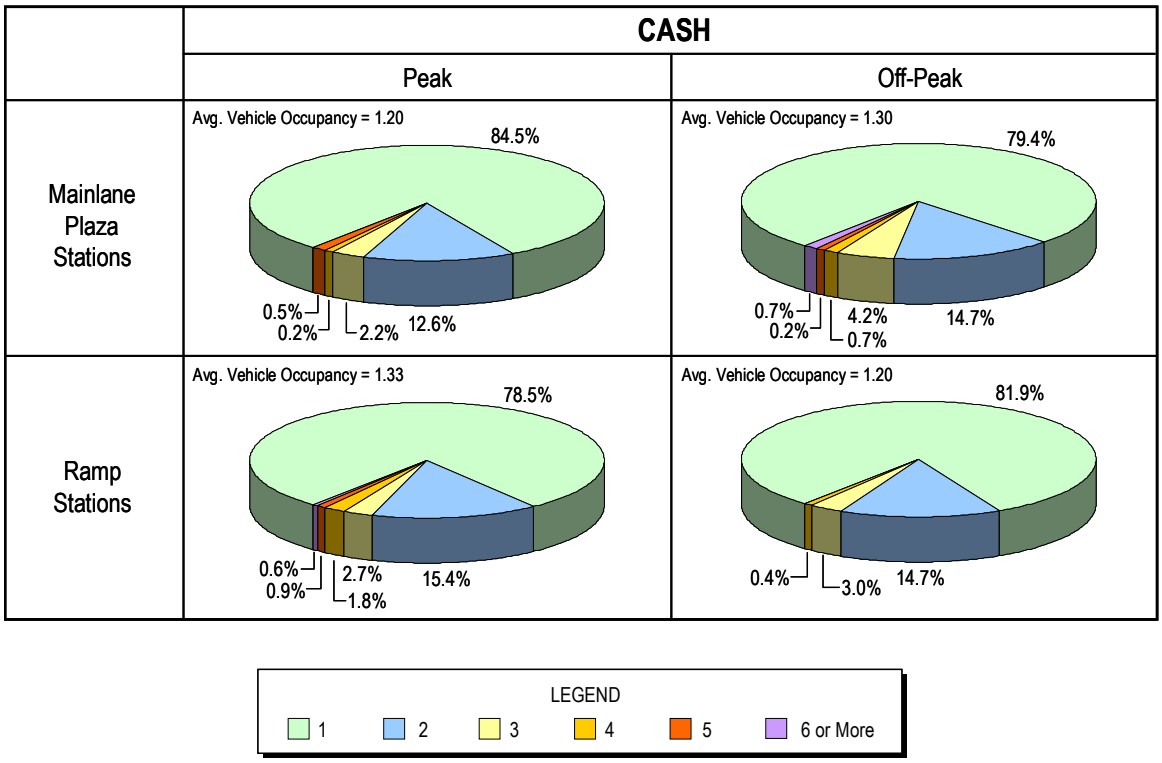


Figure 4-10. PGBT Trip Frequency Distribution



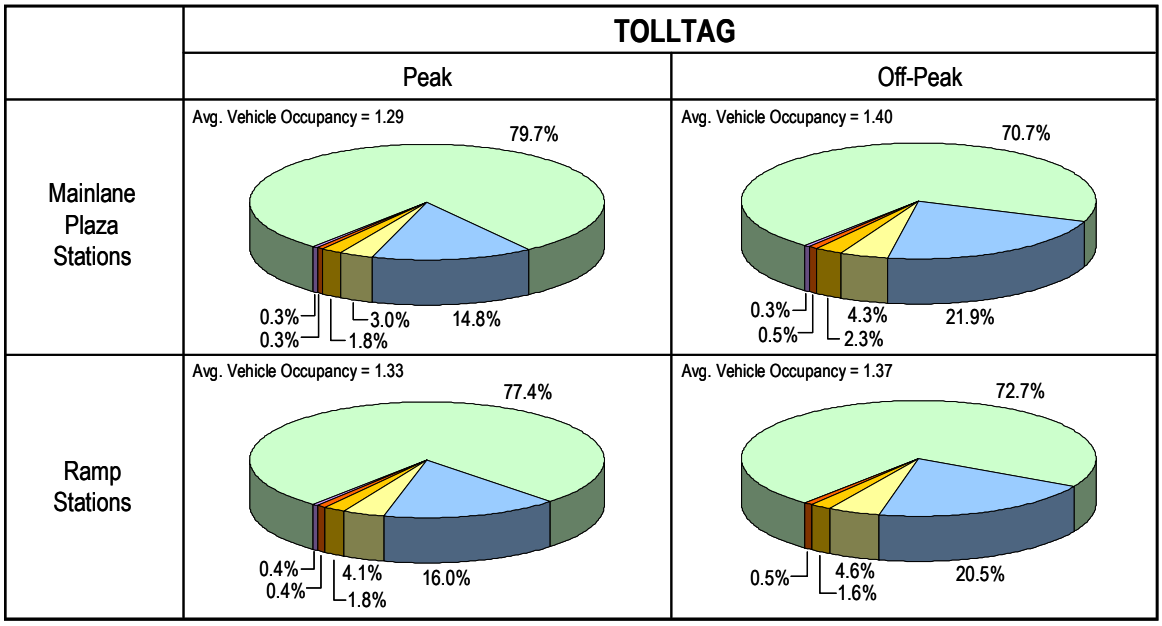
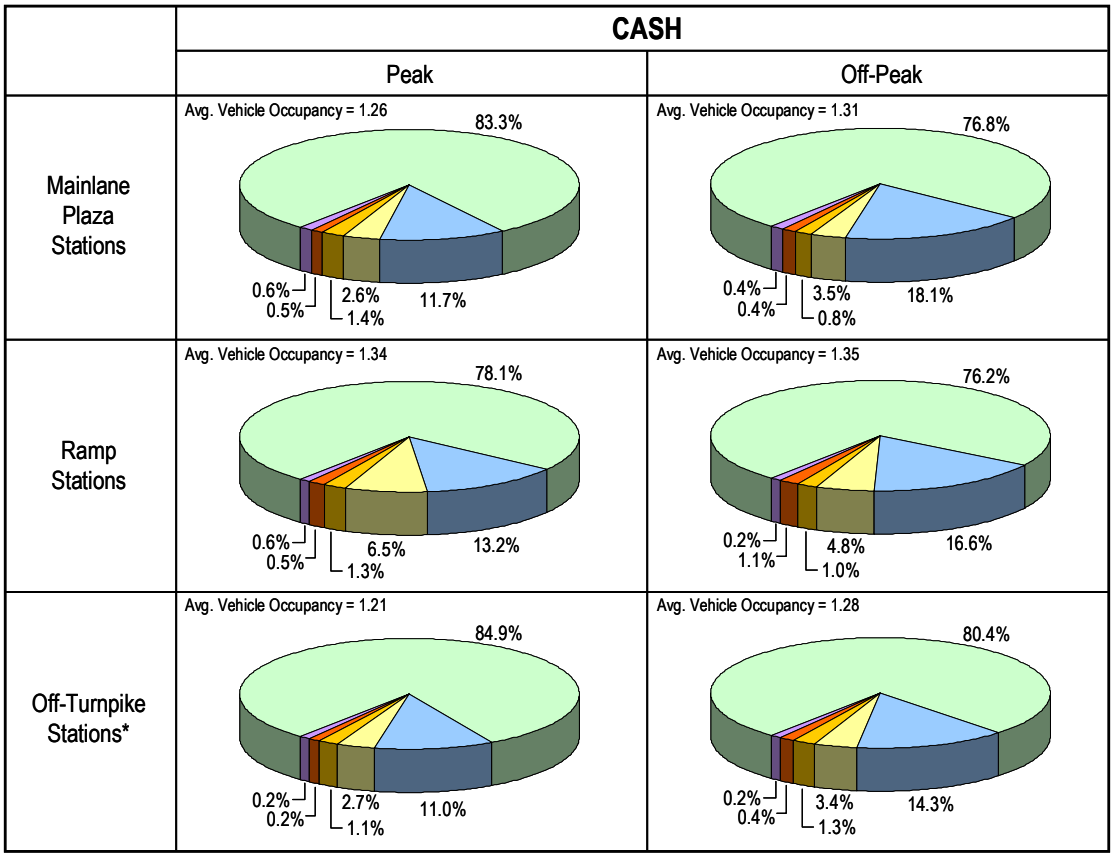
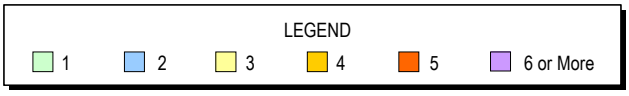


Figure 4-11. DNT Vehicle Occupancy Distribution



* Stations related to segment IV of the PGBT.



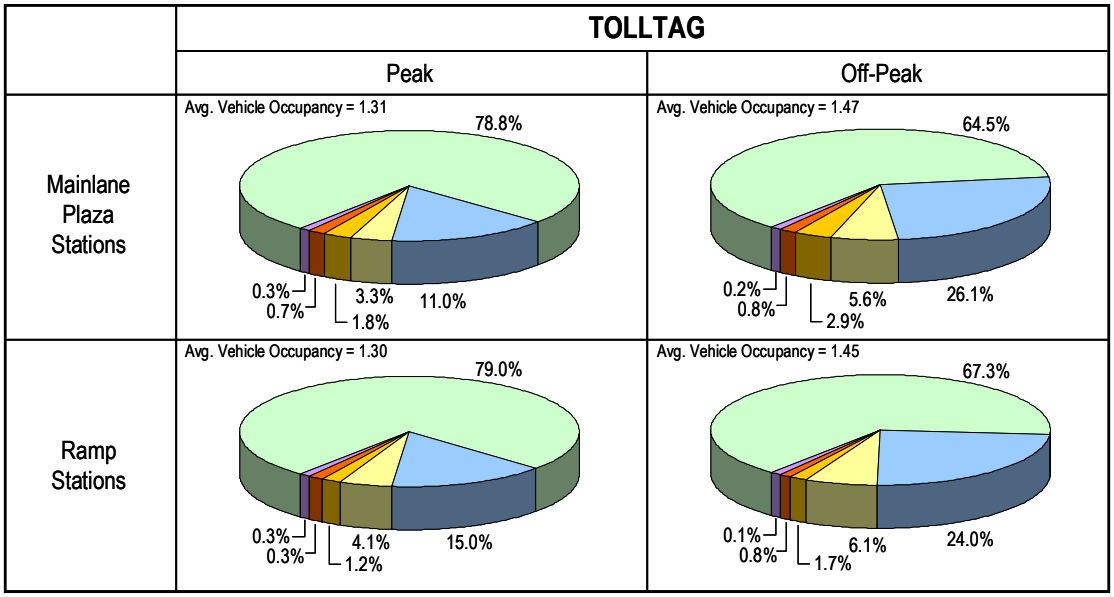


Figure 4-12. PGBT Vehicle Occupancy Distribution

PGBT EE CORRIDOR SURVEYS

NTTA authorized WSA to conduct a comprehensive origin/destination (O/D) work program along the PGBT EE corridor in April 2002. The survey locations are illustrated in the Figure 4-1.

This section provides a detailed summary for those survey locations related specifically to the proposed PGBT EE corridor. For a detailed summary of the complete O/D work program, please refer to the document titled "Technical Memorandum, Summary of Survey Results, NTTA Origin and Destination Survey Work Program," dated September 2002.

SUMMARY OF RESULTS

As a direct result of the survey effort, a significant number of statistical facts concerning the customer base of motorists who potentially would utilize the PGBT EE in their daily travels were obtained.

Survey Sample Size

The locations of the eighteen survey stations, as well as the passing and interviewed traffic totals by date of survey operation are summarized in Table 4-3.

As shown in Table 4-3, 62,945 survey questionnaires were distributed to 96,894 passing motorists at the PGBT EE survey locations. Of the total survey cards distributed, about eighteen percent were coded.

Table 4-3
Motorist Survey Sample Size
NTTA O-D Survey Program
PGBT EE Corridor
(May 2002)

Station Number	Location	Description	Survey Direction	Day Of Survey	Date Of Survey	Passing Cash Traffic	Number Of Surveys Distributed	Coded Cash Surveys	Coded Cash As A Percent Of Surveys Distributed
E1	PLEASANT VALLEY	W. OF MERRITT	BOTH	Wednesday	5-01-02	2,351	2,260	332	14.7
E2	MILES	N. OF CASTLE	BOTH	Wednesday	5-01-02	661	423	135	31.9
E3	NORTHEAST PKWY	W. OF CASTLE	WB	Monday	5-06-02	12,512	7,999	1,809	22.6
E4	MERRIT	N. OF LIBERTY	SB	Monday	5-06-02	2,335	1,808	441	24.4
E5	LIBTERY GROVE	S. OF MERRITT	EB	Wednesday	5-01-02	1,866	1,579	370	23.4
E6	SH 66	E. OF CENTERVILLE	WB	Thursday	5-02-02	12,077	7,240	1,433	19.8
E8	MILLER RD	E OF CENTERVILLE	WB	Thursday	5-02-02	4,495	3,410	707	20.7
E10	ROWLETT RD	S. OF CHANA	NB	Monday	5-06-02	11,054	7,978	1,506	18.9
E11	IH 30	BELT LINE RD ON-RAMP	WB	Tuesday	5-07-02	7,238	6,172	796	12.9
E12	IH 30	ROSE HILL ON-RAMP	WB	Tuesday	5-07-02	3,499	2,760	542	19.6
E13	IH 30	ROAN RD ON-RAMP	WB	Tuesday	5-07-02	8,937	4,463	748	16.8
E14	IH 30	ZION ON-RAMP	WB	Wednesday	5-08-02	2,128	1,757	288	16.4
E15	IH 30	CHANA ON-RAMP	WB	Wednesday	5-08-02	1,395	1,255	173	13.8
E16	IH 30	DALROCK ON-RAMP	WB	Thursday	5-09-02	7,972	4,254	555	13.0
E17	IH 30	VILLAGE ON-RAMP	WB	Thursday	5-09-02	10,690	5,318	883	16.6
E18	IH 30	GOLIAD ST ON-RAMP	WB	Friday	5-10-02	7,684	4,269	542	12.7
TOTAL						96,894	62,945	11,260	17.9

The total survey database was then entered into computer files for processing and analysis. Based on the traffic count data, the complete survey database was then expanded to average weekday levels.

Trip Purpose Distribution

As shown in Figure 4-13, "journey to/from work" was the major trip purpose (67.7 percent) during peak periods. When combined with "company business", work related trips reached 73.7 percent. During off-peak periods, "journey to/from work" related trips fell to 37.0 percent with personal business and shopping trips representing about 35.0 percent of total trips.

Trip Frequency Distribution

As would be expected during peak periods, 71.8 percent of motorists make their trip five or more times per week, as indicated in Figure 4-13. This relates closely to the high percentage of work trips mentioned above. During off-peak periods, the trip frequency rates drop dramatically with only 47.8 percent of motorists making their trip five or more times per week.

Vehicle Occupancy Distribution

Figure 4-13 indicates that in the PGBT EE corridor patrons drive alone. An overwhelming majority of vehicles have only one occupant during peak and off-peak periods. The average vehicle occupancy for peak and off-peak periods was 1.36 and 1.39 respectively.

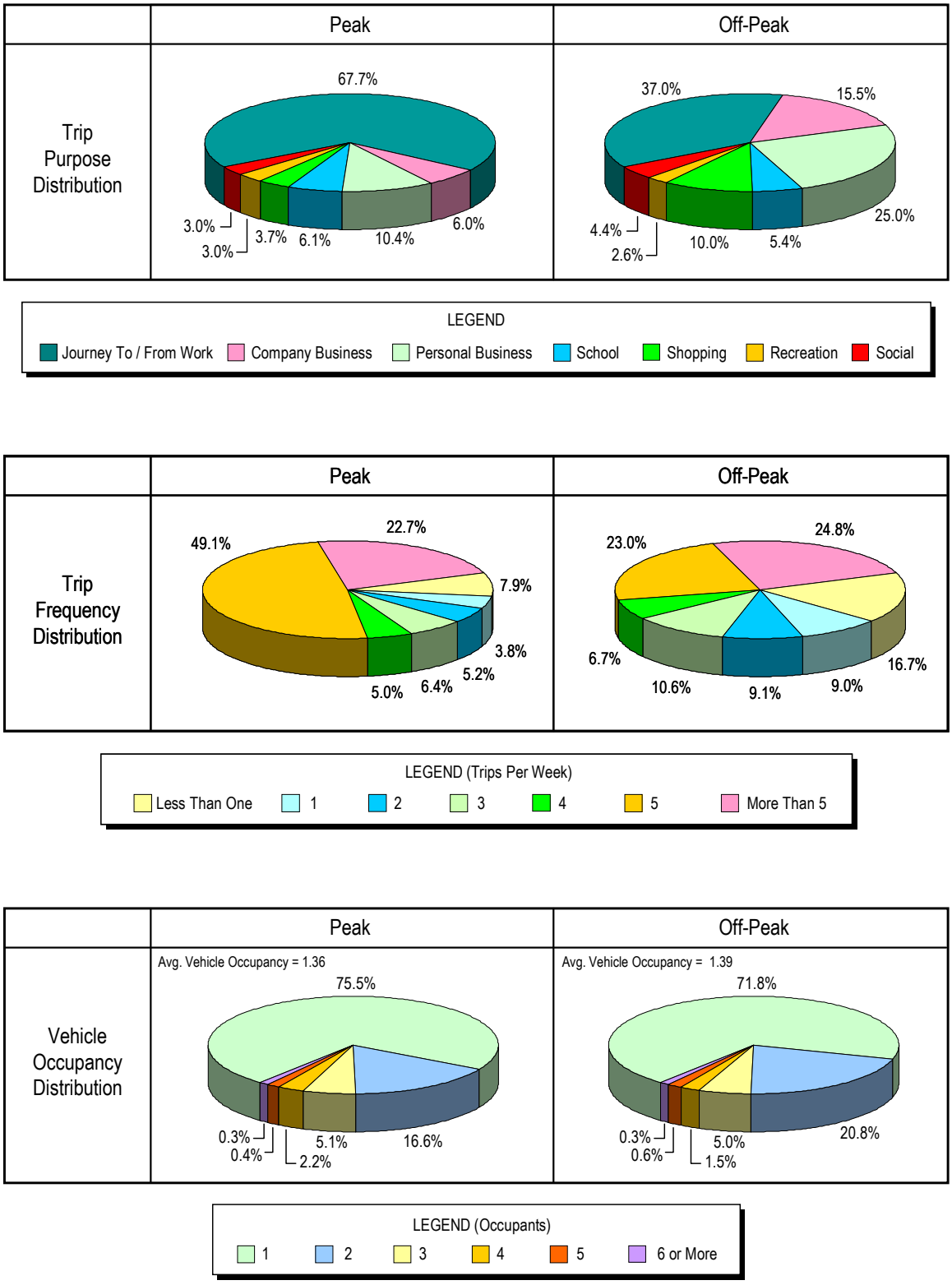


Figure 4-13. PGBT EE Trip Characteristics

SRT CORRIDOR SURVEYS

The Texas Department of Transportation (TxDOT) conducted an O/D survey in early 2006 as part of the data collection effort for the SRT (formerly known as SH 121) solicitation process. The results of the survey were distributed to NTTA and potential bidders for the SRT. Both an intercept survey and mail-out survey were conducted. The intercept surveys were handed out to drivers that were stopped at signalized intersections along the corridor. The mail-out surveys were distributed using the license plates of vehicles traveling on the SRT service roads. The license plate numbers were captured using video recordings of traffic in the corridor, and surveys were mailed to the corresponding addresses of the registered vehicle owner using state vehicle registration data. The locations of the intercept surveys and video capture are shown in Figure 4-1.

The surveys that were distributed are shown in Figures 4-14 and 4-15. Under each survey approach, patrons were asked specifics concerning their trip origin and destination for the most recent trip. In addition, information regarding trip purpose, trip frequency and vehicle occupancy were obtained.

TEXAS DEPARTMENT OF TRANSPORTATION

Station	Day	Dir.	Hour

DEAR MOTORIST: This survey is being undertaken to obtain important information about travel patterns on **SH 121 between US 75 and the western interchange with Business 121**. You are asked to complete and mail this postage-paid questionnaire at your earliest convenience. Your cooperation will help the Texas Department of Transportation serve you better and will lead to improved travel in the future. Please help make this mailback survey successful by returning the completed form today.

1. Where did you start this trip (in this direction)? Please be as specific as possible (If you do not know the street address please identify the nearest intersection, or other explanation, e.g., airport, shopping center, etc.)

Major Intersection or Street Address

City County State Zip Code

2. Where did you end this trip (in this direction)? Please be as specific as possible (If you do not know the street address please identify the nearest intersection, or other explanation, e.g., airport, shopping center, etc.) This should not be the same as answer to Question 1.

Major Intersection or Street Address

City County State Zip Code

3. What was the purpose of this trip when given this card? (Circle one)

1. To / From Work
2. Company Business
3. Personal Business
4. School
5. Shopping
6. Recreation
7. Social
8. To / From DFW Airport

4. How often each week do you use this roadway to make this trip in this direction for the above purpose? (Circle one)

Less than 1 1 2 3 4 5 More than 5

5. Including yourself, how many people were in your vehicle? Please include children. (Circle one)

1 2 3 4 5 6 or more

6. Please identify type of vehicle you were driving. (Circle one)

1. Passenger car or any other 2-axle vehicle
2. Motorcycle
3. 3 axle Truck
4. 4 axle Truck
5. Truck with 5 or more axles
6. Other _____

7. Do you, or others in your family, currently have a TollTag transponder? (Circle one)

1. Yes 2. No

8. If you would like to participate in the supplemental follow-up Internet survey, please provide your email address.
Email (Optional) _____

The Texas Department of Transportation would like to express its appreciation for your participation in responding to this survey. January 2006

If you have any questions about this survey, please call weekdays **214-320-4480**.

Figure 4-14. SRT Intercept Survey Form

Dear Motorist: As stated, your vehicle was randomly selected to participate in this important survey. Please answer the following questions about your most recent weekday trip that uses **SH 121 between US 75 and the western interchange with Business 121** as part of your travel route. Please provide information regarding only the one-way portion of this specific trip. Thank you for your participation.

A. Please indicate the time period in which this one-way trip was made. (Circle one)

1. 6:00 am to 9:00 am 2. 9:00 am to 3:00 pm 3. 3:00 pm to 7:00 pm 4. 7:00 pm to 6:00 am

B. In which direction were you traveling when making this one-way trip? (Circle one)

1. Eastbound 2. Westbound

C. Please indicate day this one-way trip was made. (Circle one)

1. Monday 2. Tuesday 3. Wednesday 4. Thursday 5. Friday

D. Where did you start this trip (in this direction)? Please be as specific as possible. (If you do not know the street address please identify the nearest intersection, airport, shopping center, etc.)

Street Address or Nearest Intersection

City County State Zip Code

E. Where did you end this trip (in this direction)? Please be as specific as possible. (If you do not know the street address please identify the nearest intersection, airport, shopping center, etc.) This should not be the same as answer to Question D.

Street Address or Nearest Intersection

City County State Zip Code

F. What was the purpose of this particular trip? (Circle one)

1. To / From Work 3. Personal Business 5. Shopping 7. Social
2. Company Business 4. School 6. Recreation 8. To / From DFW Airport

G. How often each week do you make this trip in this direction for the above purpose? (Circle one)

Less than 1 1 2 3 4 5 More than 5

H. Including yourself, how many people were in your vehicle? Please include children. (Circle one)

1 2 3 4 5 6 or more

I. Please indicate the nearest street that you used to **enter** SH 121:

J. Please indicate the nearest street that you used to **exit** from SH 121:

K. Please identify the type of vehicle you were driving. (Circle one)

1. Passenger car or any other 2-axle vehicle 3. 3 axle Truck 5. Truck with 5 or more axles
2. Motorcycle 4. 4 axle Truck 6. Other _____

L. Do you, or others in your family, currently have a TollTag transponder? (Circle one) 1. Yes 2. No

M. If you would like to participate in the supplemental follow-up Internet survey, please provide your email address.

Email (Optional)_____

February 2006

Figure 4-15. SRT Mail-out Survey Form

SUMMARY OF RESULTS

The data collected from the origin/destination survey was obtained from TxDOT. The data set included 3,946 data points from the intercept survey and 2,729 data points from the mail-out survey. The survey data, which had been previously geocoded, was used to gain a better understanding of traveler characteristics in the SRT corridor and to check the adequacy of the trip tables used in the travel demand model.

The following sections are intended to provide a short summary of some of the results of the survey.

Trip Characteristic Summary

A profile of trip characteristics was developed for the SRT surveys. The survey trip characteristics were summarized separately for the intercept and mail-out surveys. Characteristic summaries are presented for trip purpose, trip frequency and vehicle occupancy in Figures 4-16 through 4-18.

Trip Purpose Distribution

As shown in Figure 4-16, over half of the surveyed motorists in the SRT corridor were on trips to and from work. The next most common trip purposes were personal business, company business, and shopping. Similar to other NTTAS facilities, the SRT corridor's predominant customer base travels for work related trips during the peak periods.

Trip Frequency Distribution

As shown in Figure 4-17, the average traveler in the SRT corridor makes similar trips on a frequent basis. In both surveys, over half of all respondents reported making a similar trip at least four times per week. The results indicate that most travelers in the SRT corridor are traveling on SRT and adjacent arterials on a regular basis.

Vehicle Occupancy Distribution

Figure 4-18 shows the vehicle occupancies for travelers in the SRT corridor. The figure indicates that a significant majority of travelers in the SRT corridor drive alone. In each survey, the single occupant vehicle distribution was above 70 percent and over 90 percent of surveyed vehicles had occupancies of either one or two persons per vehicle. Both the intercept and mail-out survey results indicated an average occupancy of 1.4 in the SRT corridor.

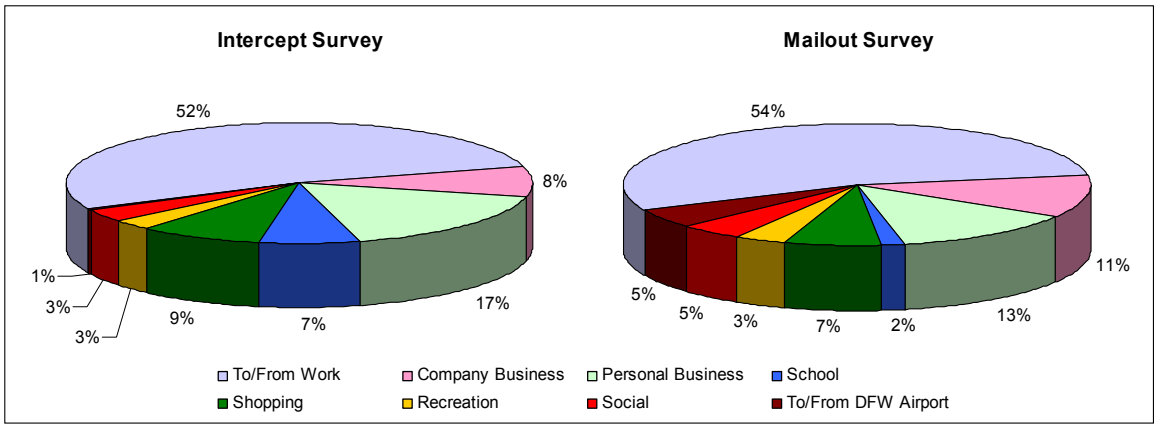


Figure 4-16. SRT Trip Purpose Distribution

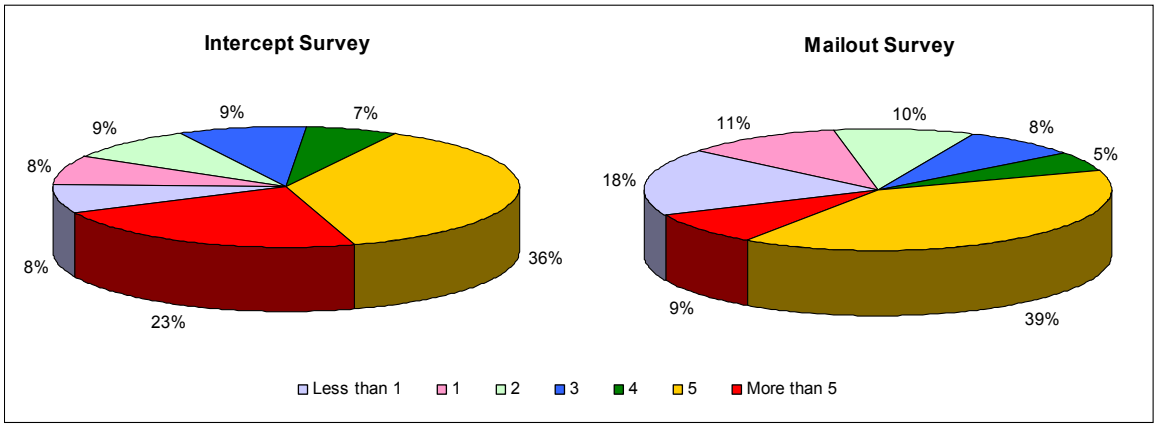


Figure 4-17. SRT Trip Frequency Distribution (Trips per Week)

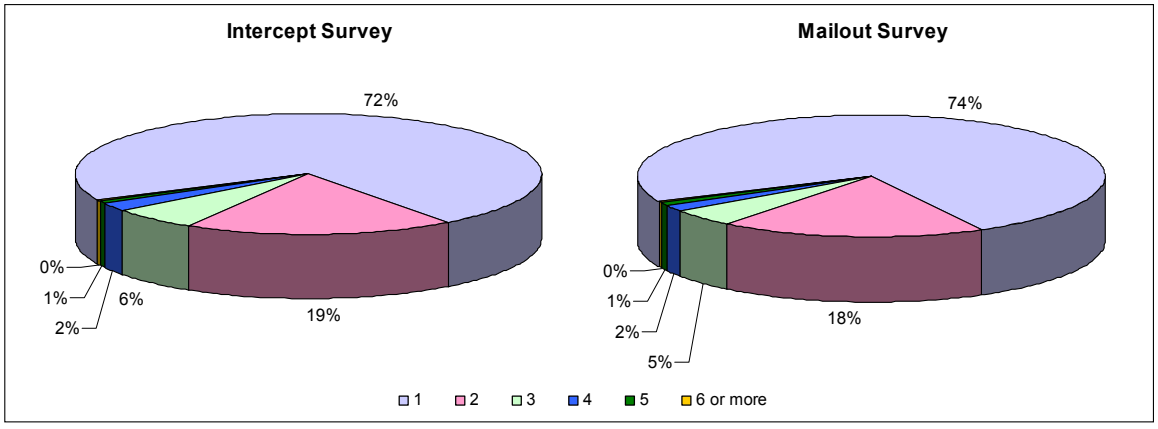


Figure 4-18. SRT Vehicle Occupancy Distribution

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CHAPTER 5

NTTA SYSTEM DEMOGRAPHIC GROWTH CHARACTERISTICS

As part of this study, a review was made of the historic and projected demographic characteristics used by the North Central Texas Council of Governments (NCTCOG) to develop its traffic modeling trip tables. This chapter describes the major socioeconomic characteristics of the Dallas-Fort Worth Metropolitan Area (DFWMA) including both regional and specific trends within the NTTA System (NTTAS) corridors.

NCTCOG's Executive Board approved the current regional demographic forecast in April 2003. The forecast was conducted for the ten counties that comprise the DFWMA: Collin, Dallas, Denton, Tarrant, Johnson, Ellis, Kaufman, Rockwall, Parker and Wise. This database was used as the baseline to generate future trip patterns in the DFWMA.

The first section of this chapter provides a description of the NCTCOG forecast process used to generate the base demographics. The second section details the regional historical and future growth in the ten-county area. The historical and future growth of the individual municipalities within the study corridors is considered in the third section of the chapter. The last section describes the demographic characteristics of the NTTAS corridors.

The demographic descriptions included in this chapter range from the macro level (the region) to the corridor level (five-mile corridor along all NTTAS facilities). This information is the foundation to develop the potential demand for the NTTAS. The demographic information is used by the trip generation model to estimate total trips in the travel demand model.

NCTCOG DEMOGRAPHIC FORECAST PROCESS

As required by federal legislation, NCTCOG periodically develops future demographics based on county and region control totals created by the Texas State Data Center (TSDC) and other independent consultants. The TSDC is part of the State Data Center System, a national network of 52 centers (all 50 states, Puerto Rico and the Virgin Islands) in charge of disseminating demographic information. The demographics adopted by NCTCOG are considered official demographics to support the metropolitan planning process and travel demand modeling within the DFW region.

NCTCOG's six step demographic forecast and trip table development process is illustrated in Figure 5-1. In the first step, regional control totals of population and employment were developed in five-year increments from a base year (2000) through the forecast year (2030). These regional totals were obtained from the TSDC and were complemented with forecasts developed by independent economists at the Perryman Group. A task force of local officials from city, county, and transportation entities acted as a governing body for the process and endorsed the forecast for approval by NCTCOG's Executive Board.

The TSDC population forecast process is a cohort-component forecast method for which the key element is the rate of migration. Three scenarios with different rates of migration are usually developed.

Table 5-1 shows the control totals that were considered during the forecasting process. The 2030 population forecast ranges from 6.1 million, for the zero percent migration scenario, to 12.1 million under the 1.0 percent migration scenario. The population control totals adopted by NCTCOG for the region are shown in bold in Table 5-1. They reflect similar trends to those developed by the Perryman Group, and fall between the 0.5 and 1.0 migration scenarios from the TDSC, representing a middle ground.

Table 5-1
Population Control Totals

	2000	2010	2020	2030
TSDC Scenario 0.0	5,079,600	5,576,147	5,924,157	6,150,687
TSDC Scenario 0.5	5,079,600	6,075,653	7,172,447	8,403,478
TSDC Scenario 1.0	5,079,600	6,670,036	8,937,884	12,132,893
The Perryman Group	5,079,600	6,336,947	7,728,399	9,216,601
NCTCOG Adopted Forecast	**5,154,300**	**6,391,300**	**7,733,400**	**9,125,400**

Source: North Central Texas Council of Governments, Research and Information Services.

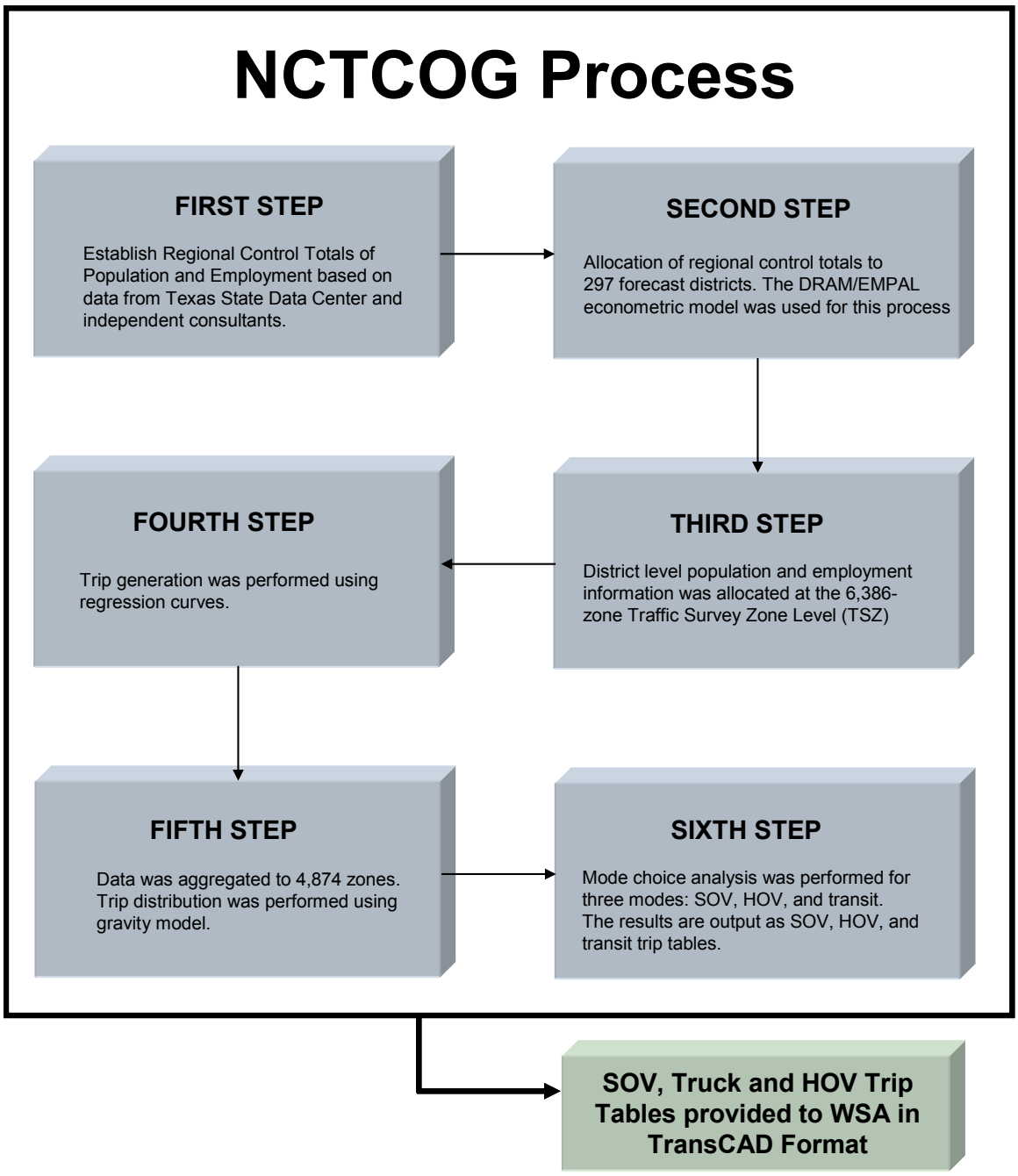

Figure 5-1. NCTCOG Forecast Process

The employment control totals were generated by NCTCOG with input from its Employment Estimates program, which monitors non-construction job counts by place of work for municipalities in the North Central Texas Metropolitan Planning Area. The employment control totals seen in Table 5-2 show that the total employment in the ten-county area will increase from 3.2 million in 2000 to 5.4 million by 2030.

Table 5-2
Employment Control Totals

	2000	2010	2020	2030
NCTCOG Adopted Forecast	**3,152,500**	**3,897,100**	**4,658,700**	**5,399,700**

Source: North Central Texas Council of Governments, Research and Information Services.

The second step of the forecasting process involved allocating the regional control totals to 297 forecast districts for each five-year interval. The DRAM/EMPAL econometric model was used for this process as it is the most widely accepted model by metropolitan planning organizations in the country. Key variables for the DRAM/EMPAL model include current employment locations by sector, household locations by income quartile, land use inventories, travel time matrices, and the number of workers per household.

In the third step, the district level information was disaggregated to the Traffic Survey Zone (TSZ) level which is the smallest aggregation incorporated in the travel demand process. There are 6,386 TSZs in the ten-county area. The critical variables used in this process were: district level household change, acres of vacant land, density of future residential development, and proximity to transportation infrastructure. Output from this process was closely reviewed by the member cities and approved by the Regional Demographic Task Force before being presented and approved by the NCTCOG Executive Board.

The fourth step involves performing trip generation by using regression curves. This process estimates the total number of trips generated and attracted for each TSZ zone. In the fifth step, the data was aggregated into 4,874 zones. Trip distribution is then performed using the gravity model. In the sixth and final step, mode choice analysis is performed and trip tables are created for the single occupant vehicle (SOV), high occupancy vehicle (HOV), truck and transit modes.

HISTORICAL AND FUTURE REGIONAL GROWTH

The sixteen counties served by NCTCOG include Collin, Dallas, Denton, Ellis, Erath, Hood, Hunt, Johnson, Kaufman, Navarro, Palo Pinto, Parker, Rockwall, Somervell, Tarrant and Wise. Figure 5-2 illustrates the spatial relationship of these counties and highlights the ten counties included in NCTCOG's Demographic Forecast. The analysis of historical and future demographic growth from a regional perspective is based on county-level information pertaining to population, employment, and income.

HISTORICAL REGIONAL POPULATION TRENDS

Table 5-3 shows the historical population trends for Collin, Dallas, Denton, Ellis, Johnson, Kaufman, Parker, Rockwall, Tarrant and Wise Counties, Texas and the United States. The total population in the ten-county area has increased at an average annual rate of 2.6 percent from 1970 to 2000, equivalent to 2.7 million additional residents. This population growth trend exceeded the state and national growth trends between 1970 and 2000 which were 2.1 percent and 1.1 percent per year, respectively.

Dallas County, the most heavily-populated county in the region, grew by 891,203 people between 1970 and 2000 at an average annual growth rate of 1.7 percent. This annual growth rate was slightly lower than the rate of growth experienced by the state during the same period, which was 2.1 percent. Dallas County's population in 2000 represented approximately 43.7 percent of the total population of the ten-county area.

Collin County was the fastest growing county in the area between 1970 and 2000. The population increased from 66,920 in 1970 to 491,675 in 2000, corresponding to an average annual growth rate of 6.9 percent over the thirty year period. The Collin County population growth rate from 1970 to 2000 has been significantly higher than the population increase experienced by the State of Texas and the United States, respectively.

Denton County has historically been among the most heavily-populated and fastest-growing counties in the ten-county area. The population in Denton County increased from 75,633 in 1970 to 432,976 in 2000, corresponding to an average annual growth rate of 6.0 percent. Its growth rate was 2.9 and 5.5 times higher than the growth rate experienced by the state and the nation, respectively, during that period.

Tarrant County is the second largest county in the region in terms of population with approximately 1.4 million people in 2000. Its population increased at an average annual rate of 2.4 percent between 1970 and 2000, adding a total of 730,632 people during the same period. Rockwall County experienced a significant growth rate of 6.2 percent between 1970 and 2000 gaining 36,034 residents.

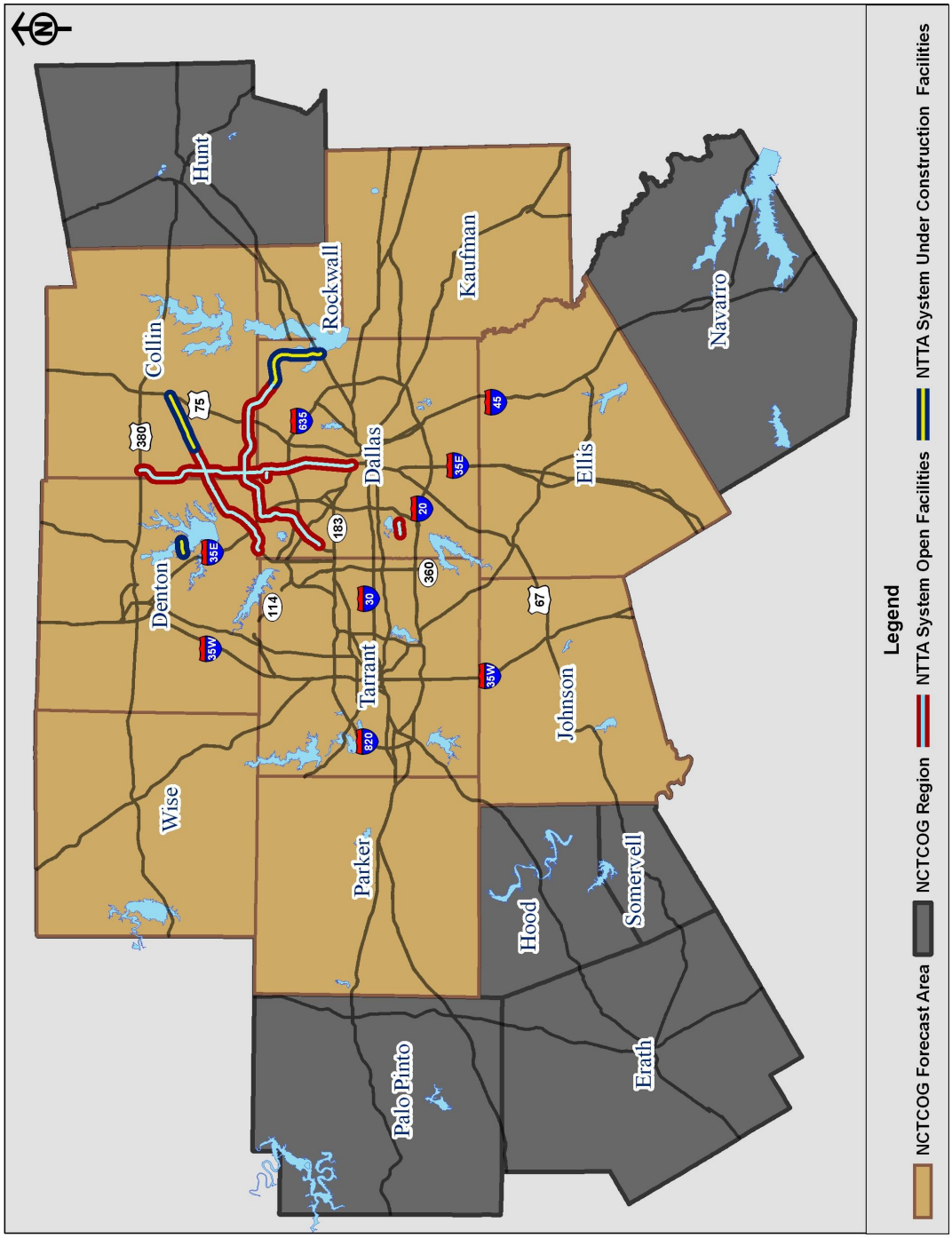

Figure 5-2. Ten County Area Location

Table 5-3
Countywide Population Trends and Projections

County	U.S.Census Bureau				North Central Texas 2030 Demographic Forecast	Annual Percent Growth (1970-2000)	Annual Percent Growth (2000-2030)	Percent Population Distribution By County		Percentage of New Residents Between 2000 and 2030
	Year 1970	Year 1980	Year 1990	Year 2000	Year 2030			2000	2030	
Collin	**66,920**	**144,576**	**264,036**	**491,675**	**1,166,645**	**6.9%**	**2.9%**	**9.7%**	**12.8%**	**16.8%**
Dallas	**1,327,696**	**1,556,419**	**1,852,810**	**2,218,899**	**2,817,191**	**1.7%**	**0.8%**	**43.7%**	**30.9%**	**14.9%**
Denton	**75,633**	**143,126**	**273,525**	**432,976**	**1,085,343**	**6.0%**	**3.1%**	**8.5%**	**11.9%**	**16.2%**
Ellis	46,638	59,743	85,167	111,360	448,588	2.9%	4.8%	2.2%	4.9%	8.4%
Johnson	45,769	67,649	97,165	127,793	444,151	3.5%	4.2%	2.5%	4.9%	7.9%
Kaufman	32,392	39,015	52,220	71,313	277,745	2.7%	4.6%	1.4%	3.0%	5.1%
Parker	33,888	44,609	64,785	88,495	328,418	3.3%	4.5%	1.7%	3.6%	6.0%
Rockwall	**7,046**	**14,528**	**25,604**	**43,080**	**144,976**	**6.2%**	**4.1%**	**0.8%**	**1.6%**	**2.5%**
Tarrant	**715,587**	**860,880**	**1,170,103**	**1,446,219**	**2,291,723**	**2.4%**	**1.5%**	**28.5%**	**25.2%**	**21.0%**
Wise	19,687	26,575	34,679	48,793	102,449	3.1%	2.5%	1.0%	1.1%	1.3%
Ten-County Area	2,371,256	2,957,120	3,920,094	5,080,603	9,107,229	2.6%	2.0%	100.0%	100.0%	100.0%
State of Texas	11,256,480	14,337,820	16,986,510	20,851,820	31,830,579	2.1%	1.4%	N/A	N/A	N/A
United States	203,982,310	227,225,620	248,709,873	281,421,906	362,880,000	1.1%	0.9%	N/A	N/A	N/A

Souce: NCTCOG, U.S. Census Bureau.

FUTURE REGIONAL POPULATION GROWTH

Included in Table 5-3 is NCTCOG's 2030 population forecast. Population in the ten-county area is expected to increase from 5.1 million in 2000 to 9.1 million by 2030, corresponding to an average annual growth rate of 2.0 percent. This annual growth rate for the ten-county area is anticipated to be higher than the annual growth rate for both the state and the nation.

Dallas County is expected to add approximately 598,000 additional residents between 2000 and 2030. Population in Denton County will increase to 1.1 million in 2030 from 432,976 in 2000, representing an average annual growth rate of 3.1 percent. Tarrant County will add 846,000 people during the same period, representing the highest absolute increase as compared with the other counties.

The future population profile for Collin County is expected to be similar to that of Denton County. Collin County population is expected to grow between 2000 and 2030 at an average annual rate of 2.9 percent, from about 491,675 in 2000 to 1.2 million by 2030. Rockwall County population is expected to grow between 2000 and 2030 at an average annual rate of 4.1 percent, from 43,080 in 2000 to 144,976 by 2030.

As indicated in Table 5-3, Dallas and Tarrant Counties will continue to comprise the largest population centers. However, their overall shares would decline as surrounding counties, particularly Denton and Collin, continue to grow at faster rates.

Figures 5-3 and 5-4 illustrate the future population by county along with their historical and projected growth, respectively. The degree to which Dallas and Tarrant Counties comprise the majority of the total population of the ten-county area, with Denton and Collin Counties to a lesser degree, is evident in Figure 5-3. Conversely, on a percentage basis, Denton and Collin Counties have experienced the highest rates of population growth since 1970 and are expected to remain high-growth counties through to 2030, as evident in Figure 5-4.

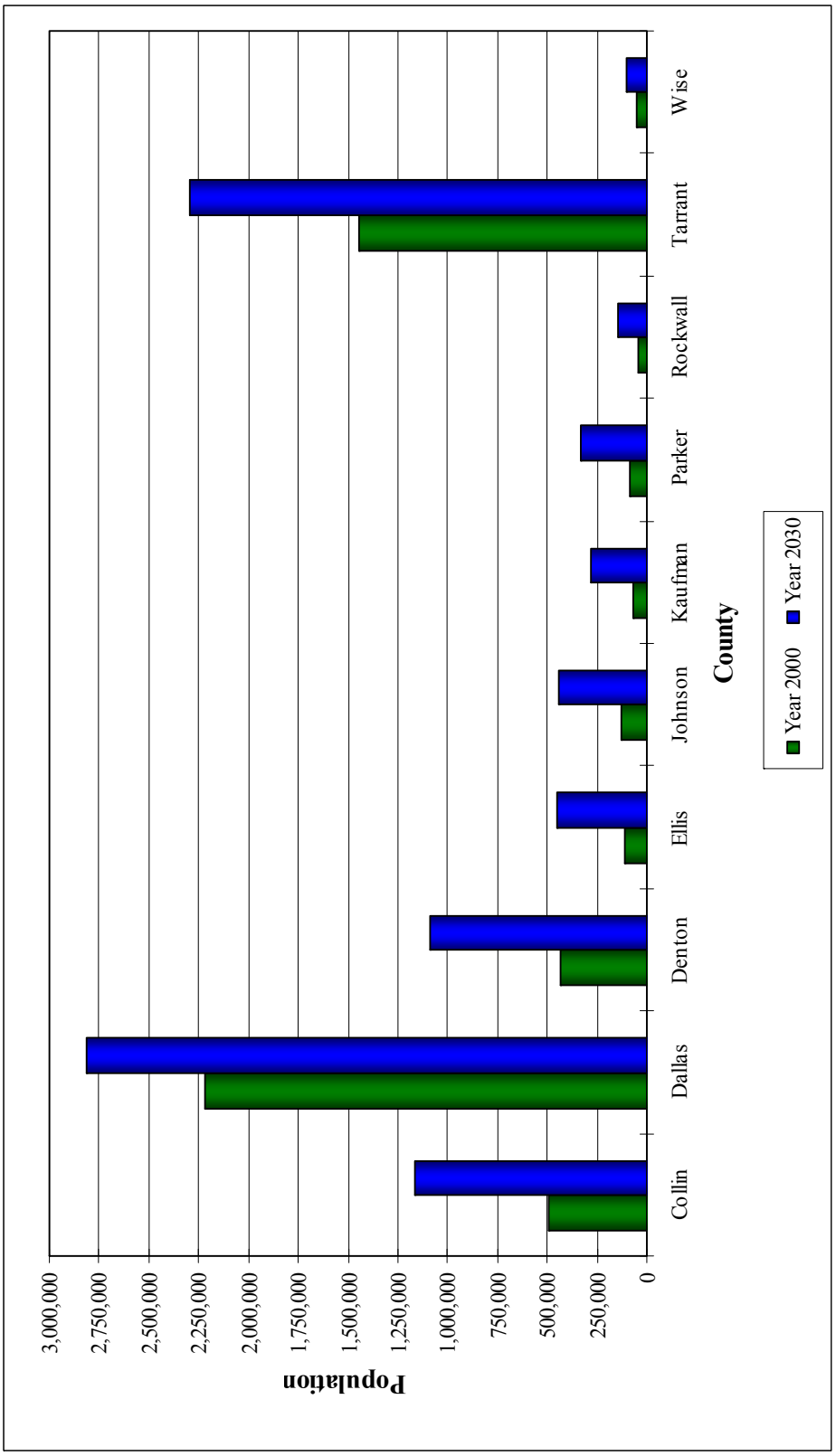

Figure 5-3. 2000 and 2030 Population

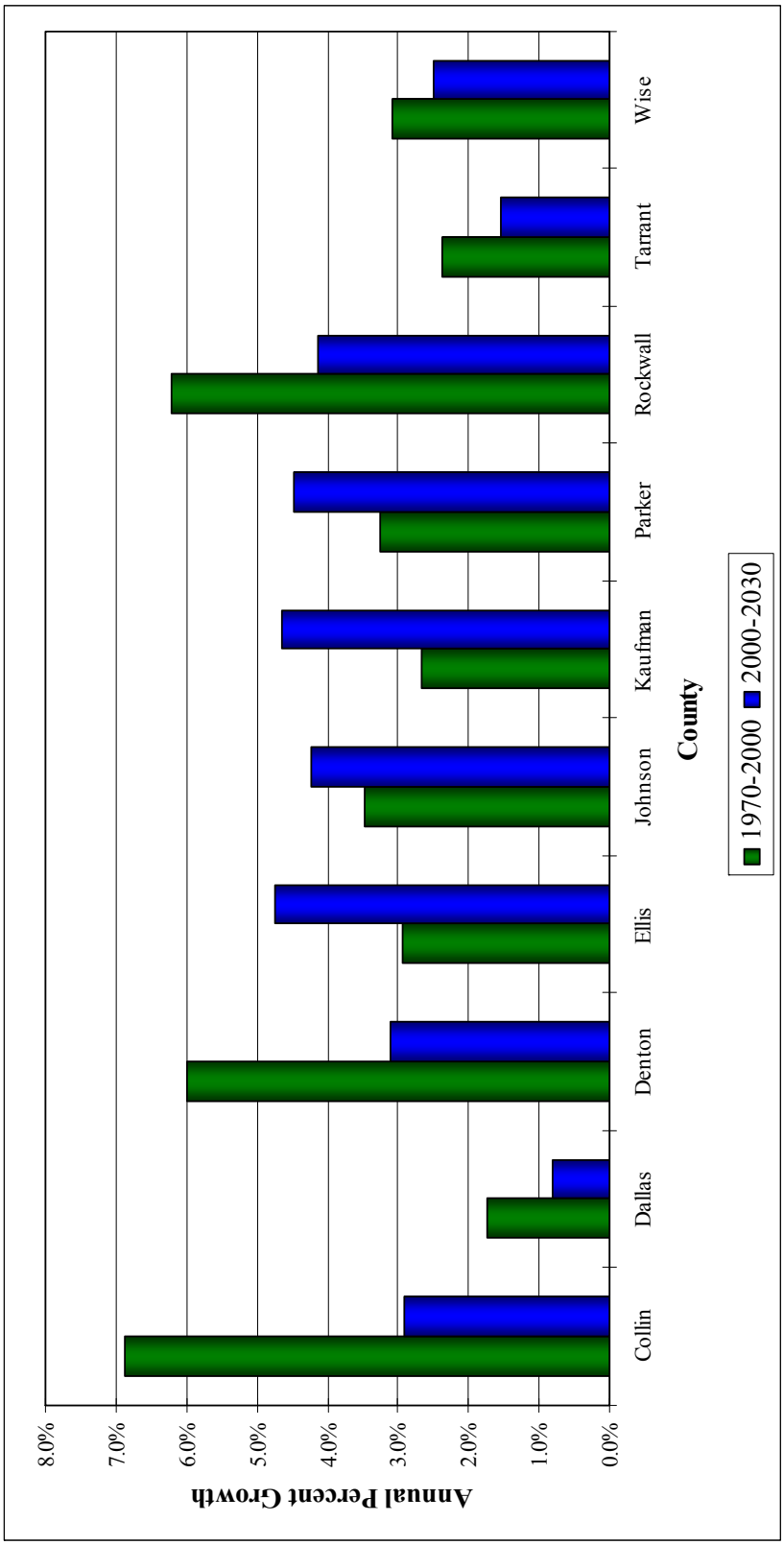

Figure 5-4. Population Annual Growth Rate for Counties

HISTORICAL REGIONAL EMPLOYMENT TRENDS

Employment statistics are used as relative indicators of trip attractions to an area. Intense employment growth in an area indicates the potential for an increase in the demand for transportation infrastructure. The countywide historical employment trends in the ten-county area are shown in Table 5-4. Between 1990 and 2000, employment in the ten-county area increased at an average annual rate of 3.9 percent, which was higher than the employment growth rate of both the state and nation.

Dallas County continues to be the major employment center in the region. Its employment in 2000 comprised 55.3 percent of the ten-county area's total employment, and increased from 1.3 million in 1990 to 1.7 million in 2000.

Approximately 110,000 new jobs were attracted to Collin County during the 1990s which corresponds to an average annual growth rate of 8.1 percent. Ten percent of the total jobs produced in the region from 1990 to 2000 were attracted to Collin County.

Denton County experienced strong employment growth during the 1990s; employment grew from 75,817 in 1990 to 152,818 in 2000 corresponding to an additional 77,001 jobs at an average annual growth rate of 8.6 percent. Its employment growth rate was the highest in the DFWMA during that period.

Tarrant County employment increased from 586,058 in 1990 to 864,360, equivalent to approximately 278,302 new jobs. During 2000, the total employment in Tarrant County represented 27.4 percent of the total employment in the ten-county area.

Employment distributions by county are also shown in Table 5-4. Dallas and Tarrant Counties incorporate the bulk of the employment centers in the ten-county area, recording almost 83 percent of the region's total employment in 2000. Denton and Collin Counties comprised more than 11 percent of the total in 2000.

FUTURE REGIONAL EMPLOYMENT GROWTH

Table 5-4 also shows NCTCOG's 2030 employment forecast. Dallas County's employment is expected to increase from 1.7 million in 2000 to 2.5 million by 2030 at an average annual growth rate of 1.2 percent. Dallas County is expected to house 34.7 percent of the total additional jobs in the ten-county area by 2030.

Collin County's employment is projected to increase from 204,057 in 2000 to 517,264 in 2030 at an average annual growth rate of 3.1 percent. Collin County would gain 13.9 percent of the total regional employment growth.

Table 5-4
Countywide Employment Trends and Projections

County	Year 1990	Year 2000	Year 2030	Annual Percent Growth (1990-2000)	Annual Percent Growth (2000-2030)	Percent Employment Distribution By County		Percentage of New Employees Between 2000 and 2030
						2000	2030	
Collin	**93,729**	**204,057**	**517,264**	**8.1%**	**3.1%**	**6.5%**	**9.5%**	**13.9%**
Dallas	**1,254,974**	**1,745,109**	**2,529,371**	**3.4%**	**1.2%**	**55.3%**	**46.7%**	**34.7%**
Denton	**75,817**	**152,818**	**413,453**	**7.3%**	**3.4%**	**4.8%**	**7.6%**	**11.5%**
Ellis	27,789	49,071	162,769	5.9%	4.1%	1.6%	3.0%	5.0%
Johnson	26,214	45,071	142,544	5.6%	3.9%	1.4%	2.6%	4.3%
Kaufman	17,174	31,027	82,078	6.1%	3.3%	1.0%	1.5%	2.3%
Parker	16,173	29,816	94,703	6.3%	3.9%	0.9%	1.7%	2.9%
Rockwall	**7,492**	**17,025**	**48,466**	**8.6%**	**3.5%**	**0.5%**	**0.9%**	**1.4%**
Tarrant	**586,058**	**864,360**	**1,388,247**	**4.0%**	**1.6%**	**27.4%**	**25.6%**	**23.2%**
Wise	N/A	19,848	37,823	N/A	2.2%	0.5%	0.7%	0.8%
Ten-County Area	2,105,420	3,158,202	5,416,718	4.1%	1.8%	100.0%	100.0%	100.0%
State of Texas	6,983,170	9,289,286	16,743,000	2.9%	2.0%	N/A	N/A	N/A
United States	108,657,200	129,877,063	202,431,000	1.8%	1.5%	N/A	N/A	N/A

Souce: NCTCOG

Denton County's employment is projected to increase from 152,818 in 2000 to over 413,000 in 2030 at an average annual growth rate of 3.4 percent. Denton County would gain 11.5 percent of the total regional employment growth.

Employment in Tarrant County is expected to reach 1.4 million in 2030, a 0.5 million increase from the 2000 employment of 0.86 million. This represents an average annual growth of 1.6 percent between 2000 and 2030. Tarrant County is expected to account for 23.2 percent of the total additional jobs in the ten-county area.

Between 2000 and 2030, 2.3 million additional jobs are expected to be added in the ten-county area, at an average annual growth rate of 1.8 percent. Employment in Texas and in the nation is expected to grow at an average annual rate of 2.0 percent and 1.5 percent from 2000 to 2030 respectively.

Table 5-4 also presents year 2030 employment distributions for the ten-county area. The major employment concentrations are expected to continue to be located in Dallas and Tarrant Counties. However, the projections anticipate the migration of jobs from the major city centers to the growing tech industries located in the suburbs throughout the northern part of the region. Denton and Collin Counties together accounted for 17.8 percent of regional employment growth from 1990 to 2000 as compared to 73.0 percent in Dallas and Tarrant Counties combined. For the 2000 to 2030 period, the shares of total employment growth shift to 25.4 percent for Denton/Collin Counties and 57.9 percent for Dallas/Tarrant Counties.

Figure 5-5 illustrates future employment by county. The historical and expected future annual growth rates for each county are shown in Figure 5-6. As with the ten-county

area's population profile, its employment profile shows that the majority of employment exists in Dallas and Tarrant Counties (Figure 5-5) while the greatest degree of historic employment growth on a percentage basis has occurred in Denton and Collin Counties (Figure 5-6). Employment growth in Denton and Collin Counties through 2030 on a percentage basis is expected to remain higher (between three and four percent annually) than that expected in Dallas and Tarrant Counties (between one and two percent annually). Employment percentage growth in the peripheral counties of the ten-county area is also expected to be higher than the expected Dallas and Tarrant County growth.

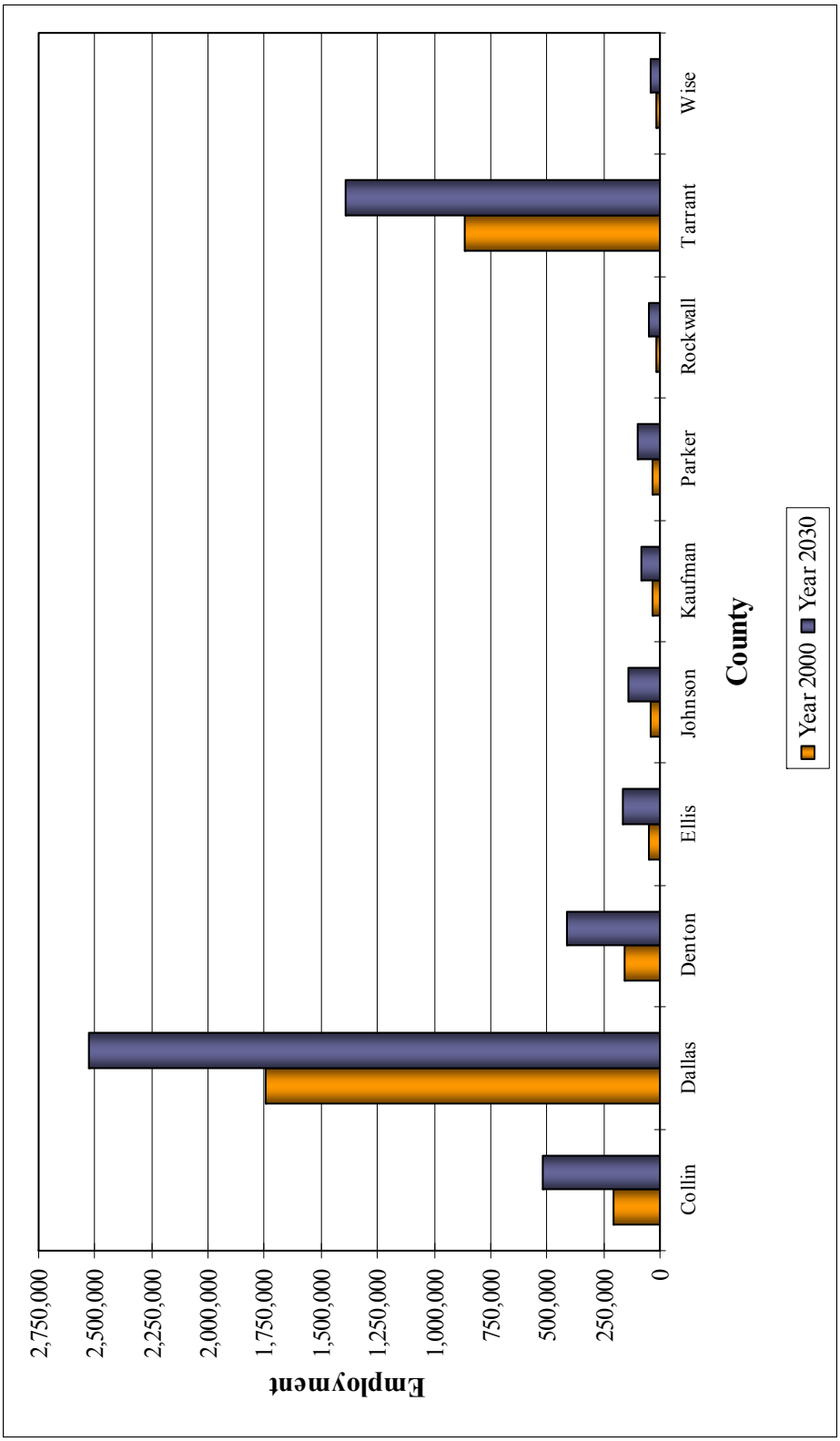

Figure 5-5. 2000 and 2030 Employment

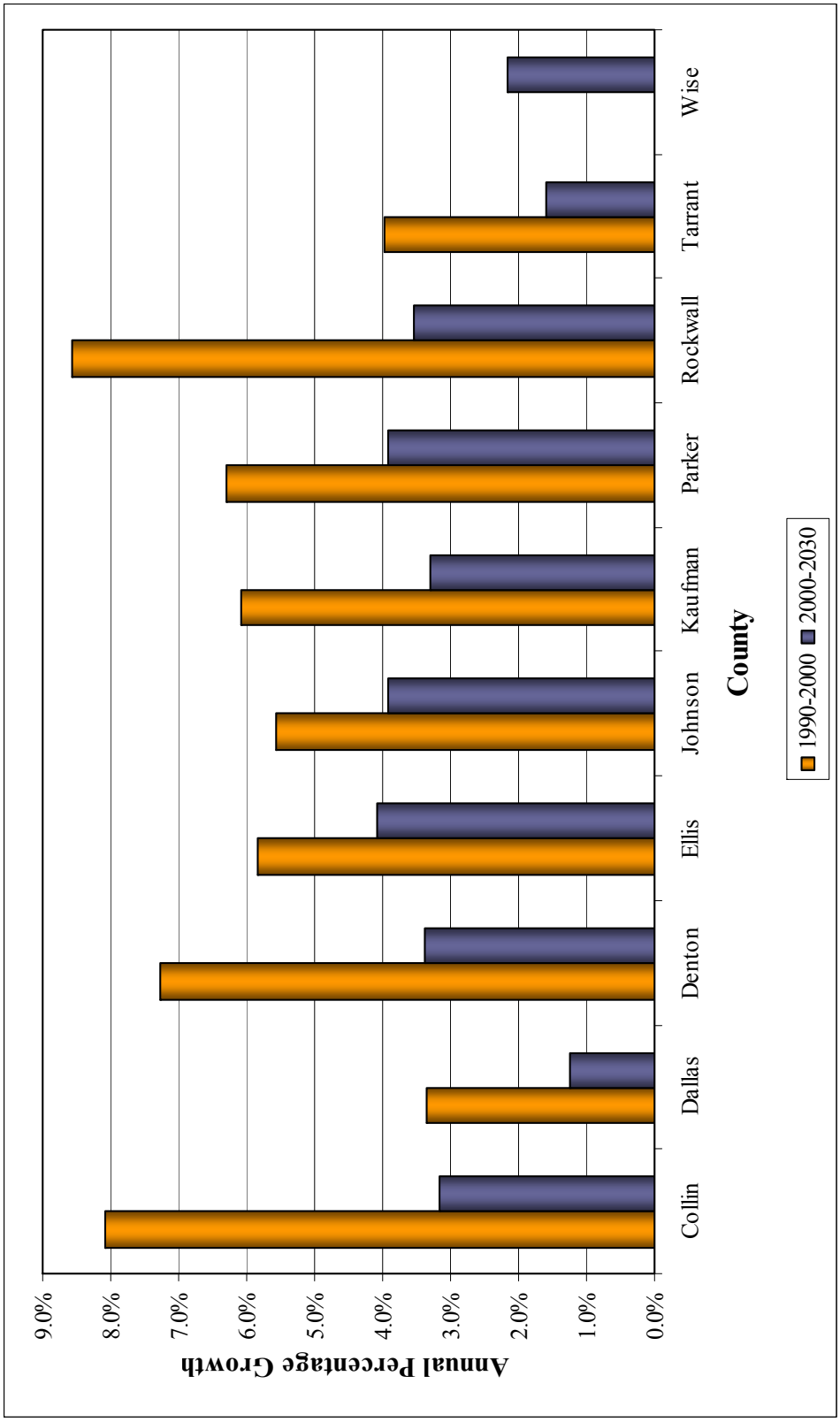

Figure 5-6. Employment Annual Growth Rate for Counties

REGIONAL MEDIAN HOUSEHOLD INCOME TRENDS

Travel demand, and specifically demand for toll roads, is sensitive to the amount of disposable income available within a household. A reliable indicator of a household's propensity for trip-making, and specifically a motorist's willingness to pay a toll, is median household income. Generally, households with higher incomes have a propensity to make more automobile trips than those with lower incomes due to their greater levels of disposable income. Value of time, a key factor in motorists' willingness to pay tolls, also tends to be higher in households with higher incomes.

A comparison of median household income for the ten-county area is provided in Table 5-5. The most recent median household income data estimated by the U.S. Census Bureau for 2007 are provided for the urban counties, the state, and the nation. The median household income data presented in Table 5-5 indicates that when reported in real 2007 dollars, income in the region, the state, and the nation grew considerably between 1989 and 1999, but had declined somewhat by 2007. The 1999 median household incomes in Collin, Dallas, and Denton Counties were higher than those of the state and nation.

Table 5-5
Median Household Income (In Real 2007 Dollars)

County	Year 1989 [1]	Year 1999 [1]	Year 2007 Estimate [2]	Average Annual Growth Rate		
				(1989-1999)	(1989-2007)	(1999-2007)
Collin	**$74,401**	**$86,617**	**$77,671**	**1.5%**	**0.3%**	**-1.4%**
Dallas	**$51,096**	**$52,977**	**$46,330**	**0.4%**	**-0.6%**	**-1.7%**
Denton	**$59,679**	**$71,187**	**$68,624**	**1.8%**	**0.9%**	**-0.5%**
Ellis	$49,395	$61,568	$54,900	2.2%	0.7%	-1.4%
Johnson	$49,490	$54,563	$50,188	1.0%	0.1%	-1.0%
Kaufman	$44,104	$54,761	$55,238	2.2%	1.4%	0.1%
Parker	$49,458	$55,634	$57,985	1.2%	1.0%	0.5%
Rockwall	**$68,576**	**$79,683**	**$75,915**	**1.5%**	**0.6%**	**-0.6%**
Tarrant	**$52,276**	**$56,468**	**$52,755**	**0.8%**	**0.1%**	**-0.8%**
Wise	$41,848	$51,276	$53,968	2.1%	1.6%	0.6%
State of Texas	$43,677	$48,823	$46,248	1.1%	0.4%	-0.7%
United States	$48,592	$51,350	$50,007	0.6%	0.2%	-0.3%

[1] Adjusted to 2007 dollars using the Consumer Price Index (CPI).

[2] Estimate calculated by U.S. Census Bureau, presented in 2007 American Community Survey.

Sources: 1990 and 2000 Decennial Census, 2007 American Community Survey, U.S. Census Bureau.

Collin County had the highest median household income of all of the counties in the DFWMA. Typically, the median household incomes for the counties in the ten-county area have historically been higher than the state and national averages.

In 1999, median household incomes ranged from 1.77 times that of the state for Collin County to 1.05 times that of the state for Wise County. Similarly, the ten-county area median household incomes ranged from 1.69 times the national median household income for Collin County to 1.00 times the national median household income for Wise County.

The 2007 median household income estimates for Collin, Denton, Rockwall and Tarrant Counties were all higher than the state and national median household income figure. Median household incomes in 2007 ranged from 68 percent higher than the state average in Collin County to 0.2 percent higher in Dallas County. Similarly, the 2007 median household incomes ranged from 1.55 times that of the nation for Collin County to 0.93 times that of the nation for Dallas County.

Between 1989 and 2007, the annual rate of growth of median household income in the region's counties compared favorably to the state and nation, although some counties showed a smaller rate of increase. Figure 5-7 illustrates the median household income distribution among ten-county area counties, the State of Texas and the United States during 1989 and 1999, and the available data for 2007.

Figure 5-8 shows the median household income from the 2000 Census at the TSZ level for the NTTAS presented in constant 1999 dollars. Figure 5-8 shows that the areas to the south of the NTTAS are generally lower income areas. There are several zones along the DNT and PGBT with median household incomes of greater than $100,000. A large majority of all zones surrounding the SRT corridor have median household incomes of at least $75,000 in 1999 dollars.

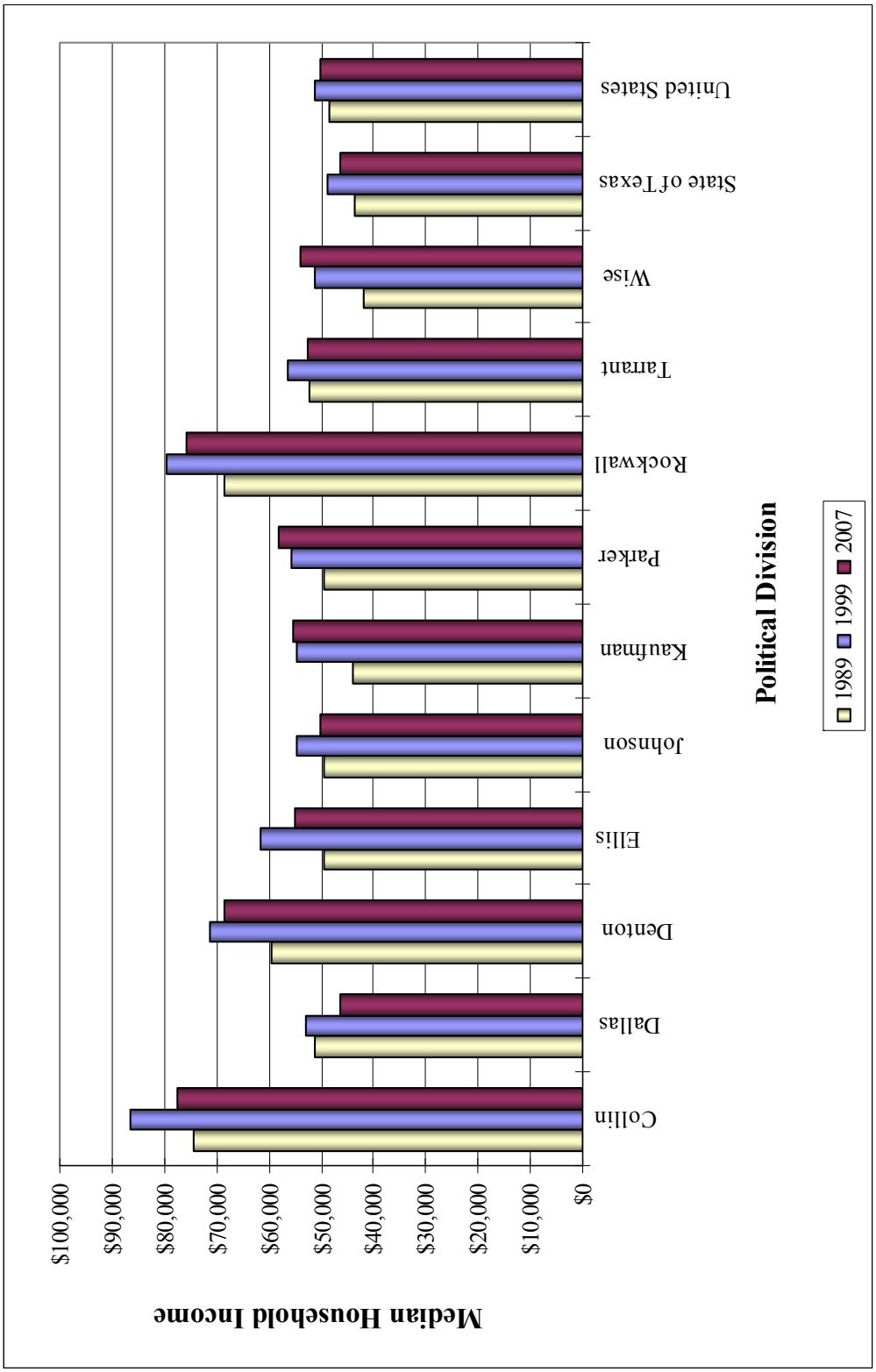

Figure 5-7. Median Household Income Trend (2007 Dollars)

Source: 1990 and 2000 Decennial Census, 2007 American Community Survey, U.S. Census Bureau.

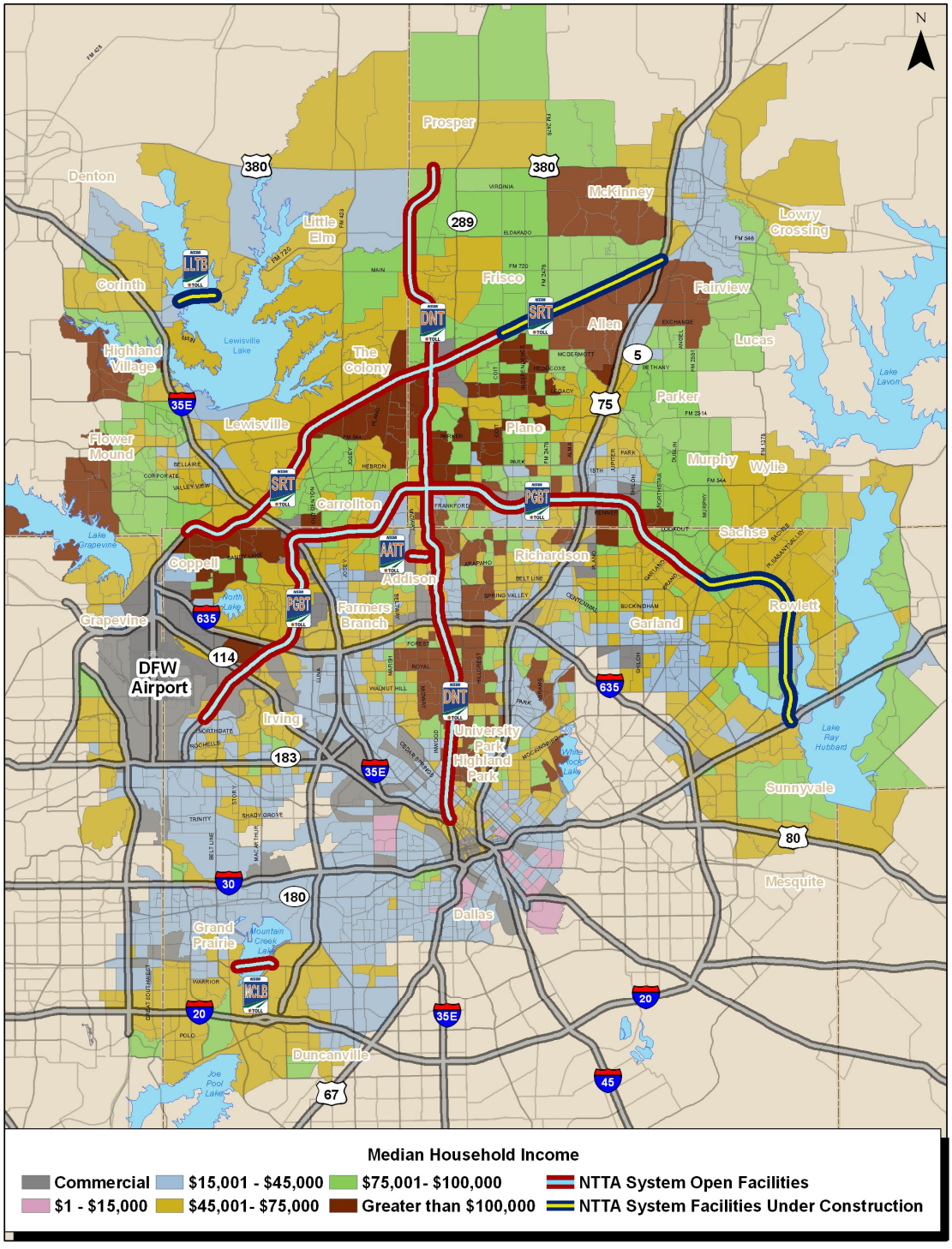

Figure 5-8. 2000 Median Household Income (1999 dollars)

HISTORICAL AND FUTURE MUNICIPAL GROWTH

In this section, the historical and future demographic growth in the municipalities that comprise the study area of the NTTAS facilities is addressed.

The DNT is located in or close to the Cities of Addison, Dallas, Farmers Branch, Frisco, Highland Park, Plano, The Colony, and University Park. The PGBT passes through the Cities of Carrollton, Coppell, Dallas, Garland, Irving, Lewisville, Plano, and Richardson. The AATT is in the City of Addison. The MCLB is positioned next to the Cities of Dallas and Grand Prairie. The LLTB will serve The Cities of Argyle, Corinth, Denton, Flower Mound, Frisco, Highland Village, Lake Dallas, Lewisville, Little Elm and The Colony. Cities surrounding the SRT include Allen, Carrollton, Coppell, Fairview, Flower Mound, Frisco, Grapevine, Irving, Lewisville, Lowry Crossing, Lucas, McKinney, Plano, and The Colony. A map of these municipalities is provided in Figure 5-9. The aggregation of these cities is referred in Tables 5-6 and Table 5-7 as NTTAS study area.

HISTORICAL MUNICIPAL POPULATION TRENDS

The historical population trends and projections of the municipalities in the study area are presented in Table 5-6. Average annual population growth between 1970 and 2000 ranged from a low of -0.5 percent in Highland Park to a high of 12.0 percent in Flower Mound. Population information was not available for Lowry Crossing or The Colony in 1970.

The Cities of Addison, Corinth, Flower Mound and Highland Village experienced the fastest rates of population growth between 1970 and 2000. Flower Mound grew by 49,017 residents at an average annual growth rate of 12.0 percent. Corinth gained 10,864 residents at an average annual rate of 11.3 percent while Addison added 13,861 residents at an average annual rate of 11.2 percent. Highland Village grew by 11,657 residents at an average annual growth rate of 11.1 percent.

The Cities of Dallas, Garland, Irving and Plano had the largest incremental population growth between 1970 and 2000. Dallas gained 358,191 residents at an average annual rate of 1.2 percent. Plano's population increased by 204,158 residents at an average annual rate of 8.8 percent while Garland grew by 133,728 residents at an average annual rate of 3.3 percent. Irving gained 99,372 residents at an average annual growth rate of 2.4 percent.

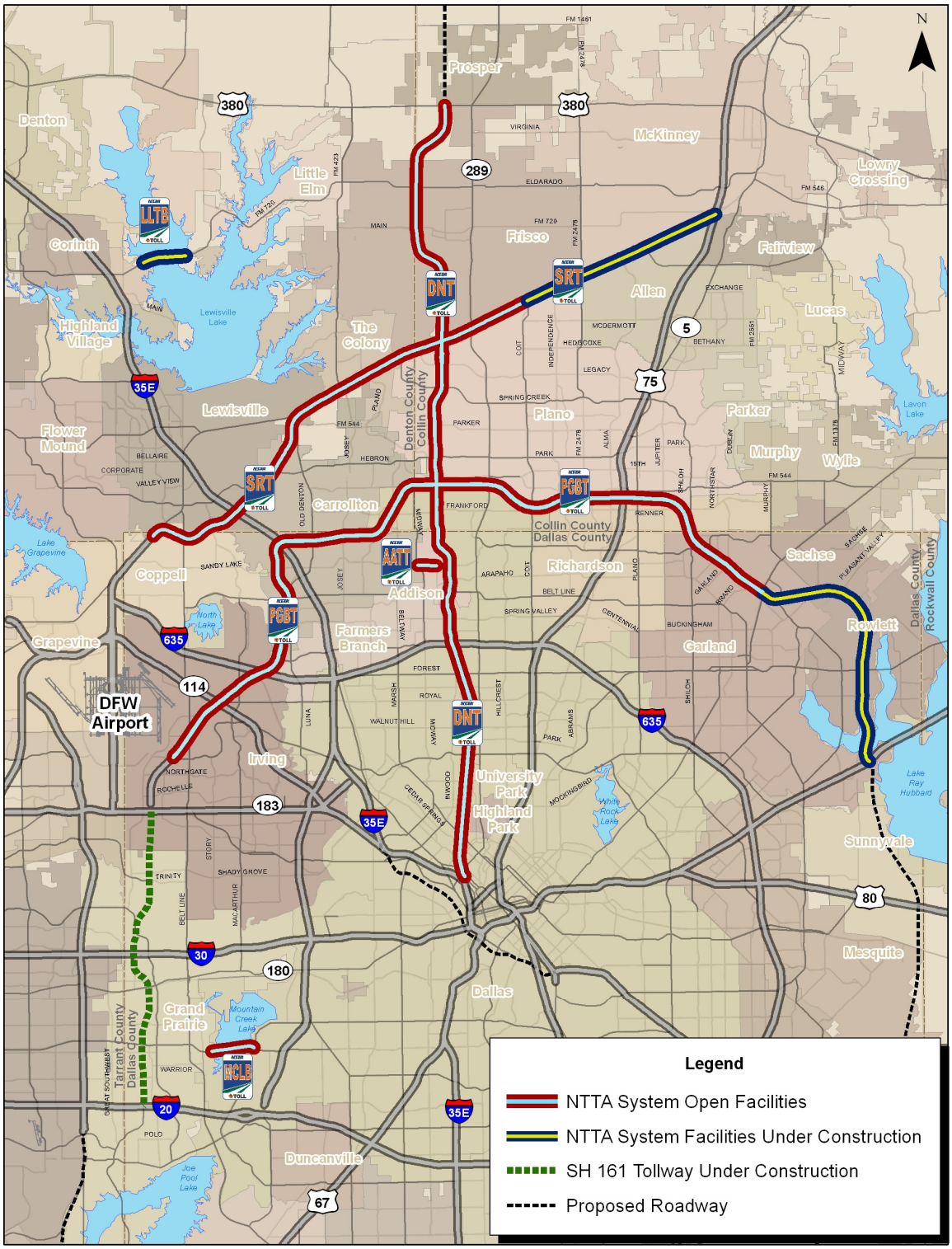

Figure 5-9. Municipality Locations

Table 5-6
Historical Municipal Population Trends and Projections
NTTA System Study Area

Municipality	Year 1970	Year 1980	Year 1990	Year 2000	Year 2030	Annual Percent Growth (1970-2000)	Annual Percent Growth (2000-2030)	Number of New Residents (1970-2000)	Number of New Residents (2000-2030)	Percent Population Distribution By Municipality		Percentage of New Residents Between 2000 and 2030
										2000	2030	
Addison	593	5,553	8,783	14,454	19,303	11.2%	1.0%	13,861	4,849	0.5%	0.4%	0.4%
Allen	1,940	8,314	18,309	43,554	99,331	10.9%	2.8%	41,614	55,777	1.5%	2.3%	4.1%
Argyle	443	1,111	1,575	2,365	11,810	5.7%	5.5%	1,922	9,445	0.1%	0.3%	0.7%
Carrollton	13,855	40,595	82,169	109,576	124,086	7.1%	0.4%	95,721	14,510	3.7%	2.9%	1.1%
Coppell	1,728	3,826	16,881	35,958	45,410	10.6%	0.8%	34,230	9,452	1.2%	1.1%	0.7%
Corinth	461	1,264	3,944	11,325	27,070	11.3%	2.9%	10,864	15,745	0.4%	0.6%	1.2%
Dallas	844,401	904,599	1,006,877	1,202,592	1,404,847	1.2%	0.5%	358,191	202,255	40.8%	32.6%	14.9%
Denton	39,874	48,063	66,270	80,537	190,719	2.4%	2.9%	40,663	110,182	2.7%	4.4%	8.1%
Fairview	463	893	1,554	2,644	18,100	6.0%	6.6%	2,181	15,456	0.1%	0.4%	1.1%
Farmers Branch	27,492	24,863	24,250	28,028	43,978	0.1%	1.5%	536	15,950	0.9%	1.0%	1.2%
Flower Mound	1,685	4,402	15,527	50,702	91,640	12.0%	2.0%	49,017	40,938	1.7%	2.1%	3.0%
Frisco	1,845	3,499	6,141	33,714	227,911	10.2%	6.6%	31,869	194,197	1.1%	5.3%	14.3%
Garland	81,437	138,857	180,650	215,165	241,767	3.3%	0.4%	133,728	26,602	7.3%	5.6%	2.0%
Grand Prairie	50,904	71,462	99,606	129,356	231,011	3.2%	2.0%	78,452	101,655	4.4%	5.4%	7.5%
Grapevine	7,049	11,801	29,198	42,059	49,484	6.1%	0.5%	35,010	7,425	1.4%	1.1%	0.5%
Heath	520	1,459	2,108	3,991	17,669	7.0%	5.1%	3,471	13,678	1.9%	7.3%	51.4%
Highland Park	10,133	8,909	8,739	8,804	9,027	-0.5%	0.1%	-1,329	223	0.3%	0.2%	0.0%
Highland Village	516	3,246	7,027	12,173	18,624	11.1%	1.4%	11,657	6,451	0.4%	0.4%	0.5%
Irving	97,260	109,943	155,037	196,632	225,714	2.4%	0.5%	99,372	29,082	6.7%	5.2%	2.1%
Lake Dallas	1,431	3,177	3,656	6,166	9,209	5.0%	1.3%	4,735	3,043	0.2%	0.2%	0.2%
Lewisville	9,264	24,273	46,521	77,737	111,168	7.3%	1.2%	68,473	33,431	2.6%	2.6%	2.5%
Little Elm	363	926	1,255	3,646	18,882	8.0%	5.6%	3,283	15,236	0.1%	0.4%	1.1%
Lowry Crossing	N/A	443	865	1,229	2,897	N/A	2.9%	N/A	1,668	0.0%	0.1%	0.1%
Lucas	540	1,371	2,205	2,890	14,974	5.8%	5.6%	2,350	12,084	0.1%	0.3%	0.9%
McKinney	15,193	16,256	21,283	54,369	225,933	4.3%	4.9%	39,176	171,564	1.8%	5.2%	12.6%
Mesquite	55,131	67,053	101,484	126,366	157,259	2.8%	0.7%	71,235	30,893	58.7%	65.0%	116.1%
Murphy	261	1,150	1,547	3,113	12,576	8.6%	4.8%	2,852	9,463	1.4%	5.2%	35.6%
Plano	17,872	72,331	128,713	222,030	257,061	8.8%	0.5%	204,158	35,031	7.5%	6.0%	2.6%
Richardson	48,405	72,496	74,840	92,577	113,815	2.2%	0.7%	44,172	21,238	3.1%	2.6%	1.6%
Rockwall	3,121	5,939	10,486	17,862	53,265	6.0%	3.7%	14,741	35,403	8.3%	22.0%	133.1%
Rowlett	2,243	7,522	23,260	44,134	68,961	10.4%	1.5%	41,891	24,827	20.5%	28.5%	93.3%
Sachse	777	1,640	5,346	9,750	25,298	8.8%	3.2%	8,973	15,548	4.5%	10.5%	58.4%
Sunnyvale	995	1,404	2,228	2,667	11,554	3.3%	5.0%	1,672	8,887	1.2%	4.8%	33.4%
The Colony	N/A	11,586	22,113	26,531	64,216	N/A	3.0%	N/A	37,685	0.9%	1.5%	2.8%
University Park	23,498	22,254	22,259	20,764	20,764	-0.4%	0.0%	-2,734	0	0.7%	0.5%	0.0%
Wylie	2,675	3,152	8,716	15,016	45,625	5.9%	3.8%	12,341	30,609	7.0%	18.9%	115.1%
NTTA System Study Area *	1,364,368	1,705,632	2,211,422	2,950,476	4,310,958	2.6%	1.3%	1,586,108	1,360,482	100.0%	100.0%	100.0%
Ten-County Area	2,371,256	2,957,120	3,920,094	5,080,603	9,107,229	2.6%	2.0%	2,709,347	4,026,626	N/A	N/A	N/A
State of Texas	11,258,480	14,337,820	16,986,510	20,851,820	31,830,579	2.1%	1.4%	9,593,340	10,978,759	N/A	N/A	N/A
United States	203,982,310	227,225,620	248,709,873	281,421,906	362,880,000	1.1%	0.9%	77,439,596	81,458,094	N/A	N/A	N/A

* NTTA System Study Area is aggregation of all the cities in the corridor
Source: NCTCOG, Texas State Data Center, U.S. Census Bureau

The municipalities that comprise the NTTAS corridors grew by an average rate of 2.4 percent per year between 1970 and 2000. This compares to a historical average annual population growth rate of 2.6 percent for the ten-county area, 2.1 percent for the state, and 1.1 percent for the nation.

FUTURE MUNICIPAL POPULATION GROWTH

Population projections for 2030 were developed by NCTCOG for the municipalities in the study corridor. As shown in Table 5-6, population growth in most of the municipalities is expected to be much lower than the average annual population growth that was experienced between 1970 and 2000.

The Cities of Fairview, Frisco, Little Elm and Lucas are expected to see the largest average annual growth rates between 2000 and 2030. It is projected that Fairview will gain 15,456 residents at an average annual growth rate of 6.6 percent while Frisco will gain 194,197 residents at the same rate of 6.6 percent. Little Elm and Lucas are expected to grow by 15,236 and 12,084 residents respectively at an average annual growth rate of 5.6 percent

The largest incremental growth between 2000 and 2030 is expected to be seen in Dallas, Frisco, McKinney, Denton, and Grand Prairie. Dallas is projected to gain 202,255 residents at an average annual growth rate of 0.5 percent while McKinney will gain 171,564 residents at an average annual growth rate of 4.9 percent. Denton is expected to grow by 110,182 residents at an average annual rate of 2.9 percent while Grand Prairie is expected to grow by 101,655 residents at an average annual rate of 2.0 percent.

Frisco and McKinney are expected to have the largest percentage increase in the share of future projected population growth between 2000 and 2030. The share of study area population in Frisco is expected to increase from 1.3 percent in 2000 to 6.0 percent in 2030. McKinney's share of study area population is expected to increase from 2.0 percent in 2000 to 5.9 percent in 2030. The share of study area population in Dallas is expected to decrease from 45.2 percent in 2000 to 36.7 percent in 2030.

HISTORICAL MUNICIPAL EMPLOYMENT TRENDS

Historical employment trends for the municipalities in the NTTAS corridors are presented in Table 5-7. The twenty-eight municipalities have experienced average annual employment growth between 1990 and 2000 ranging from a low of 2.5 percent in Dallas to a high of 12.7 percent in Flower Mound and Frisco. Employment information was not available for Argyle, Fairview, Highland Village, Little Elm, Lowry Crossing or Lucas in 1990.

Table 5-7
Historical Municipal Employment Trends and Projections
NTTA System Study Area

Municipality	Year 1990	Year 2000	Year 2030	Annual Percent Growth (1990-2000)	Annual Percent Growth (2000-2030)	Number of New Employees (1990-2000)	Number of New Employees (2000-2030)	Percent Employment Distribution By Municipality	
								2000	2030
Addison	29,350	45,649	66,213	4.5%	1.2%	16,299	20,564	2.2%	2.0%
Allen	3,550	9,059	45,114	9.8%	5.5%	5,509	36,055	0.4%	1.4%
Argyle	N/A	535	4,024	N/A	7.0%	N/A	3,489	0.0%	0.1%
Carrollton	45,250	68,199	83,148	4.2%	0.7%	22,949	14,949	3.3%	2.6%
Coppell	6,350	18,401	29,380	11.2%	1.6%	12,051	10,979	0.9%	0.9%
Corinth	1,000	2,213	3,225	8.3%	1.3%	1,213	1,012	0.1%	0.1%
Dallas	809,650	1,038,314	1,390,219	2.5%	1.0%	228,664	351,905	49.6%	43.0%
Denton	37,050	58,581	107,572	4.7%	2.0%	21,531	48,991	2.8%	3.3%
Fairview	N/A	218	11,670	N/A	14.2%	N/A	11,452	0.0%	0.4%
Farmers Branch	50,150	75,013	156,798	4.1%	2.5%	24,863	81,785	3.6%	4.9%
Flower Mound	1,550	5,130	12,993	12.7%	3.1%	3,580	7,863	0.2%	0.4%
Frisco	2,550	8,437	58,931	12.7%	6.7%	5,887	50,494	0.4%	1.8%
Garland	62,300	93,265	117,947	4.1%	0.8%	30,965	24,682	4.5%	3.6%
Grand Prarie	51,800	82,664	125,866	4.8%	1.4%	30,864	43,202	3.9%	3.9%
Grapevine	27,100	49,565	85,475	6.2%	1.8%	22,465	35,910	2.4%	2.6%
Heath	N/A	413	1,568	N/A	4.5%	N/A	1,155	0.5%	1.2%
Highland Park	1,550	2,405	2,586	4.5%	0.2%	855	181	0.1%	0.1%
Highland Village	N/A	1,065	1,796	N/A	1.8%	N/A	731	0.1%	0.1%
Irving	106,600	165,435	276,941	4.5%	1.7%	58,835	111,506	7.9%	8.6%
Lake Dallas	N/A	1,683	2,384	N/A	1.2%	N/A	701	0.1%	0.1%
Lewisville	15,650	37,145	62,603	9.0%	1.8%	21,495	25,458	1.8%	1.9%
Little Elm	N/A	672	1,377	N/A	2.4%	N/A	705	0.0%	0.0%
Lowry Crossing	N/A	48	220	N/A	5.2%	N/A	172	0.0%	0.0%
Lucas	N/A	225	2,674	N/A	8.6%	N/A	2,449	0.0%	0.1%
McKinney	12,250	26,293	74,750	7.9%	3.5%	14,043	48,457	1.3%	2.3%
Mesquite	31,400	53,785	77,015	5.5%	1.2%	22,385	23,230	65.1%	61.2%
Murphy	N/A	242	1,430	N/A	6.1%	N/A	1,188	0.3%	1.1%
Plano	54,450	115,048	184,205	7.8%	1.6%	60,598	69,157	5.5%	5.7%
Richardson	57,750	94,792	163,014	5.1%	1.8%	37,042	68,222	4.5%	5.0%
Rockwall	4,550	9,692	21,507	7.9%	2.7%	5,142	11,815	11.7%	17.1%
Rowlett	3,950	7,882	13,310	7.2%	1.8%	3,932	5,428	9.5%	10.6%
Sachse	N/A	1,504	6,899	N/A	5.2%	N/A	5,395	1.8%	5.5%
Sunnyvale	1,150	2,265	7,142	7.0%	3.9%	1,115	4,877	2.7%	5.7%
The Colony	1,650	3,510	13,002	7.8%	4.5%	1,860	9,492	0.2%	0.4%
University Park	6,500	9,012	9,716	3.3%	0.3%	2,512	704	0.4%	0.3%
Wylie	2,450	5,144	10,140	7.7%	2.3%	2,694	4,996	6.2%	8.1%
NTTA System Study Area*	1,427,550	2,093,503	3,232,854	3.9%	1.5%	665,953	1,139,351	100.0%	100.0%
Ten-County Area	2,157,000	3,153,454	5,416,718	3.9%	1.8%	996,454	2,263,264	N/A	N/A
State of Texas	6,983,170	9,283,286	16,743,000	2.9%	2.0%	2,300,116	7,459,714	N/A	N/A
United States	108,657,200	129,877,063	202,431,000	1.8%	1.5%	21,219,863	72,553,937	N/A	N/A

* NTTA System Study Area is aggregation of all the cities in the corridor
Source: NCTCOG, Texas State Data Center, U.S. Census Bureau

The Cities of Flower Mound, Frisco, and Coppell experienced the highest average annual growth rates between 1990 and 2000. Flower Mound and Frisco grew by 3,580 and 5,887 employees respectively at an average annual rate of 12.7 percent. Employment in Coppell grew at an average annual rate of 11.2 percent gaining 12,050 employees.

The Cities of Dallas, Irving and Plano experienced the largest incremental employment growth between 1990 and 2000. Dallas grew by 228,664 employees at an average annual

growth rate of 2.5 percent. Irving gained 58,835 employees at an average annual rate of 4.5 percent while Plano gained 60,598 residents at an average annual rate of 7.8 percent.

The twenty-eight municipalities that comprise the study area experienced a combined average annual employment growth rate of 3.8 percent between 1990 and 2000 which is comparable to the annual average employment growth rates of 3.9 percent experienced in the ten-county area, 2.9 percent in the state and 1.8 percent in the nation.

FUTURE MUNICIPAL EMPLOYMENT GROWTH

Also presented in Table 5-7 are estimates of future employment growth through 2030, as estimated by NCTCOG. All of the study area municipalities will continue to see growth in employment between 2000 and 2030. The City of Fairview is expected to see the fastest employment growth with an average annual rate of 14.2 percent while Highland Park will experience a low rate of only 0.2 percent.

The Cities of Fairview, Lucas, Argyle, and Frisco are expected to see the largest average annual growth rates between 2000 and 2030. It is projected that Fairview will gain 11,452 employees at an average annual rate of 14.2 percent while Lucas will gain 2,449 employees at an average annual rate of 8.6 percent. Employment in Argyle is expected to grow by 3,489 at an average annual rate of 7.0 percent while Frisco is expected to gain 50,494 employees at an average annual rate of 6.7 percent.

The Cities of Dallas and Irving are expected to see the largest incremental employment growth between 2000 and 2030. Dallas is projected to grow by 351,905 employees at an average annual rate of 1.0 percent. Irving is expected to gain 111,506 employees at an average annual rate of 1.7 percent.

The employment projections prepared by NCTCOG indicate that Dallas will continue to be the focal point of employment activity in the municipalities that comprise the SRT study area, but there is expected to be more job growth in surrounding cities.

NTTAS CURRENT AND FUTURE DEVELOPMENT GROWTH

In this section, the current and future economic development potential within the NTTAS study area is described. The future development potential is based on the identification of major employment establishments in the study corridor, potential new developments in the study area, as well as an examination of the demographic forecasts for the area immediately adjacent to and within the NTTAS.

MAJOR EMPLOYMENT ESTABLISHMENTS

The Dallas Morning News ranks the top 150 major corporations in the Dallas-Fort Worth metropolitan area every year. The ranking is based on the total revenue generated by each corporation in the previous year. From the 2009 rankings, 119 of the top 150

corporations are located within an approximate five-mile distance of the NTTAS. A list of those corporations is presented in Table 5-8 and the location of these facilities is illustrated in Figure 5-10.

Exxon Mobil Corp., the highest-ranked corporation, is located in Irving within a five-mile distance of both the PGBT and the DNT. The company experienced $425.0 billion in revenue in 2008. AT&T is located in downtown Dallas and is ranked second with $124.0 billion in revenue in 2008. AMR Corp. in Fort Worth is located near the PGBT and is ranked third with $23.7 billion in 2008 revenue.

Kimberly Clark Corp. and J.C. Penney Co. in Plano in Irving are ranked fourth and fifth respectively. Kimberly Clark Corp earned $19.4 billion in revenue in 2008 and is located near the PGBT. J.C. Penny Co. is located near DNT and earned $18.4 billion in 2008 revenue.

In addition to the corporations ranked in the 2009 survey described above, there are several employment establishments within the study area of the NTTAS with 1,000 or more employees. In 2004, NCTCOG organized a list of employment establishments with 1,000 or more employees. Table 5-9 indicates those establishments located within a five-mile distance of a NTTAS facility and their locations are illustrated in Figure 5-11.

There are ten companies in the NTTAS study area with 5,000 or more employees: American Airlines/AMR, Texas Health Resources Inc., Parkland Memorial Hospital, Electronic Data Systems (EDS) now a HP company, UT Southwestern Medical Center, Baylor University Medical Center, Texas Instruments H.Q., Compucom Campus, Grapevine Mills Mall and Sourcenet Solution. These business establishments are important traffic generators to the NTTAS facilities.

Table 5-8
Major Corporations Ranked by the Dallas Morning News
NTTA System Study Corridor

Name	City	2009 Rank	2008 Revenue	Name	City	2009 Rank	2008 Revenue
Exxon Mobil Corp.	Irving	1	$425,071,000,000	Dynamex Inc.	Dallas	75	$455,776,000
AT&T Inc.	Dallas	2	$124,028,000,000	PFSweb Inc.	Plano	76	$451,843,000
AMR Corp.	Fort Worth	3	$23,766,000,000	Affirmative Ins Holdings Inc.	Addison	77	$448,923,000
Fluor Corp.	Irving	4	$22,325,890,000	Diodes Inc.	Dallas	78	$432,785,000
Kimberly-Clark Corp.	Irving	5	$19,415,000,000	Titan Global Holdings Inc.	Richardson	79	$418,330,000
J.C. Penney Co.	Plano	6	$18,486,000,000	Capstead Mortgage Corp.	Dallas	80	$400,489,000
Texas Instruments Inc.	Dallas	8	$12,501,000,000	Carbo Ceramics Inc.	Irving	81	$387,828,000
Dean Foods Co.	Dallas	9	$12,454,610,000	Penson Worldwide Inc.	Dallas	82	$383,869,000
Southwest Airlines Co.	Dallas	10	$11,023,000,000	Mannatech Inc.	Coppell	84	$332,703,000
Commercial Metals Co.	Irving	11	$10,427,380,000	Reddy Ice Holdings Inc.	Dallas	85	$329,298,000
Energy Transfer Partners LP	Dallas	12	$9,293,868,000	Furmanite Corp.	Richardson	86	$320,942,000
Tenet Healthcare Corp.	Dallas	14	$8,663,000,000	Nexstar Broadcasting Group Inc.	Irving	88	$284,947,000
Centex Corp.	Dallas	15	$8,275,562,000	Texas Capital Bancshares Inc.	Dallas	89	$271,400,000
Atmos Energy Corp.	Dallas	17	$7,221,305,000	Tyler Technologies Inc.	Dallas	91	$265,101,000
Celanese Corp.	Dallas	18	$6,823,000,000	Silverleaf Resorts Inc.	Dallas	92	$257,447,000
Affiliated Computer Svs. Inc.	Dallas	20	$6,160,550,000	i2 Technologies Inc.	Dallas	93	$255,813,000
Holly Corp.	Dallas	21	$5,867,668,000	Sport Supply Group Inc.	Farmers Branch	94	$251,394,000
Blockbuster Inc.	Dallas	23	$5,287,900,000	Capital Senior Living Corp.	Dallas	95	$193,274,000
Alon USA Energy Inc.	Dallas	24	$5,156,706,000	Gainsco Inc.	Dallas	96	$190,534,000
Crosstex Energy LP	Dallas	25	$4,907,049,000	American Realty Investors Inc.	Dallas	98	$181,920,000
Flowserve Corp.	Irving	26	$4,473,473,000	NL Industries Inc.	Dallas	99	$165,502,000
Brinker International Inc.	Dallas	27	$4,235,223,000	CompX International Inc.	Dallas	100	$165,500,000
RadioShack Corp.	Dallas	28	$4,224,500,000	Hallwood Group Inc.	Dallas	101	$162,237,000
Comerica Inc.	Dallas	29	$3,944,000,000	DG Fastchannel Inc.	Irving	102	$157,081,000
Trinity Industries Inc.	Dallas	30	$3,882,800,000	Arabian American Dvlpt. Co.	Dallas	103	$154,630,200
Lennox International Inc.	Richardson	31	$3,481,400,000	United States Lime & Minerals Inc.	Dallas	105	$142,356,000
Torchmark Corp.	Mckinney	32	$3,326,918,000	Transcontinental Realty Invtrs. Inc.	Dallas	106	$142,344,000
Idearc Inc.	DFW Airport	33	$2,973,000,000	PMFG Inc.	Dallas	107	$140,496,000
Rent-A-Center Inc.	Plano	34	$2,884,172,000	Craftmade International Inc.	Coppell	108	$137,590,000
Perot Systems Corp.	Plano	35	$2,779,000,000	U.S. Home Systems Inc.	Lewisville	109	$132,503,000
MetroPCS Communications Inc.	Dallas	36	$2,751,516,000	EF Johnson Technologies Inc.	Irving	110	$126,286,000
Ensco International Inc.	Dallas	39	$2,450,400,000	Holly Energy Partners LP	Dallas	111	$118,088,000
Pioneer Natural Resources Co.	Irving	40	$2,277,350,000	Universal Power Group Inc.	Carrollton	112	$117,897,600
Zale Corp.	Irving	41	$2,138,041,000	ViewPoint Financial Group	Plano	113	$115,336,000
Alliance Data Systems Corp.	Dallas	42	$2,025,267,000	Microtune Inc.	Plano	114	$108,020,000
Regency Energy Partners LP	Dallas	43	$1,885,037,000	DGSE Cos.	Dallas	115	$105,219,000
Cinemark Holdings Inc.	Plano	44	$1,742,287,000	Hilltop Holdings Inc.	Dallas	116	$102,545,000
Fossil Inc.	Richardson	45	$1,583,242,000	Entrust Inc.	Addison	117	$99,661,000
Exco Resources Inc.	Dallas	46	$1,490,258,000	Atrion Corp.	Allen	118	$95,895,000
Valhi Inc.	Dallas	47	$1,485,300,000	Adams Golf Inc.	Plano	119	$91,451,000
Denbury Resources Inc.	Plano	48	$1,360,868,000	Dorchester Minerals LP	Dallas	120	$89,925,000
Kronos Worldwide Inc.	Dallas	50	$1,316,900,000	TGC Industries Inc.	Plano	121	$86,769,740
Ashford Hospitality Trust Inc.	Dallas	52	$1,172,856,000	Heelys Inc.	Carrollton	124	$70,741,000
Titanium Metals Corp.	Dallas	53	$1,151,500,000	DRI Corp.	Dallas	125	$70,559,000
FelCor Lodging Trust Inc.	Irving	55	$1,129,776,000	Toreador Resources Corp.	Dallas	126	$62,374,000
Encore Wire Corp.	Mckinney	56	$1,081,132,000	American Caresource Holdings Inc.	Irving	127	$58,288,780
Builders FirstSource Inc.	Dallas	57	$1,034,524,000	RF Monolithics Inc.	Dallas	128	$54,661,000
Texas Industries Inc.	Dallas	59	$1,028,854,000	Pizza Inn Inc.	The Colony	130	$49,518,000
Tuesday Morning Corp.	Dallas	60	$885,280,000	GVI Security Solutions Inc.	Carrollton	131	$47,333,000
CEC Entertainment Inc.	Irving	61	$814,509,000	Westwood Holdings Group Inc.	Dallas	132	$46,456,000
Darling International Inc.	Irving	62	$807,492,000	Natural Health Trends Corp.	Dallas	133	$45,810,000
Eagle Materials Inc.	Dallas	64	$749,553,000	Global Innovation Corp.	Frisco	136	$33,487,940
Belo Corp.	Dallas	65	$733,470,000	RBC Life Sciences Inc.	Irving	137	$30,409,000
A.H. Belo Corporation	Dallas	67	$637,314,000	Zix Corp.	Dallas	138	$28,035,000
Odyssey HealthCare Inc.	Dallas	68	$616,050,000	Retractable Technologies Inc.	Little Elm	139	$27,899,000
Comstock Resources Inc.	Frisco	70	$563,749,000	Interphase Corp.	Plano	140	$26,231,000
Keystone Consolidated Inds Inc.	Dallas	71	$562,693,000	Thomas Group Inc.	Irving	141	$25,121,000
Palm Harbor Homes Inc.	Addison	72	$555,096,000	Uranium Resources Inc.	Lewisville	143	$18,551,070
Frozen Food Exp Indst. Inc.	Dallas	73	$490,536,000	Integrated Security Systems	Irving	144	$10,609,590
SWS Group Inc.	Dallas	74	$477,527,000				

Source: Dallas Morning News Scorecard 2009

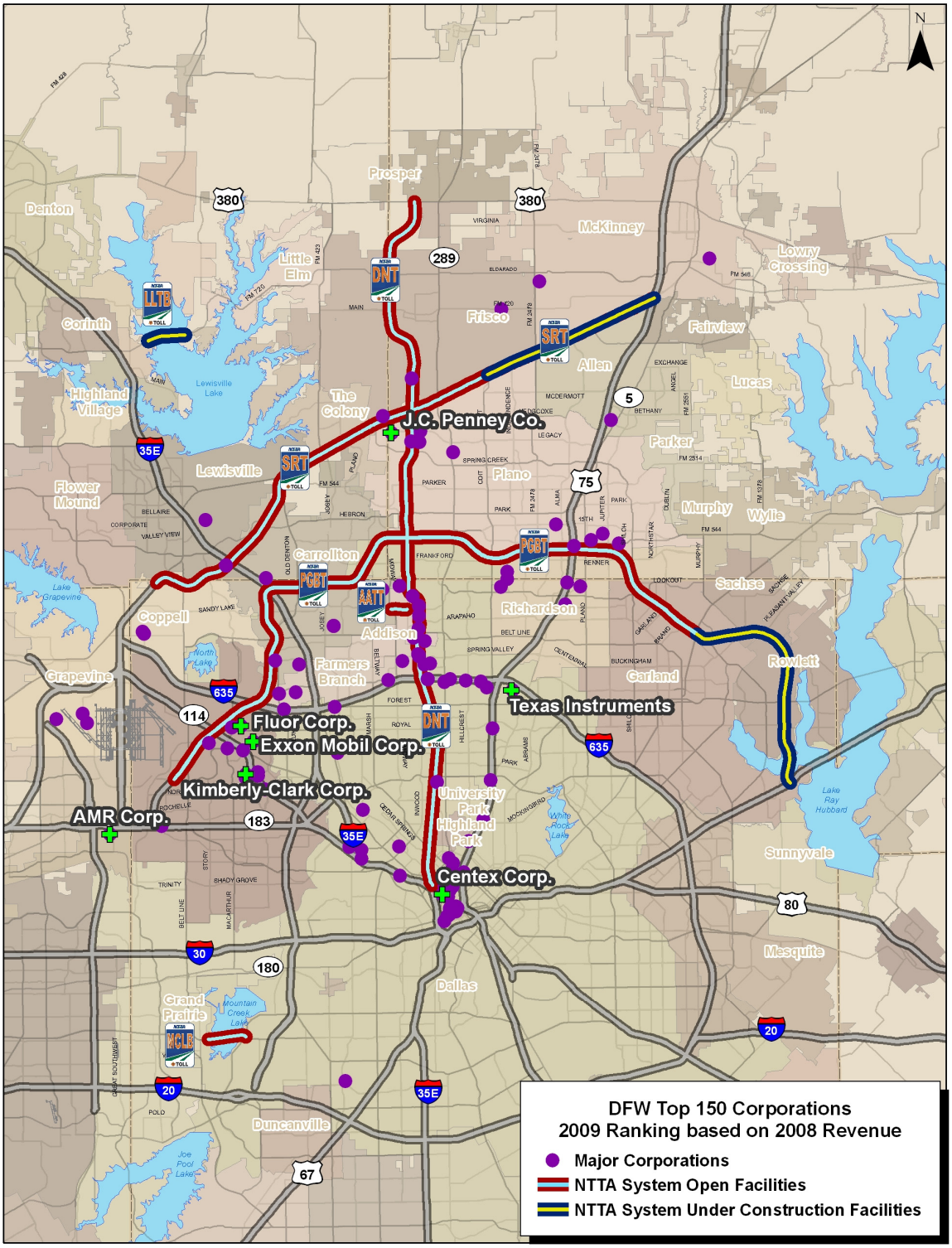

Figure 5-10. DFW Top 150 Corporations

Table 5-9
Major Employment Establishments with 1,000 or more Full-Time Employees
NTTA System Study Corridor

Name	City	Number of Employees	Name	City	Number of Employees
American Airlines/AMR	D/FW Airport	17,950	ACS Image Solutions Inc.	Dallas	1,300
Texas Health Resources Inc.	Irving	9,384	Dallas Semiconductor	Farmers Branch	1,300
Parkland Memorial Hospital	Dallas	7,406	Denton State School	Denton	1,300
EDS	Plano	6,700	Microsoft (Sierra VI)	Irving	1,300
UT Soutwestern Med. Center	Dallas	6,530	Presbyterian Hospital of Plano	Plano	1,300
Baylor Uni. Medical Center	Dallas	5,751	Collin County	McKinney	1,290
Texas Insturments H.Q.	Dallas	5,345	Medical Center of Plano	Plano	1,266
Compucom Campus	Dallas	5,300	Aurum Technologies	Plano	1,250
Grapevine Mills Mall	Grapevine	5,000	State Farm Mutl. Auto Insur.	Dallas	1,234
Sourcenet Solution	Plano	5,000	Bank of America	Dallas	1,230
Nortel Networks	Richardson	4,730	Allstate Insurance Inc.	Irving	1,200
Delta Air Lines Inc.	D/FW Airport	4,300	Benemax I LP	Irving	1,200
Presbyterian Hosp.-Dallas	Dallas	4,100	Federal Government-Local IRS	Farmers Branch	1,200
JC Penney Co. Inc.	Plano	4,000	Geico Insurance	Farmers Branch	1,200
Texas Instruments Inc.	Dallas	4,000	Raytheon	Plano	1,200
MCI Worldcom	Richardson	3,500	Software Spectrum Inc.	Garland	1,200
Vought	Dallas	3,481	Transamerica R.E. Tax Svc.	Dallas	1,200
Northpark Mall	Dallas	3,300	Vartec Telecom Inc.	Dallas	1,200
Southwest Airlines	Dallas	3,060	Prefferred Care Development	Plano	1,191
Blue Cross Blue Shield-TX	Richardson	3,000	Environmental Protection Agency	Dallas	1,150
Children's Med. Center Dallas	Dallas	3,000	Microtune Inc.	Plano	1,139
Countrywide Home Loans	Plano	3,000	Fidelity Investments	Dallas	1,130
Frito-Lay Inc.	Plano	3,000	Texas Women's University	Denton	1,129
Southern Methodist University	University Park	3,000	First American Real Estate Info Svcs.	Dallas	1,110
Dynamex Dedicated Fleet Svcs.	Irving	2,950	Halliburton Energy Srvcs.	Carrolton	1,110
Perot Systems Corporation	Dallas	2,811	SWS Securities Inc.	Dallas	1,110
Alcatel	Plano	2,800	Baylor Medical Ctr. - Garland	Garland	1,094
Ratheon/E-Systems Inc.	Garland	2,750	American Forms	Plano	1,050
Lockheed Martin	Grand Prairie	2,700	Neiman Marcus	Dallas	1,030
Chase Bank of Texas	Dallas	2,600	Xerox Corp.	Irving	1,030
IBM Corp.	Farmers Branch	2,590	Fed. Reservce Bank of Dallas	Dallas	1,020
Nokia	Irving	2,400	7-11	Dallas	1,013
Southwestern Bell	Dallas	2,400	Affiliated Computer Srvcs.	Dallas	1,010
US Postal Service	Dallas	2,310	Adams Mark Hotel	Dallas	1,000
Bank of America	Dallas	2,280	AT&T Wireless	Plano	1,000
Medical City of Dallas	Dallas	2,200	CCCC-Spring Creek	Plano	1,000
Army & Air Force Exch. Srvc.	Dallas	2,103	Dr. Pepper/Seven-Up Corp.	Plano	1,000
University of Texas at Dallas	Richardson	2,015	Exxon-Mobil Exploration	Dallas	1,000
City of Dallas	Dallas	2,000	First Horizon Home Loans	Irving	1,000
Fujitsu Network Communications	Richardson	2,000	GTE Corporation	Irving	1,000
Mobil Oil Corporation	Dallas	2,000	Marc Group	Irving	1,000
Opryland Hotel	Grapevine	2,000	Neiman Marcus - Mail Order	Irving	1,000
Raytheon	McKinney	2,000	Nortel Networks Inc.	Richardson	1,000
Richland College	Dallas	2,000	Omnicom	Dallas	1,000
United Parcel Service Inc.	Dallas	2,000	Roadway Express Inc.	Irving	1,000
The Dallas Morning News	Dallas	1,900	SWS Securities Inc.	Dallas	1,000
Methodist Medical Center	Dallas	1,891	Verizon Communications	Irving	1,000
TXU	Dallas	1,884	Xerox Corp.	Irving	1,000
NEC America Inc.	Irving	1,850	Zale Corp.	Irving	1,000
Accenture	Dallas	1,842	Zale-Lipshy Uni. Med. Ctr.	Dallas	1,000
Bass Enterprises Production	Dallas	1,800	City of Carrollton	Carrollton	950
St. Paul Medical Center	Dallas	1,709	Verizon Internet Solutions	Grapevine	900
D/FW Airport Board	D/FW Airport	1,700	Verel International Inc.	Carrollton	867
JP Morgan Chase	Dallas	1,700	IBM Corp.	Coppell	860
North Texas Mail Processing Center	Coppell	1,695	Ford Motor Credit	Irving	830
Ericsson Headquarters	Plano	1,664	Brinkes Home Security	Irving	800
Bank of America	Dallas	1,620	Capital One Auto Finance	Plano	800
US Postal Service	Dallas	1,620	Experian	Allen	800
Centex Corp	Dallas	1,618	Medical Center of Lewisville	Lewisville	800
Gulfstream Aerospace	Dallas	1,600	Network Associates	Plano	800
American Airlines Center Arena	Dallas	1,559	Texas Instruments Inc.	Plano	800
Capital Senior Living Inc.	Dallas	1,558	North Central Medical Center	McKinney	750
MBNA Information Srvcs. Inc.	Addison	1,550	Benecorp Business Services	Allen	719
Aegis Communications	Irving	1,500	American Building Control Inc.	Lewisville	710
Allied Resource Mgt. of Fla.	Dallas	1,500	Genuity	Lewisville	700
Arthur Anderson Worldwide Coop.	Dallas	1,500	GTE Corporation (Verizon)	Irving	700
Centre at Preston Ridge	Frisco	1,500	McKesson	Carrollton	700
Cisco Systems	Richardson	1,500	Medco Health Solutions of Irving	Irving	700
Mary Kay Cosmetics-HQ	Addison	1,500	Quest Diagnostics Incorporated	Irving	700
Perot Systems	Plano	1,500	Verizon Service Center	Coppell	660
Poly-America Inc.	Grand Prairie	1,500	Minyard	Coppell	650
Wyndham Anatole Hotel	Dallas	1,500	Trinity Medical Center	Carrollton	620
ST Microelectronics	Carrolton	1,450	General Aluminum Company of Texas	Carrollton	608
AT&T Call Center	Dallas	1,447	Allen Premium Outlets	Allen	600
Citigroup	Irving	1,430	Allied Electronics Inc.	Flower Mound	600
Baylor Healthcare Sys.-Irving	Irving	1,417	MHA Group	Irving	600
Abbott Laboratories	Irving	1,400	Express One International Inc.	Irving	580
Centex Home Equity Phase I & II	Lewisville	1,400	Home Intereiors	Carrollton	577
Novation LLC	Irving	1,400	United American Insurance	McKinney	564
VHA Inc.	Irving	1,400	Hoya Optical Laboratories	Lewisville	560
Xerox Corp.	Lewisville	1,381	Computer Associates	Plano	550
Central Freight Lines Inc.	Irving	1,330			

Source: North Central Texas Council of Governments

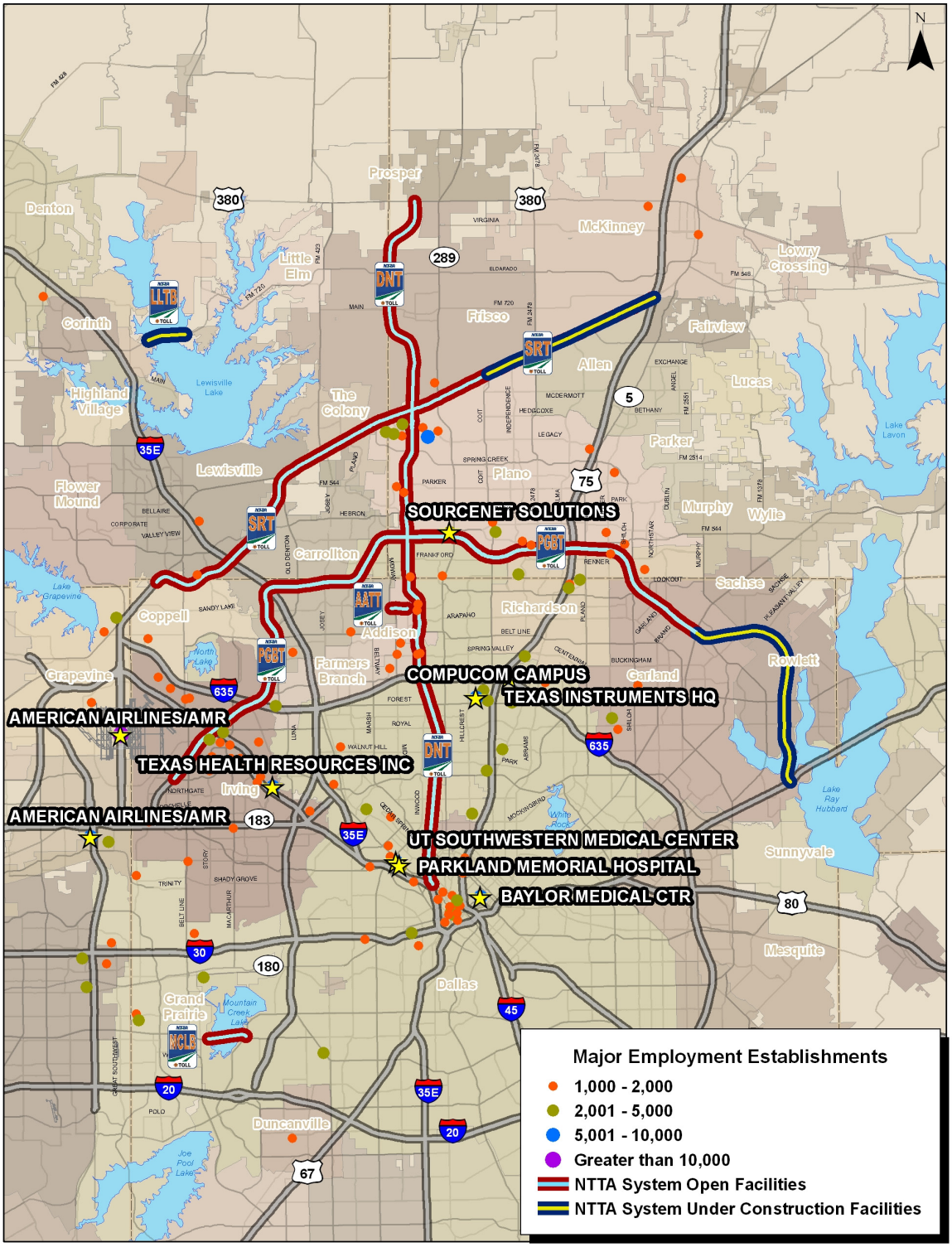

Figure 5-11. Major Employment Establishments

FUTURE POPULATION AND EMPLOYMENT ALONG THE CORRIDORS

Estimates of future population and employment growth between 2000 and 2030 for an approximate ten-mile corridor centered on the NTTAS facilities disaggregated at the Traffic Survey Zone (TSZ) level is highlighted in Figures 5-12 through 5-19.

Population Growth Estimates

The absolute population growth between 2000 and 2030 is presented in Figure 5-12. It is clear that the greatest amount of absolute population growth is expected in the northern part of the NTTAS area. Many of the zones surrounding the northern portion of the DNT and the SRT are expected to add more than 5,000 residents by 2030. Zones surrounding the LLTB are also expected to see a large amount of incremental growth. To the east of the PGBT, there are multiple zones that are expected to add more than 1,000 residents per zone.

Figure 5-13 illustrates the annual compounded population growth rate based on the NCTCOG official demographics. The vast majority of zones surrounding the NTTAS will experience an annual population growth rate of five percent or less. Zones surrounding the northern portion of the DNT and the SRT are expected to experience much higher growth rates.

Figures 5-14 and 5-15 show the population densities for TSZs within five miles of each NTTAS facility for the years 2000 and 2030 respectively. The population density reflects the number of residents per acre in each zone. Population density in many of the zones in the northern portion of the corridor is expected to experience a large increase in density between 2000 and 2030.

Employment Growth Estimates

The absolute employment growth between 2000 and 2030 is presented in Figure 5-16. The largest amount of incremental growth is expected in zones to the north of the DNT. Most of the zones surrounding the NTTAS are expected to experience incremental employment growth of up to 1,000 employees.

Figure 5-17 identifies the annual compounded growth rates for employment within the TSZs in the ten-mile NTTAS influence area based on NCTCOG official demographics. Again, the highest annual employment growth rates are expected in the northern portion of the NTTAS. Most of the zones in the central and southern areas of the NTTAS will experience an annual growth rate of five percent or less.

Figures 5-18 and 5-19 show the employment densities for TSZs within five miles of the NTTAS for the years 2000 and 2030 respectively. The employment density reflects the number of employees per acre in each zone. Employment density is expected to greatly increase by 2030 in zones in the central portion of the NTTAS.

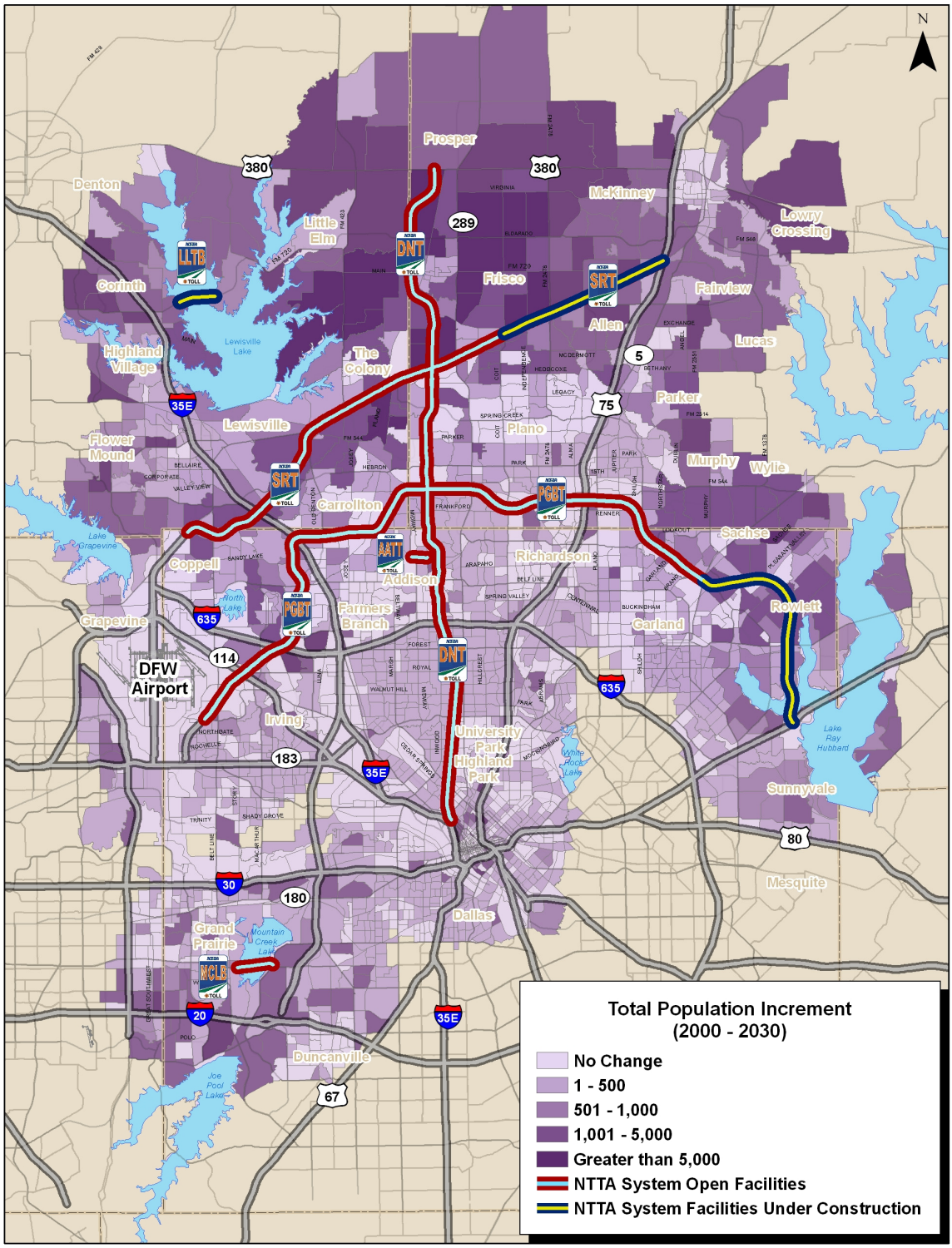

Figure 5-12. Total Population Increment (2000-2030)

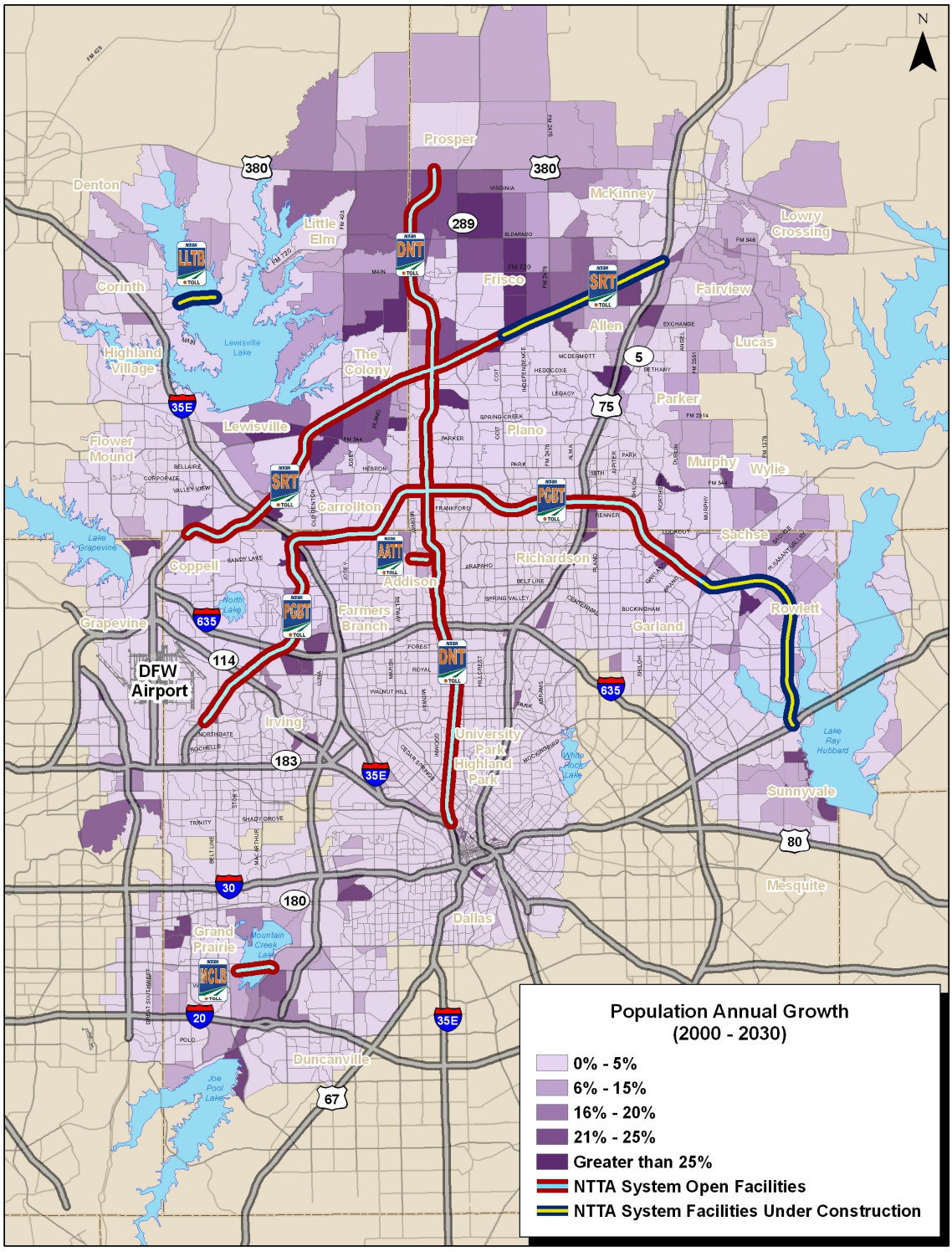

Figure 5-13. Population Annual Growth (2000-2030)

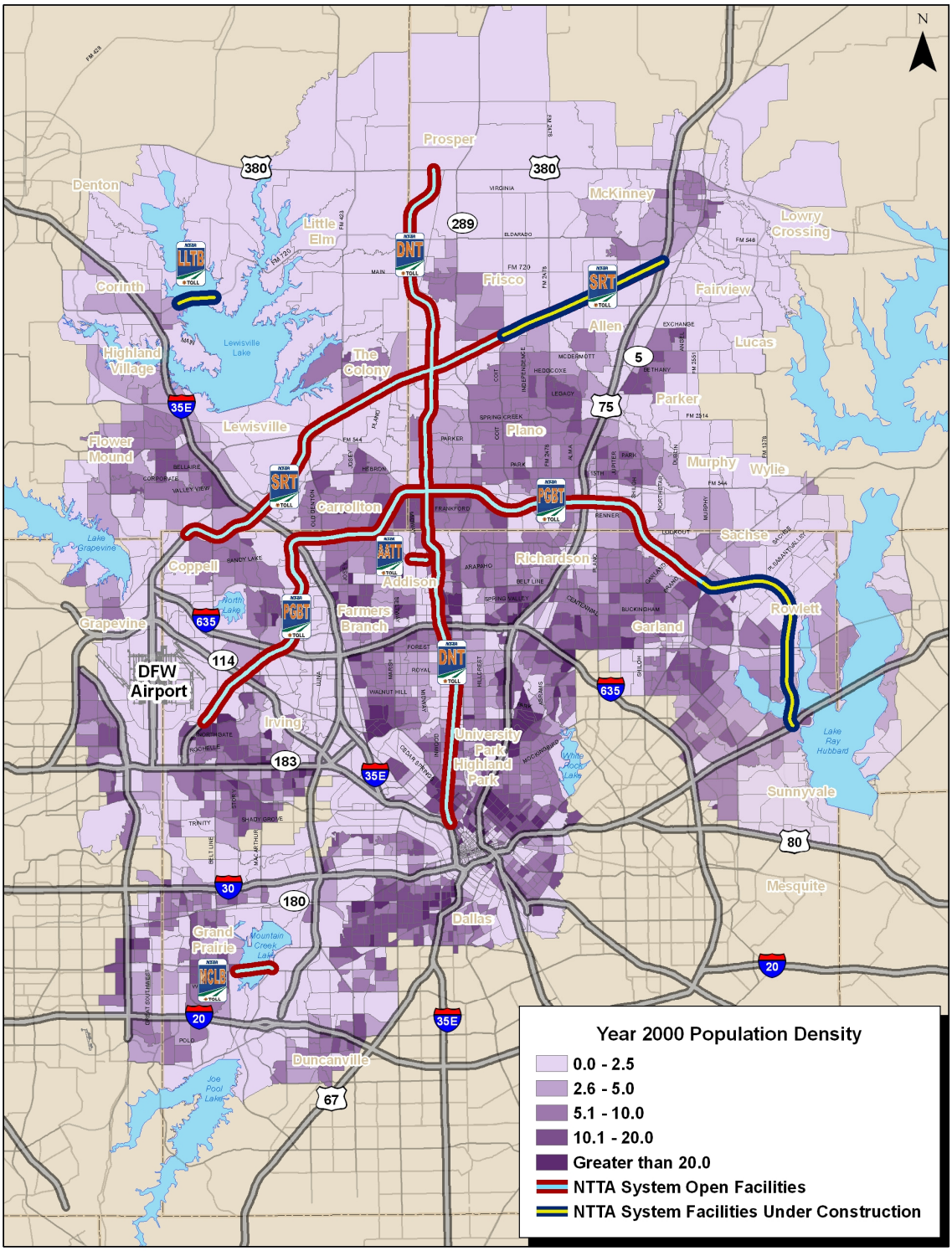

Figure 5-14. 2000 Population Density (residents/acre)

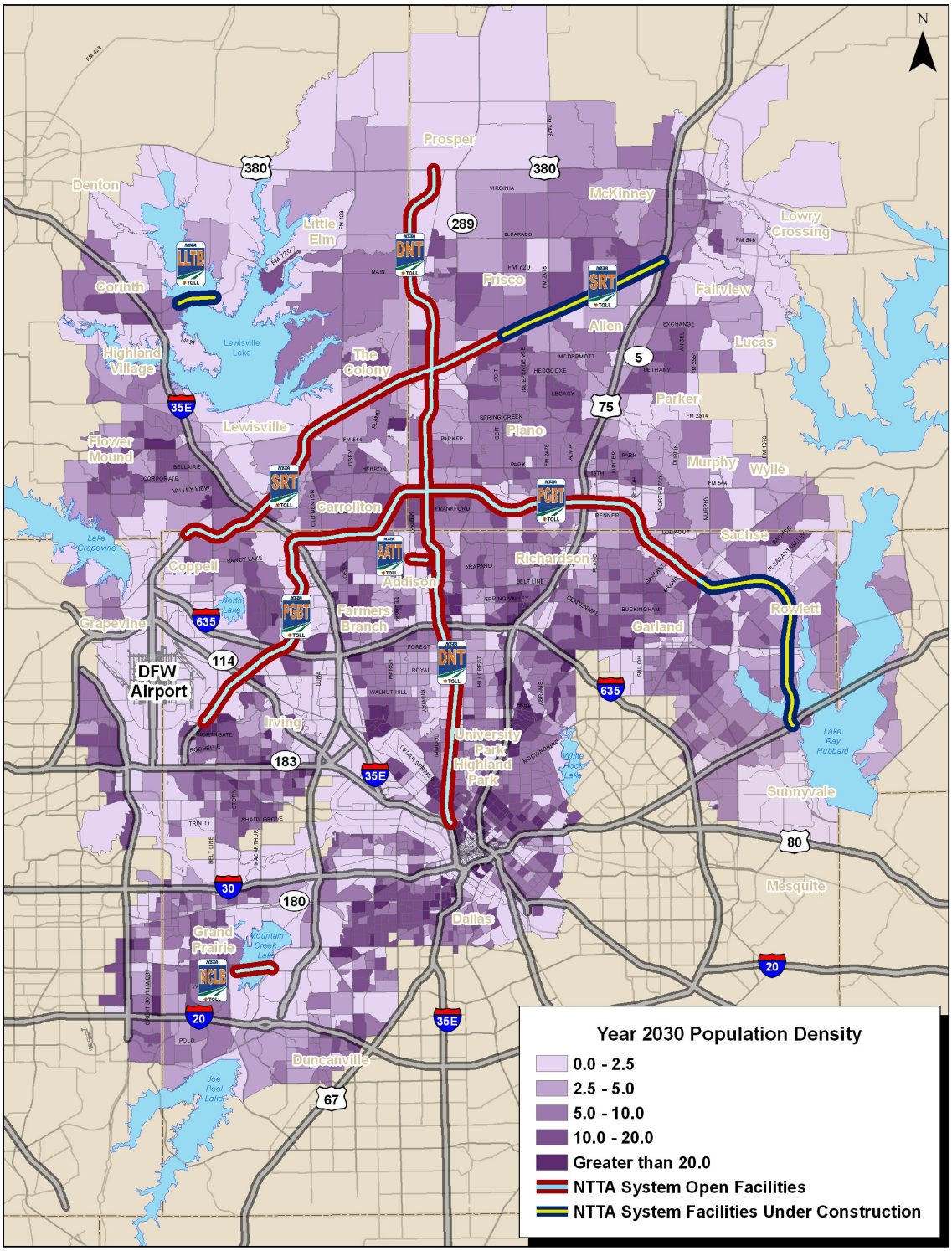

Figure 5-15. 2030 Population Density (residents/acre)

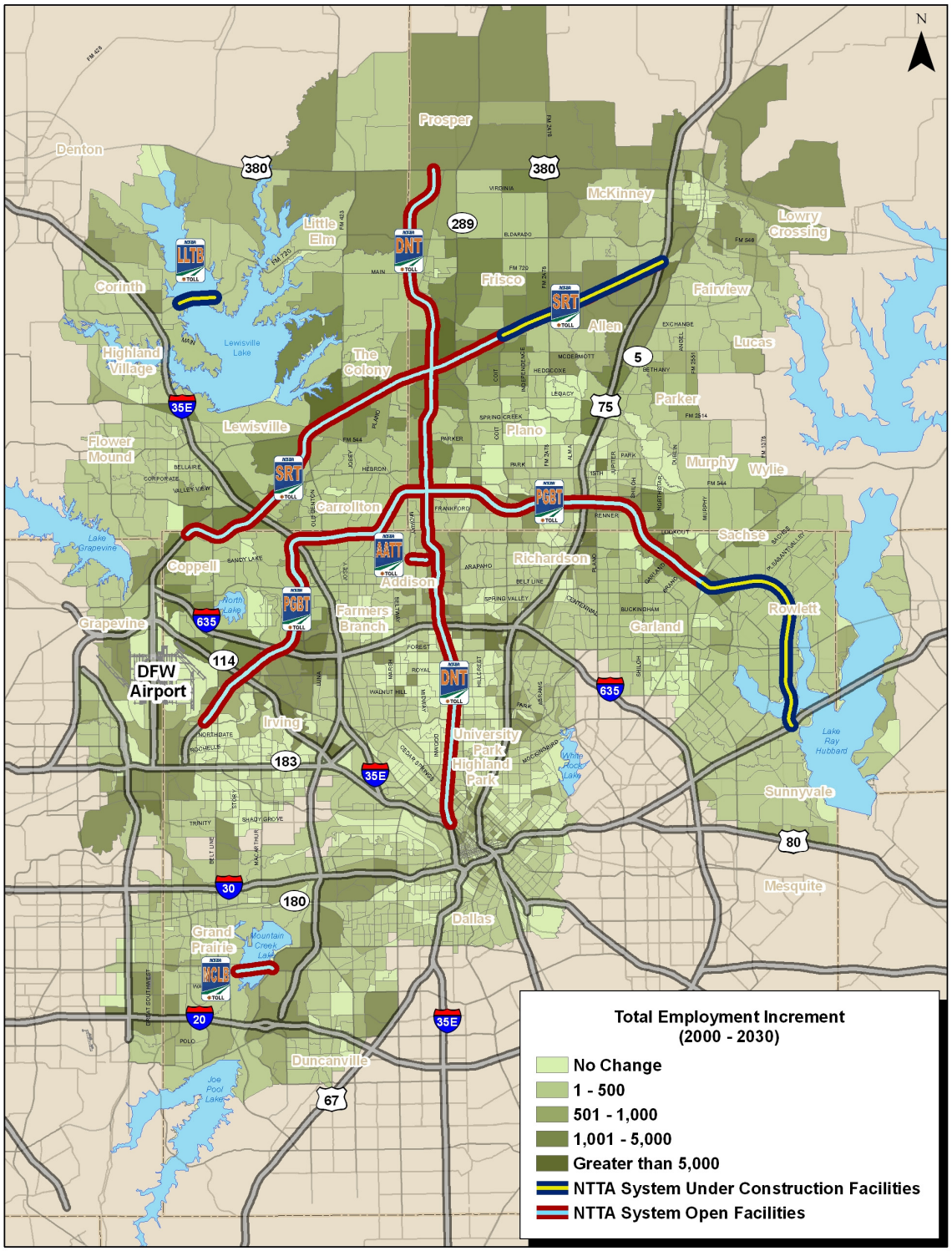

Figure 5-16. Total Employment Increment (2000-2030)

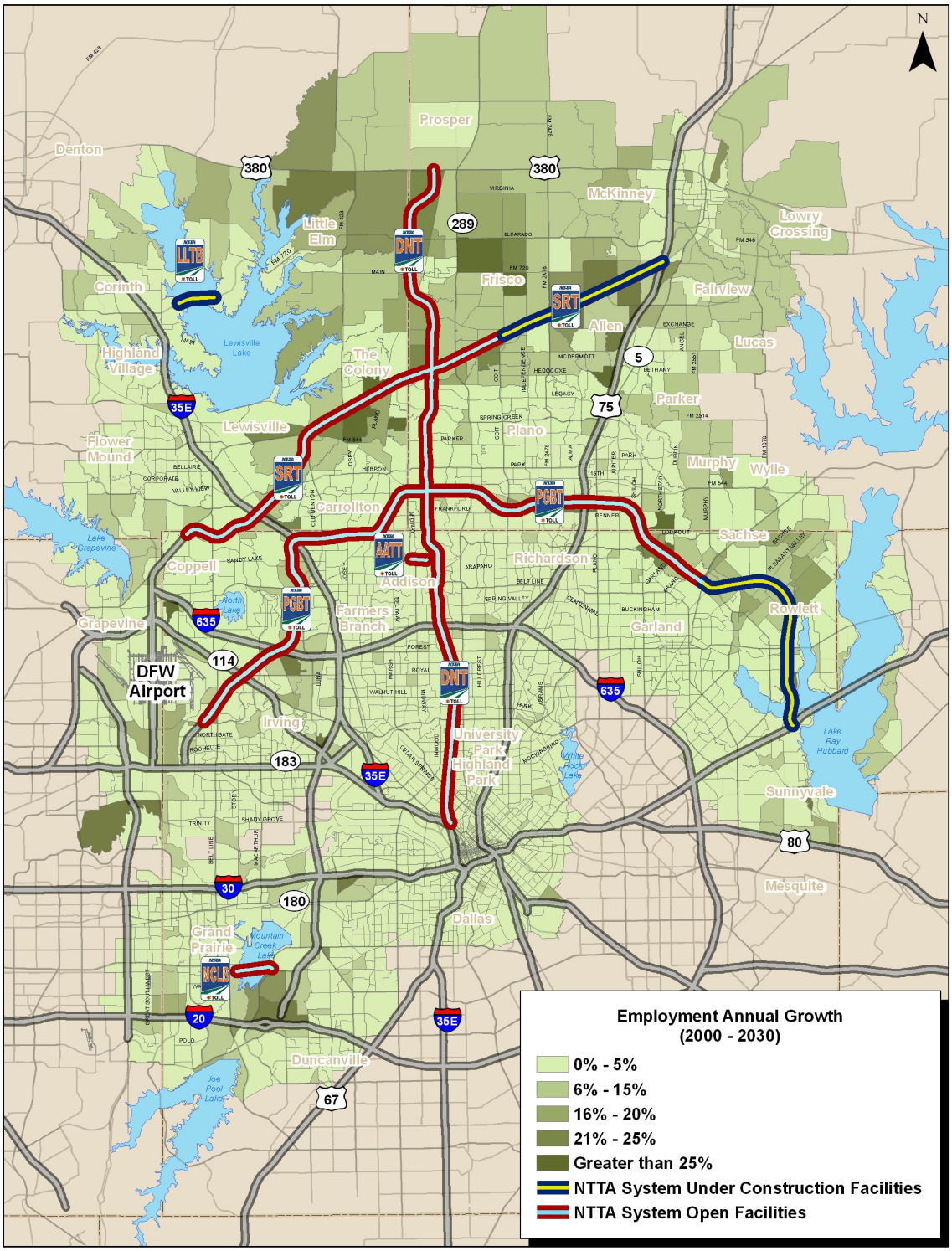

Figure 5-17. Employment Annual Growth (2000-2030)

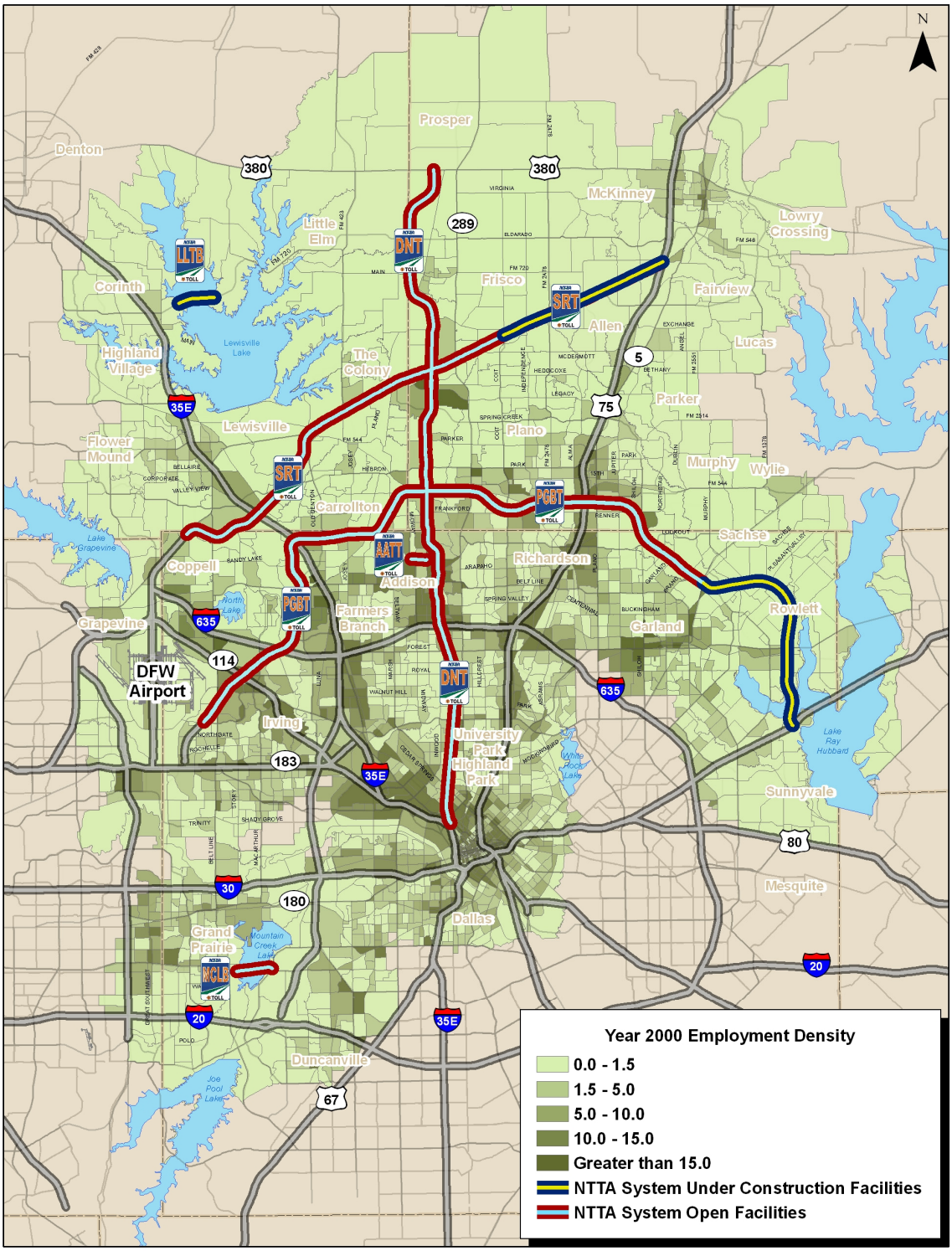

Figure 5-18. 2000 Employment Density (employment/acre)

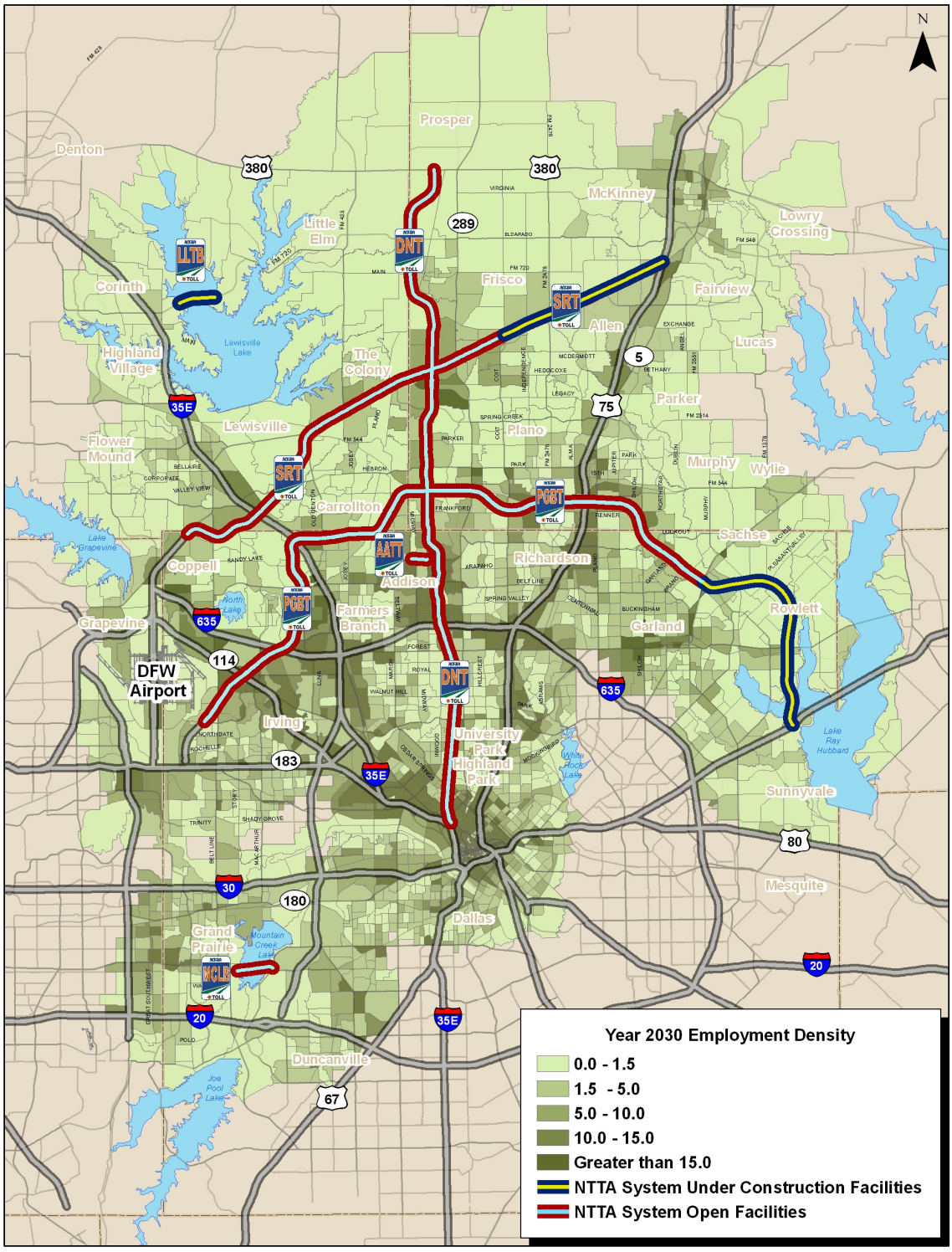

Figure 5-19. 2030 Employment Density (employment/acre)

SOCIOECONOMIC INDICATORS

CONSUMER PRICE INDEX

The consumer price index for all urban consumers (CPI-U) is the most widely used measure of inflation and serves as an economic indicator. The CPI-U determines the aggregate price level of a specific market basket of goods and services that are consumed by typical urban households. This is done by calculating the average going price of each item in the market basket. Food, clothing, housing, transportation (including tolls) and entertainment are all included in the basket. Not included are income taxes and investment items such as stocks and bonds. The Bureau of Labor and Statistics of the U.S. Department of Labor calculates the CPI-U every month.

$$CPI - U \ for \ a \ given \ time \ frame = \frac{Cost \ of \ market \ basket \ in \ given \ time \ frame}{Cost \ of \ market \ basket \ in \ base \ time \ frame} \times 100$$

The consumer price index for the base time frame (1982-1984) is 100. Inflation is determined by finding the percentage change in the CPI-U from one year to the next. Table 5-10 gives the historical trends for CPI-U from 1967-2008 for Dallas-Fort Worth, the Southern Region (Alabama, Arkansas, Delaware, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, Washington D.C., and West Virginia), and the United States. The CPI-U growth for all three regions is illustrated in Figure 5-20. The average annual growth rates for DFW CPI-U are depicted in Figure 5-21.

As indicated in Table 5-10, the CPI-U in Dallas-Fort Worth has continually increased at a similar rate to the CPI-Us for both the Southern Region and the United States. This indicates that the inflation rate in Dallas-Fort Worth is consistent with the rate of inflation seen nationwide. In Dallas-Fort Worth, the CPI-U has grown at an average annual rate of 4.6 percent per year since 1968, which is the same rate of growth experienced by the Southern Region during that time. It also appears as though CPI growth has slowed in recent years. Between 1998 and 2008, CPI-U grew at an average annual rate of 2.8 percent for Dallas-Fort Worth, the Southern Region, and the United States.

CPI-U data is available for months of January through May in the year 2009. The average CPI-U in Dallas-Fort Worth for the first five months in 2009 represents an average annual growth rate in CPI of 4.4 percent per year since 1969. Between 1999 and 2009 (average until May 2009), CPI-U grew at an average annual rate of 2.4 percent for Dallas-Fort Worth and the Southern Region.

Table 5-10
Consumer Price Index for All Urban Consumers
(1982-84 = 100.0)

Year	Dallas - Fort Worth	Growth	Southern Region	Growth	United States	Growth
1967	31.9	-----	32.6	-----	33.4	-----
1968	33.3	4.4%	34.0	4.3%	34.8	4.2%
1969	35.5	6.6%	36.0	5.9%	36.7	5.5%
1970	37.6	5.9%	37.9	5.3%	38.8	5.7%
1971	38.7	2.9%	39.5	4.2%	40.5	4.4%
1972	39.8	2.8%	40.7	3.0%	41.8	3.2%
1973	42.1	5.8%	43.3	6.4%	44.4	6.2%
1974	46.3	10.0%	48.6	12.2%	49.3	11.0%
1975	50.4	8.9%	53.3	9.7%	53.8	9.1%
1976	53.5	6.2%	56.3	5.6%	56.9	5.8%
1977	57.4	7.3%	60.0	6.6%	60.6	6.5%
1978	61.8	7.7%	65.0	8.3%	65.2	7.6%
1979	69.7	12.8%	72.4	11.4%	72.6	11.3%
1980	81.5	16.9%	81.9	13.1%	82.4	13.5%
1981	90.8	11.4%	90.7	10.7%	90.9	10.3%
1982	96.0	5.7%	96.5	6.4%	96.5	6.2%
1983	99.7	3.9%	99.7	3.3%	99.6	3.2%
1984	104.3	4.6%	103.8	4.1%	103.9	4.3%
1985	108.2	3.7%	107.1	3.2%	107.6	3.6%
1986	109.9	1.6%	108.9	1.7%	109.6	1.9%
1987	112.9	2.7%	112.4	3.2%	113.6	3.6%
1988	116.1	2.8%	116.4	3.6%	118.3	4.1%
1989	119.5	2.9%	121.5	4.4%	124.0	4.8%
1990	125.1	4.7%	127.9	5.3%	130.7	5.4%
1991	130.8	4.6%	132.9	3.9%	136.2	4.2%
1992	133.9	2.4%	136.5	2.7%	140.3	3.0%
1993	137.3	2.5%	140.8	3.2%	144.5	3.0%
1994	141.2	2.8%	144.7	2.8%	148.2	2.6%
1995	144.9	2.6%	149.0	3.0%	152.4	2.8%
1996	148.8	2.7%	153.6	3.1%	156.9	3.0%
1997	151.4	1.7%	156.9	2.1%	160.5	2.3%
1998	153.6	1.5%	158.9	1.3%	163.0	1.6%
1999	158.0	2.9%	162.0	2.0%	166.6	2.2%
2000	164.7	4.2%	167.2	3.2%	172.2	3.4%
2001	170.4	3.5%	171.1	2.3%	177.1	2.8%
2002	172.7	1.3%	173.3	1.3%	179.9	1.6%
2003	176.2	2.0%	177.3	2.3%	184.0	2.3%
2004	178.7	1.4%	181.8	2.5%	188.9	2.7%
2005	184.7	3.4%	188.3	3.6%	195.3	3.4%
2006	190.1	2.9%	194.7	3.4%	201.6	3.2%
2007	193.2	1.7%	200.4	2.9%	207.3	2.8%
2008	201.8	4.4%	208.7	4.2%	215.3	3.8%
2008 (Jan - May)	199.3	-----	206.9	-----	213.6	-----
2009 (Jan - May)	199.3	0.0%	205.9	-0.5%	212.6	-0.4%
Compounded Annual Growth Rate	**(1968-2008)** **(1998-2008)** **(1969-2009*)** **(1999-2009*)**	**4.6%** **2.8%** **4.4%** **2.4%**	**(1968-2008)** **(1998-2008)** **(1969-2009*)** **(1999-2009*)**	**4.6%** **2.8%** **4.5%** **2.4%**	**(1968-2008)** **(1998-2008)** **(1969-2009*)** **(1999-2009*)**	**4.7%** **2.8%** **4.5%** **2.5%**

* 2009 CPI is Average until May 2009

Source: Bureau of Labor Statistics (BLS)

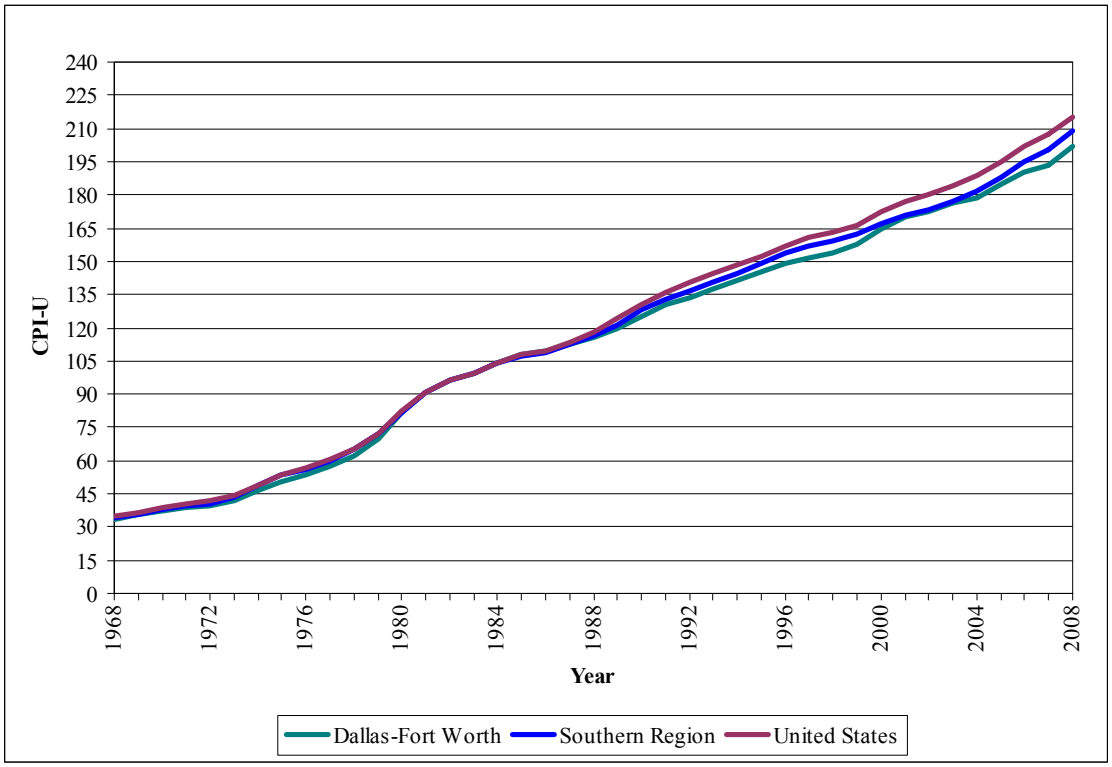

Figure 5-20. Consumer Price Index

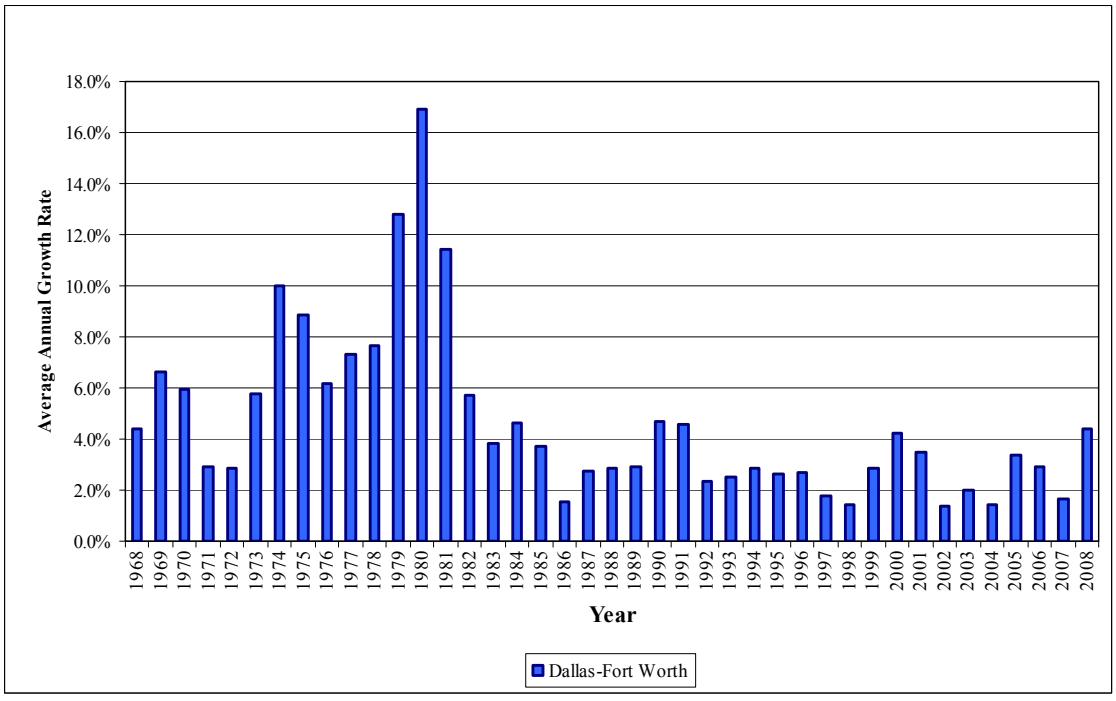

Figure 5-21. DFW CPI-U Average Annual Growth

TRENDS IN BUILDING PERMITS

The housing industry accounts for a large percentage of investment spending. Building permits are leading economic indicators as they help predict what the economy will be like in the future. Sustained declines in building permits slow the economy and can be indicative of a potential recession. Likewise, increases in this leading indicator can potentially indicate or trigger economic growth. Building permit activity provides insight into housing and overall economic activity in the upcoming months.

Building permit data is also useful for updating base year estimates that inform demographic forecasts. New homes being built indicate population growth in the area. Trends in residential building permits in Collin, Dallas and Denton Counties, the state of Texas, and the United States are presented in Table 5-11. In all cases, single-family building permits and housing starts have generally continued to grow from year to year with some exceptions. The issuance of multi-family building permits has exhibited the greatest degree of variability from year to year. Due to the current economic downturn, the number of building permits issued in the past couple of years has dropped significantly in Collin County, the State of Texas and the United States. A significant reduction in the number of building permits is seen in the first five months of 2009 as compared with the same period in 2008.

RESIDENTIAL HOUSING ACTIVITY

The number of homes that are sold and the amount of time that those homes are on the market indicate the strength of the economy. Sustained growth in the number of homes sold in combination with declining inventories indicates a strong housing market. Trends in residential housing activity, including the number of homes sold, the median price, and the average monthly inventories are presented for the Dallas Multiple Listing Service (MLS) area and the State of Texas in Table 5-12.

In 1990, homes stayed on the market for an average of 14.1 months in the Dallas MLS. By 2008, the average number of months of resale inventory had dropped to only 6.3 months. Similar numbers were seen for the State of Texas with an average of 11.6 months inventory in 1990 dropping to 6.6 months in 2008. However, it is important to note that although the number of months is much lower than in 1990, an upward trend has been experienced in recent years.

The number of homes sold in the Dallas MLS increased at an average annual rate of 6.1 percent from 1990 to 2008 while the median price of homes sold increased at an average annual rate of 3.3 percent. In Texas, the number of homes sold increased at an average annual rate of 4.8 percent and the median price increased at an average annual rate of 4.3 percent. A significant reduction in the number of homes sold can be seen between the first five months of 2008 and 2009, due to the current economic downturn.

Table 5-11
Historical Trends in Single and Multi-Family Building Permits

Year	Collin County			Dallas County			Denton County			Texas			United States		
	Single Family	Multi Family	Total	Single Family	Multi Family	Total	Single Family	Multi Family	Total	Single Family	Multi Family	Total	Single Family	Multi Family	Total
1980	1,684	664	2,348	8,275	9,147	17,422	955	480	1,435	67,870	60,445	128,315	730,067	484,738	1,214,805
1981	1,662	186	1,848	6,354	9,814	16,168	839	527	1,366	66,161	70,310	136,471	581,913	425,682	1,007,595
1982	1,850	1,492	3,342	8,901	22,739	31,640	1,239	672	1,911	78,714	123,956	202,670	562,359	458,973	1,021,332
1983	3,542	2,104	5,646	14,744	45,341	60,085	2,342	3,723	6,065	103,252	175,965	279,217	922,751	708,867	1,631,618
1984	3,495	2,212	5,707	13,480	25,197	38,677	2,479	3,008	5,487	84,565	110,867	195,432	930,174	760,399	1,690,573
1985	2,974	1,762	4,736	13,477	23,541	37,018	2,784	1,862	4,646	67,964	73,229	141,193	931782	761,200	1,692,982
1986	2,520	637	3,157	11,962	15,529	27,491	2,305	914	3,219	59,143	37,620	96,763	1,088,281	693,290	1,781,571
1987	2,123	342	2,465	8,388	1,558	9,946	1,472	429	1,901	43,975	6,506	50,481	1,036,924	511,796	1,548,720
1988	2,326	329	2,655	5,282	988	6,270	1,057	10	1,067	35,908	4,598	40,506	1,005,872	463,338	1,469,210
1989	2,170	0	2,170	5,355	460	5,815	1,188	4	1,192	36,658	4,656	41,314	945,629	409,424	1,355,053
1990	2,658	1,680	4,338	5,640	3,199	8,839	1,241	17	1,258	38,233	8,962	47,195	809,474	320,128	1,129,602
1991	2,962	817	3,779	6,032	2,199	8,231	1,783	13	1,796	46,209	10,298	56,507	784,150	199,138	983,288
1992	4,373	418	4,791	7,410	1,371	8,781	2,339	32	2,371	59,543	9,514	69,057	949,197	187,573	1,136,770
1993	5,174	505	5,679	7,312	3,873	11,185	2,616	2	2,618	69,964	15,545	85,509	1,025,816	220,282	1,246,098
1994	5,708	2,788	8,496	6,391	6,276	12,667	2,985	1,056	4,041	70,452	32,237	102,689	1,080,591	305,148	1,385,739
1995	5,386	1,662	7,048	6,063	9,045	15,108	3,385	729	4,114	70,421	34,684	105,105	1,009,842	338,268	1,348,110
1996	6,513	2,032	8,545	6,630	6,535	13,165	3,913	1,854	5,767	83,132	35,720	118,852	1,083,063	359,830	1,442,893
1997	7,198	4,361	11,559	7,065	7,436	14,501	4,085	1,764	5,849	82,228	43,794	126,022	1,074,746	384,003	1,458,749
1998	8,031	5,372	13,403	8,367	8,933	17,300	5,005	2,246	7,251	99,912	56,918	156,830	1,198,695	428,211	1,626,906
1999	7,704	4,396	12,100	8,392	6,545	14,937	5,222	1,511	6,733	101,928	44,716	146,644	1,258,527	421,150	1,679,677
2000	9,621	490	10,111	8,856	4,889	13,745	5,245	544	5,789	108,782	32,620	141,402	1,212,076	400,234	1,612,310
2001	9,657	1,761	11,418	8,334	5,505	13,839	5,430	1,734	7,164	111,915	38,427	150,342	1,235,550	401,126	1,636,676
2002	9,685	732	10,417	8,006	7,324	15,330	4,492	1,406	5,898	122,913	42,409	165,322	1,350,718	420,904	1,771,622
2003	10,434	649	11,083	9,293	6,155	15,448	4,126	1,878	6,004	137,493	43,081	180,574	1,473,036	428,856	1,901,892
2004	11,079	1,011	12,090	10,046	3,251	13,297	6,461	985	7,446	151,384	39,796	191,180	1,616,600	456,737	2,073,337
2005	12,558	1,286	13,844	10,520	3,884	14,404	3,816	1,449	5,265	166,203	44,431	210,634	1,676,334	471,770	2,148,104
2006	11,580	2,746	14,326	9,941	5,615	15,556	3,157	326	3,483	163,032	53,894	216,926	1,381,853	460,695	1,842,548
2007	6,726	3,168	9,894	6,353	6,868	13,221	3,873	1,379	5,252	120,366	58,542	178,908	985,621	418,755	1,404,376
2008	4,053	2,502	6,555	3,690	10,606	14,296	3,060	1,635	4,695	81,107	49,897	131,004	577,487	329,805	907,292
2008 (Jan-May)	2,006	606	2,612	1,884	5,126	7,010	762	1,043	1,805	37,165	23,718	60,883	243,286	134,523	377,809
2009 (Jan-May)	981	1,020	2,001	975	1,009	1,984	539	1,002	1,541	23,755	9,041	32,796	139,272	55,633	194,905
CAGR [1]	3.2%	4.9%	3.7%	-2.8%	0.5%	-0.7%	4.2%	4.5%	4.3%	0.6%	-0.7%	0.1%	-0.8%	-1.4%	-1.0%
CAGR [2]	-6.6%	-7.4%	-6.9%	-7.9%	1.7%	-1.9%	-4.8%	-3.1%	-4.3%	-2.1%	-1.3%	-1.8%	-7.0%	-2.6%	-5.7%
CAGR [3]	-51.1%	68.3%	-23.4%	-48.2%	-80.3%	-71.7%	-29.3%	-3.9%	-14.6%	-36.1%	-61.9%	-46.1%	-42.8%	-58.6%	-48.4%

[1] Compounded Annual Growth Rate (1980-2008)
[2] Compounded Annual Growth Rate (1998-2008)
[3] Compounded Annual Growth Rate (2008 - 2009)
Source: Real Estate Center at Texas A&M University

Table 5-12
Residential Housing Activity
Home Sale and Market Inventory Trends

Year	Dallas Multiple Listing Service Area			State of Texas		
	Number of Homes Sold	Average Months Inventory [1]	Median Price	Number of Homes Sold	Average Months Inventory [1]	Median Price
1990	17,528	14.1	$86,100	100,047	11.6	$68,100
1991	16,858	13.8	$86,000	99,619	10.5	$71,200
1992	19,742	11.3	$88,800	107,107	9.6	$75,200
1993	21,406	9.2	$91,800	116,604	8.5	$78,200
1994	22,999	7.8	$92,700	122,134	7.0	$80,000
1995	24,968	7.8	$94,900	121,823	7.6	$81,600
1996	30,128	6.3	$101,500	138,123	7.3	$86,400
1997	33,884	5.3	$107,400	146,395	6.8	$90,600
1998	40,051	4.1	$116,100	170,638	5.2	$96,200
1999	43,199	4.0	$121,400	184,056	4.6	$100,900
2000	45,446	3.8	$134,300	188,738	4.5	$112,100
2001	46,992	4.6	$141,500	196,401	5.1	$119,400
2002	47,199	5.5	$144,900	201,528	5.4	$124,500
2003	49,278	6.5	$148,500	216,099	6.1	$127,700
2004	54,514	6.3	$149,600	240,895	5.9	$130,000
2005	59,980	5.8	$154,800	266,193	5.4	$136,800
2006	61,825	5.7	$156,450	288,268	5.0	$141,500
2007	59,695	6.0	$158,892	275,584	5.6	$146,650
2008	50,693	6.3	$154,650	232,148	6.6	$145,775
2008 (Jan-May)	21,533	6.2	$154,650	98,559	6.3	$140,985
2009 (Jan-May)	16,497	6.5	$149,560	76,412	7.0	$127,511
ACGR [2]	6.1%	***	3.3%	4.8%	***	4.3%
AGR [3]	-23.4%	***	-3.3%	-22.5%	***	-9.6%

[1] Average number of months homes are on the market.
[2] Annual Compounded Growth Rate (1990 - 2008)
[3] Annual Growth Rate (2008 - 2009)

Source: Real Estate Center at Texas A&M University

INDEPENDENT CORRIDOR GROWTH REVIEW

The Dallas/Fort Worth combined metropolitan statistical area (CMSA) is a dynamic, rapidly growing economic region of Texas that is experiencing strong growth in both population and employment. Given the high growth in the DFW region, WSA observed that the forecast from NCTCOG's previous Mobility Plans typically under-predict the actual growth in the demographics of the region. Table 5-13 below shows the comparison of NCTCOG's population forecast from the Mobility 2030 Plan and NCTCOG's annual population estimates. The 2007, 2008 and 2009 population forecasts as shown in Table 5-13 are obtained by interpolating 2005 and 2010 population forecasts made as part of NCTCOG's 2030 Demographic Forecast in 2003. NCTCOG develops the population estimates each year based on the current housing inventories for each city in the NCTCOG region with population of 1,000 or more.

NTTAS toll facilities are currently located in Dallas, Denton and Collin counties. As seen in Table 5-13, NCTCOG's 2007 Population estimates were higher than 2007 population forecast for all the counties except for Dallas and Ellis counties. In years 2008 and 2009, population estimates were higher than the forecasts for all the counties except for Ellis county. As can be seen, population estimates for the nine county urban area for 2009 are higher than the 2010 forecasts. This shows that the region has been growing at a faster rate than NCTCOG forecasted in 2003.

Table 5-13

Population Comparison (Forecast and Estimates)

County	2007 Population Estimates**	2007 Forecast*	2008 Population Estimates**	2008 Forecast*	2009 Population Estimates**	2009 Forecast*	2010 Forecast
Collin	724,900	691,236	748,050	710,605	764,500	729,974	749,343
Dallas	2,417,650	2,429,090	2,451,800	2,448,390	2,471,000	2,467,689	2,486,989
Denton	599,350	585,021	614,650	604,538	628,300	624,055	643,572
Ellis	144,500	156,115	147,850	164,282	152,750	172,450	180,617
Johnson	155,900	152,813	159,750	157,461	162,650	162,110	166,759
Kaufman	98,350	86,055	102,550	88,943	104,850	91,831	94,719
Parker	116,200	103,838	120,300	107,942	123,950	112,047	116,151
Rockwall	73,500	64,930	76,000	69,340	77,950	73,751	78,162
Tarrant	1,745,050	1,670,889	1,780,150	1,695,954	1,807,750	1,721,018	1,746,082
Wise	63,050	60,021	64,500	61,943	66,100	63,865	65,787
Nine County Urban Area* **	6,075,400	5,939,986	6,201,100	6,047,456	6,293,700	6,154,925	6,262,394

* Interpolated between 2005 and 2010 Population projections from NCTCOG 2030 Demographic Forecast done in the year 2003

** Population estimates published by NCTCOG every year

*** Nine county urban area includes Collin, Dallas, Denton, Ellis, Johnson, Kaufman, Parker, Rockwall, Tarrant

Source: NCTCOG

To assist with an independent assessment of future employment and population along the project corridors, Wilbur Smith Associates (WSA) engaged Insight Research Corporation (IRC), Research and Demographic Solutions (RDS) and Weinstein Clower and Associates (WCA) to perform independent economic reviews and development updates along the NTTAS and other corridors. The following were the studies performed by IRC, RDS and WCA along the various corridors:

- Independent economic reviews were performed along the DNT, PGBT, AATT, MCLB and PGBT EE corridors by Insight Research Corporation

(IRC) in April 2004. The results of these reviews are documented in the report, "Investment-Grade Traffic and Revenue Study: DNT System", dated July 2004;

- An independent economic review was performed by IRC along the Lewisville Lake Toll Bridge (LLTB) corridor in November 2005. The findings of this report are presented in the draft report "Investment Grade Traffic and Toll Revenue Study: Lewisville Lake Toll Bridge", dated March 2006; and
- IRC performed an independent economic review along the Southwest Parkway/Chisholm Trail Parkway (SWP/CTP) corridor in March 2006. The findings of the economic review are included in the draft report "SH121 Southwest Parkway Traffic and Toll Revenue Investment Grade Study Independent Economic Overview and Development Updates", dated March 2006;
- IRC performed an independent economic review update along the SRT corridor in August 2007. This was done to update the independent economic review performed by IRC along the SRT in July 2006. A larger study area along the SRT corridor was considered by IRC in the 2007 study.
- IRC performed an independent economic review along the SH 161 corridor in March 2008. The findings of the economic review are included in the draft report "Investment Grade Traffic and Toll Revenue Study: SH 161", dated October 2008;
- Research and Demographic Solutions (RDS) and Weinstein, Clower and Associates (WCA) performed an independent economic review along the Trinity Parkway corridor in December 2008. This in included in the draft report "Trinity Parkway Independent Economic Review".
- WSA hired WCA in early 2009 to review the revised demographic forecasts that were developed along the DNT, PGBT, AATT, MCLB, PGBT EE, LLTB, SRT, SH 161, SWP/CTP and Trinity Parkway corridors as described above to estimate the impacts of the current economic downturn on the demographic growth along the NTTAS corridors. WCA provided an assessment of recent economic trends in the North Central Texas region as well as an updated assessment of future growth in key demographic and socio-economic characteristics. WCA also assessed the impact of national economic trends on the North Texas economy and the regional economy's resilience to financial shocks, key national policies, such as immigration, and prospects for future growth in an increasingly global marketplace. WCA's demographics review report is included as an appendix at the end of this report.

The qualifier "official" is used to refer to the NCTCOG demographics datasets, which were prepared by NCTCOG in 2003. The "probable" population and employment forecasts made by IRC, RDS and WCA to update the NCTCOG official demographics

datasets along the NTTAS and other corridors are referred to as the "revised" demographic datasets. The revised demographics datasets reflect changes to the socioeconomic trends that have occurred or have been announced since the development of the official demographics datasets in 2003.

Based on the recommendations of WCA's report included as an appendix at the end of this report, WSA applied a "lag" to the revised demographics along the SRT, SH 161 and Trinity Parkway corridors as shown in Figure 5-22. The lag was applied to 2009 and 2019 revised demographics. As shown in Figure 5-22 a two year lag was applied to revised demographics along SRT and SH 161 corridor, a one year lag was applied along the Trinity Parkway corridor and no lag was applied along DNT, PGBT, LLTB, PGBT EE, AATT and MCLB corridors.

Tables 5-14 and 5-15 show comparisons of the official and revised demographic (population and total employment) projections for the NTTAS corridors and the region for years 2009, 2019, 2025 and 2030. The revised population and employment estimates are higher than NCTCOG official demographics for all years with one exception. The revised employment for 2009 is slightly lower than the official projection.

Figures 5-23 and 5-24 illustrate the zones in the NTTAS corridors whose socio-economic characteristics were modified based on the independent economic reviews that were done by IRC along the NTTAS corridors. Figure 5-23 shows the difference between revised and official population for years 2019 and 2030. The revised demographics included for year 2019 in Figure 5-23 consider the lag in the demographics described above. In both 2019 and 2030, the biggest differences between the revised and official demographics are seen north of SRT. The revised demographics show a population difference of greater than 1,000 residents in many zones north of the SRT corridor. Figure 5-24 illustrates the difference between revised and official employment for the years 2019 and 2030. As can be seen, the largest differences are seen between the official and revised employment in zones north of the SRT corridor.

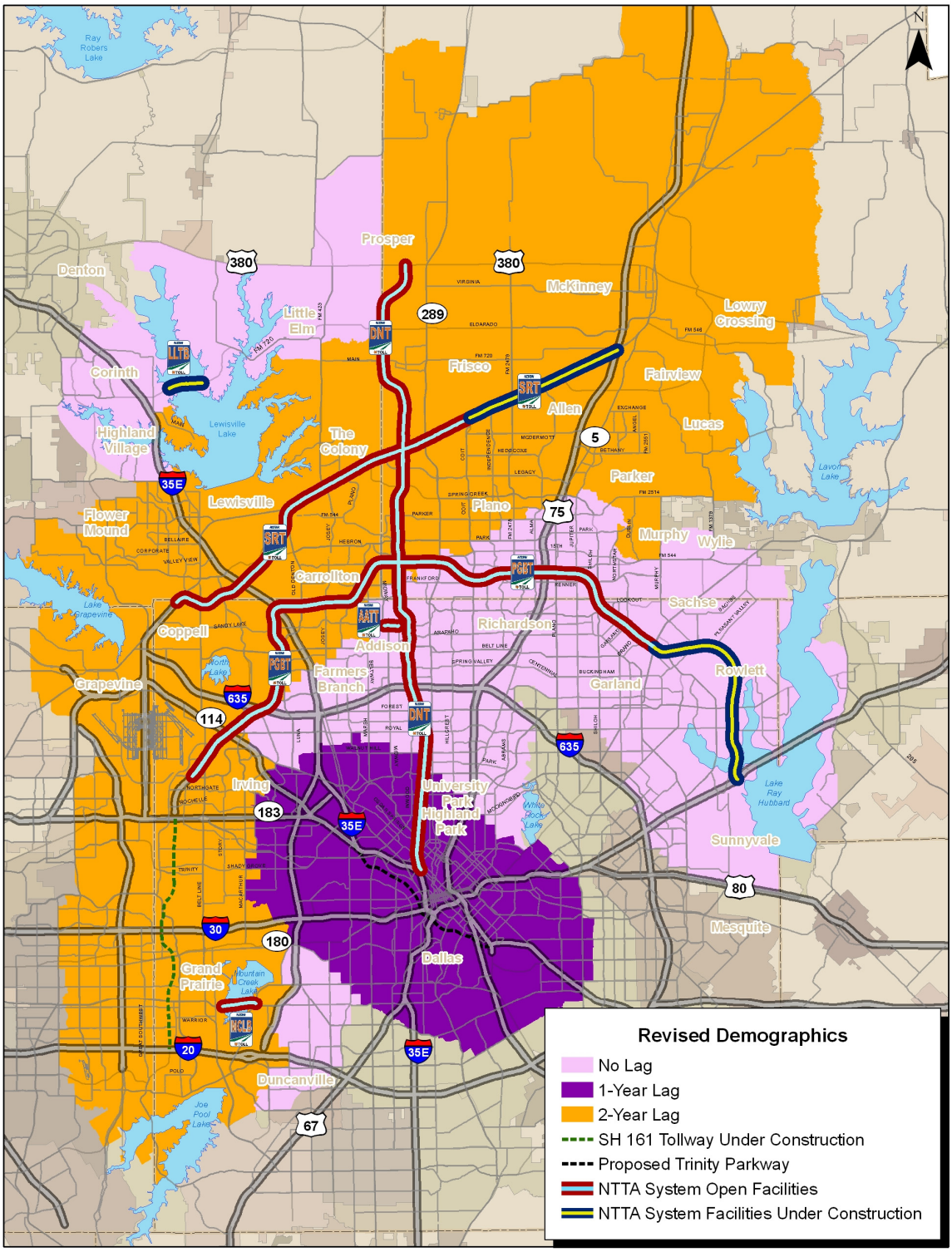

Figure 5-22. Lag Applied to Revised Demographics

Table 5-14
Comparison of Official and Revised Population Projections

Year	Collin County		Dallas County		Denton County		Rockwall County		Tarrant County		NCTCOG Region	
	Official	Revised	Official	Revised	Official	Revised	Official	Revised	Official	Revised	Official	Revised
2009	746,932	772,622*	2,484,677	2,522,025*	641,148	684,947*	77,611	77,505*	1,743,019	1,772,204*	6,062,803	6,203,897*
2019	938,306	1,094,775*	2,631,983	2,788,618*	863,040	953,479*	117,598	117,350*	2,044,012	2,136,180*	7,226,427	7,735,077*
2025	1,067,880	1,270,561	2,758,816	2,976,227	1,006,128	1,100,993	134,710	134,710	2,203,585	2,320,116	7,952,070	8,597,932
2030	1,187,606	1,390,286	2,829,580	3,089,170	1,102,151	1,197,018	147,151	147,151	2,310,439	2,426,970	8,503,146	9,191,188
ACGR [1]	2.3%	3.5%	0.6%	1.0%	3.0%	3.4%	4.2%	4.2%	1.6%	1.9%	1.8%	2.2%
ACGR [2]	2.2%	2.8%	0.6%	1.0%	2.6%	2.7%	3.1%	3.1%	1.4%	1.5%	1.6%	1.9%

[1] Annual Compounded Growth Rate (2009-2019)
[2] Annual Compounded Growth Rate (2009-2030)
* Revised Demographics with Lag

Source: NCTCOG, Insight Research Corporation

Table 5-15
Comparison of Official and Revised Employment Projections

Year	Collin County		Dallas County		Denton County		Rockwall County		Tarrant County		NCTCOG Region	
	Official	Revised	Official	Revised	Official	Revised	Official	Revised	Official	Revised	Official	Revised
2009	291,456	342,572*	2,052,703	1,995,088*	227,394	243,208*	22,915	22,926*	1,072,516	1081301*	3,793,700	3,767,273*
2019	402,356	600,155*	2,337,710	2,280,602*	320,730	358,728*	29,721	29,773*	1,257,044	1328116*	4,528,161	4,787,079*
2025	467,244	698,957	2,478,453	2,458,954	367,072	407,452	39,389	39,389	1,345,444	1,434,413	4,942,963	5,289,156
2030	527,853	759,665	2,540,076	2,543,346	423,293	463,590	50,390	50,390	1,393,459	1,482,391	5,256,667	5,625,651
ACGR [1]	3.3%	5.8%	1.3%	1.3%	3.5%	4.0%	2.6%	2.6%	1.6%	2.1%	1.8%	2.4%
ACGR [2]	2.9%	3.9%	1.0%	1.2%	3.0%	3.1%	3.8%	3.8%	1.3%	1.5%	1.6%	1.9%

[1] Annual Compounded Growth Rate (2009-2019)
[2] Annual Compounded Growth Rate (2009-2030)
* Revised Demographics with Lag

Source: NCTCOG, Insight Research Corporation

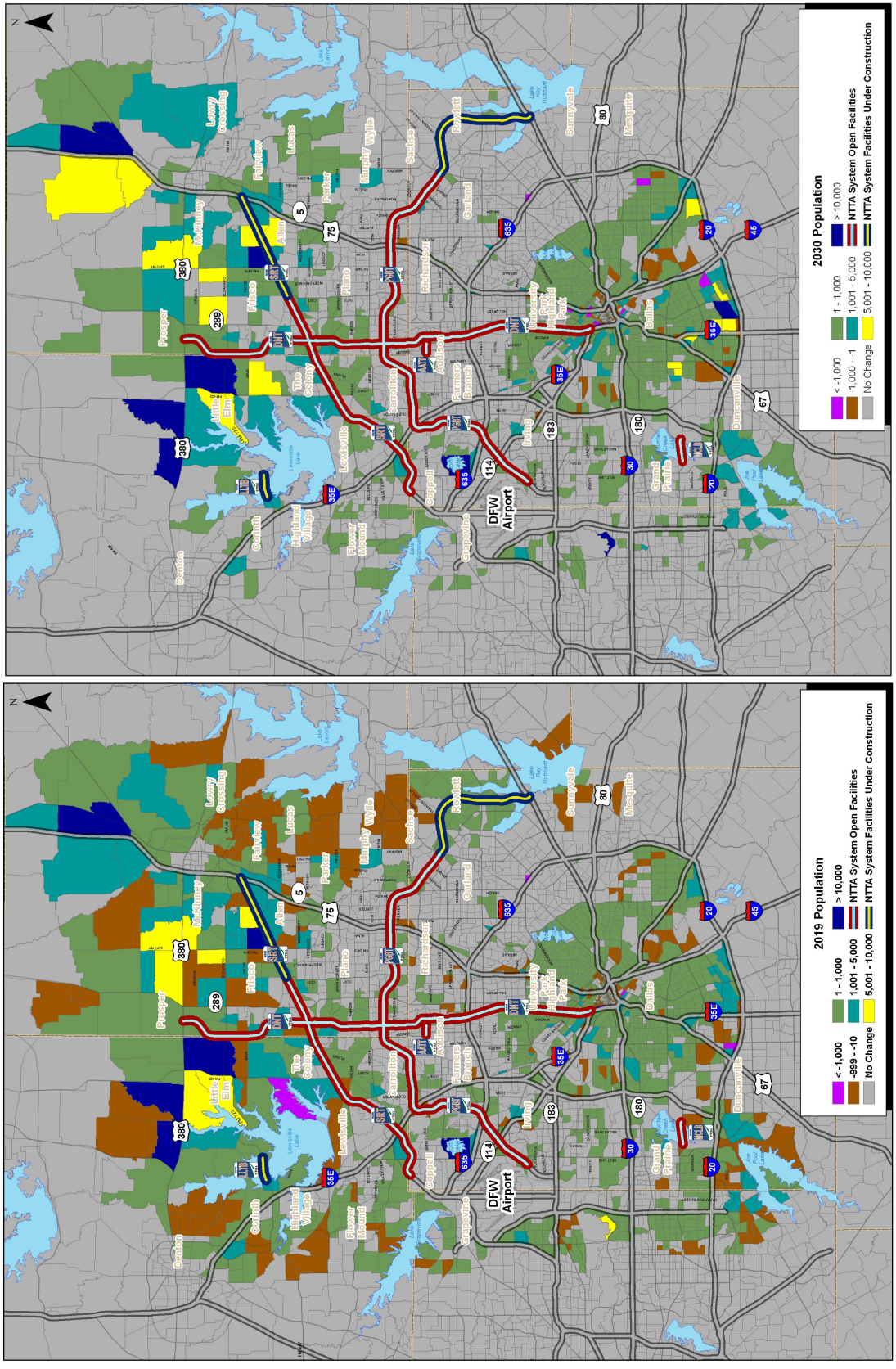

Figure 5-23. Difference between Revised and Official Population (2019 Revised Population is with Lag)

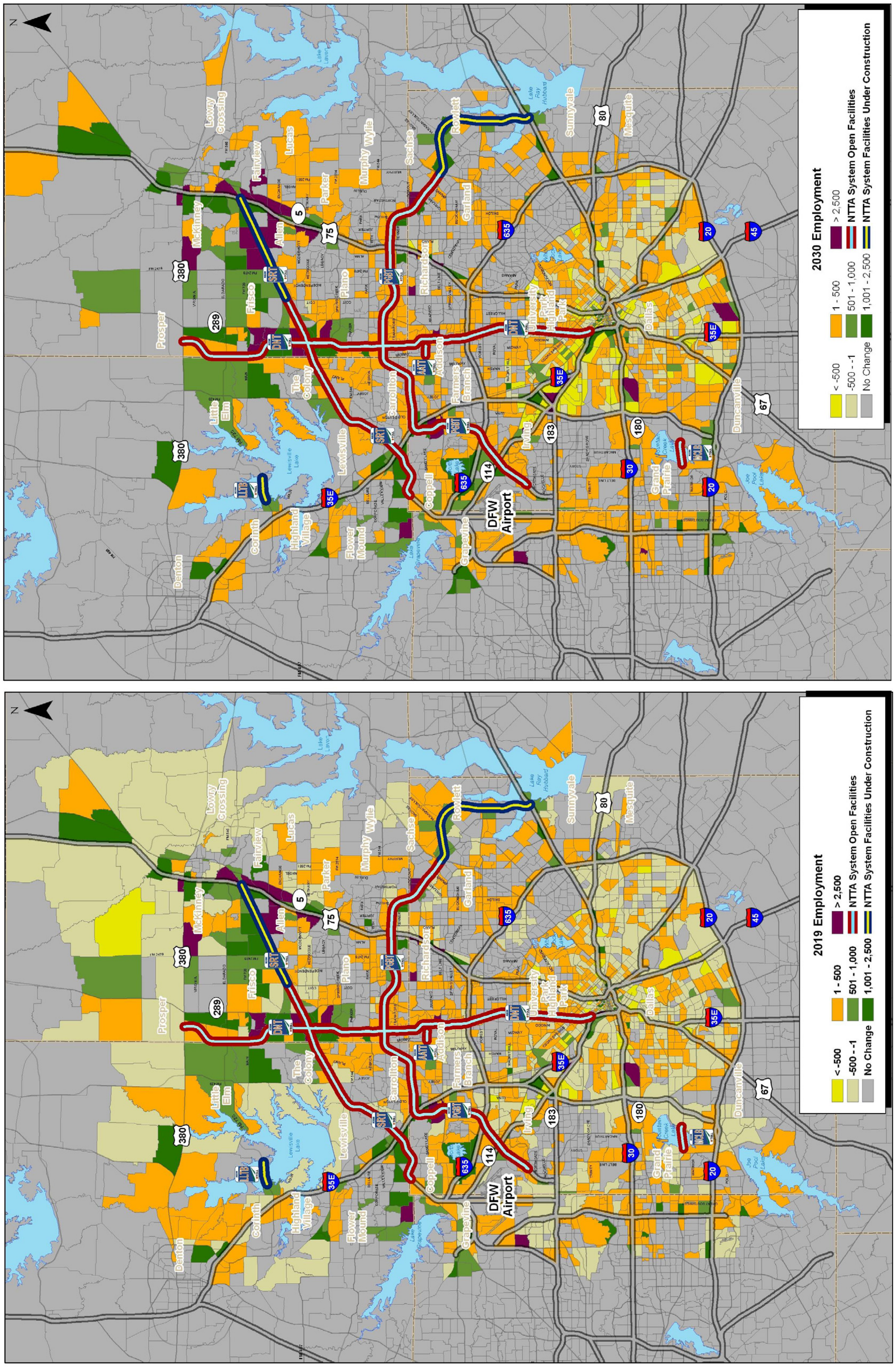

Figure 5-24. Difference between Revised and Official Employment (2019 Revised Employment is with Lag)

CHAPTER 6

TRAVEL DEMAND MODEL DEVELOPMENT

This chapter describes the travel demand model calibration and validation process, including database modifications and updates to the TransCAD network and socio-economic characteristics near the North Texas Tollway Authority System (NTTAS). Figure 6-1 illustrates the travel demand methodology used by WSA for developing the traffic and toll revenue forecasts for the NTTAS that is consistent with previous analyses done by WSA in the Dallas/Fort Worth area.

NCTCOG INFORMATION

For this study, the latest travel demand model information was obtained from the North Central Texas Council of Governments (NCTCOG). This includes the latest approved databases from the MTP 2030-2009 Update. The data includes:

- NCTCOG 4,874-zone TransCAD network structure
- Highway network characteristics for the years 2009, 2019, 2025 and 2030
- Socioeconomic information at the 4,874-zone Traffic Analysis Process (TAP) level for the years 2009, 2019, 2025 and 2030
- Trip tables for single occupant vehicles, high-occupancy vehicles, and trucks for years 2009, 2019, 2025 and 2030. These trip tables were provided for the AM peak (6:30 to 9:00 AM), PM peak (3:00 to 6:30 PM), and off-peak (9:00 AM to 3:00 PM and 6:30 PM to 6:30 AM)

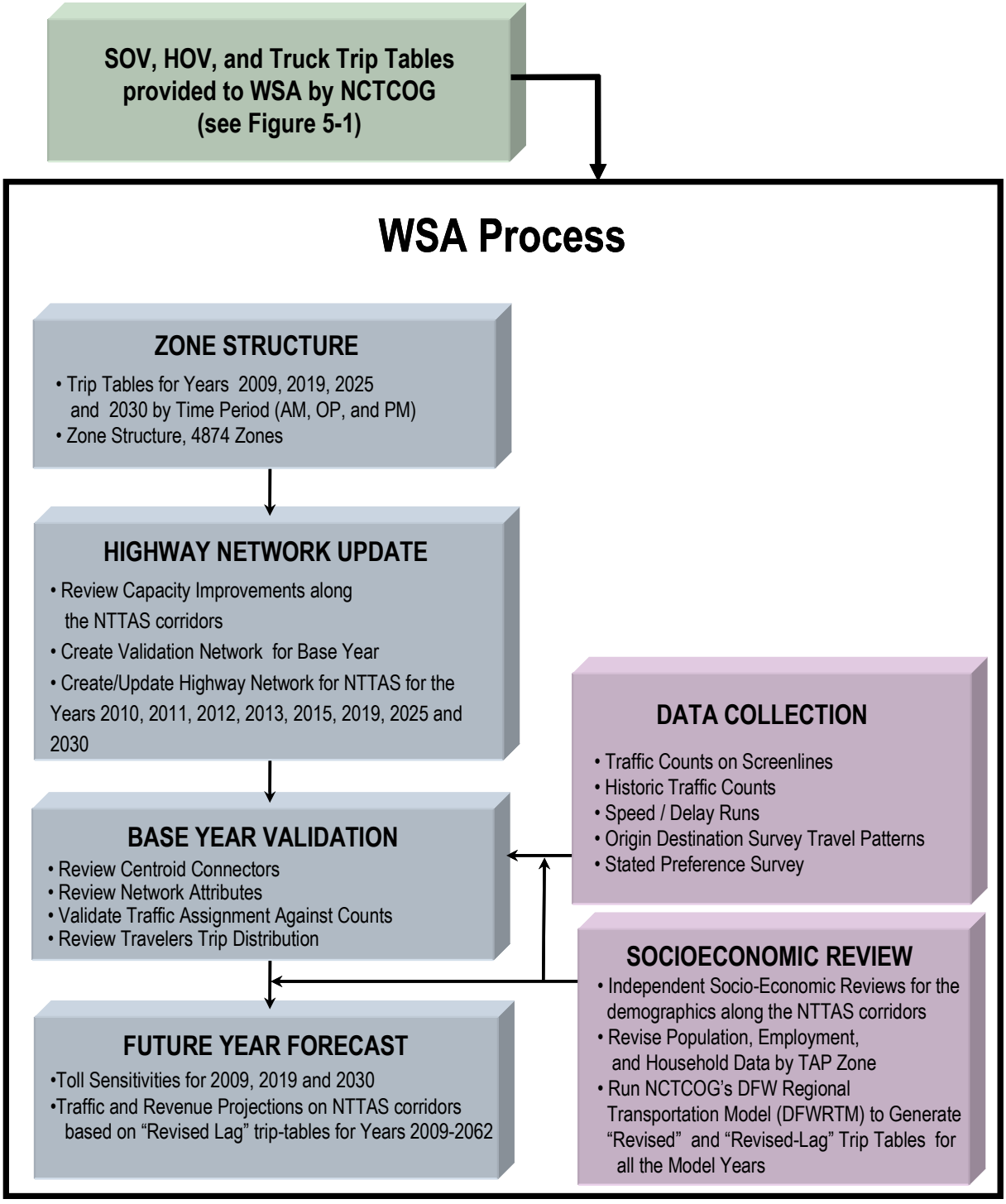

Figure 6-1. NTTAS Travel Demand Process

HIGHWAY NETWORK UPDATE

The Dallas/Fort Worth highway network obtained from the NCTCOG reflects the latest improvement projects included in the MTP 2030-2009 Update and was provided to WSA in TransCAD format. The network incorporates all existing NTTA and TxDOT toll facilities and all planned facilities in the Dallas/Fort Worth Metropolitan Area (DFWMA), as included in the MTP 2030-2009 Update. Existing toll facilities were coded to reflect all current ramp and mainlane toll charges.

The 2009, 2019, 2025 and 2030 transportation networks provided by NCTCOG were reviewed for consistency and calibrated based on the speed and delay characteristics and traffic counts collected within the corridor as described in Chapter 2. The calibrated networks were then used to develop the forecasted NTTAS traffic and toll revenues streams.

The speed and delay runs performed were used to adjust the free flow speeds along facilities in the NTTAS corridors. These adjustments accounted for geometric and operational characteristics of the major facilities that are typically not captured or reflected as part of a regional NCTCOG calibration process of speed/delay attributes. Some typical factors that can influence traffic flow in the corridor are intersection design constraints, traffic light and stop sign impedances, narrow median design, and multiple entry point characteristics.

MODEL VALIDATION

The model validation process involved comparing the traffic assignment output volumes using the ”revised-lag” trip tables, which incorporate the “lag” in the demographics and the trips due to the current economic downturn (as described in Chapter 5 and later in this chapter), against traffic counts obtained along the NTTAS corridors. Output travel time and speeds from the travel demand model were also compared to the actual travel time information. This process was performed for each of the time periods (AM Peak, PM Peak, and Off-Peak). The validation area contained many major routes in the corridor including IH 35E, IH 635, US 75, PGBT, DNT, PGBT EE and SRT. The NTTAS validation processes was performed using 2009 traffic assignment output volumes.

WSA used traffic counts collected in early 2009 along the NTTAS corridors to validate the model outputs and adjust the network characteristics where needed. Fifteen screenlines (four across DNT, six across PGBT and five across SRT) were developed to analyze the total corridor traffic trends and to ensure that the base model outputs reasonably reflected current traffic characteristics within the DNT, PGBT, PGBT EE and SRT corridors. Screenlines, as seen in Figure 6-2, were used to validate the model, and each of these screenlines analyzed traffic in the northbound and southbound directions or eastbound and westbound directions.

Travel demand modeling practitioners in the United States use two primary references to check the reasonableness of the validation process: "NCHRP 255: Highway Traffic Data For Urbanized Area Project Planning and Design," which was published by the Transportation Research Board, and "Model Validation and Reasonableness Checking Manual," which was prepared for the Federal Highway Administration .

Table 6-1 shows a comparison of the model output volumes based on the "revised-lag" trip tables and the daily traffic count volumes for each of the fifteen screenlines. Figure 6-3 compares the percent variation of the model volume from the traffic counts at all the screenlines with the maximum desirable variation according to the NCHRP 255 document. As can be seen, the model volumes are reasonably close to the traffic count totals except for PGBT screenlines 8, 10 and SRT screenlines S2 and S3. The travel demand model is over-predicting along these screenlines. The traffic counts along the NTTAS were collected in early 2009, which are few months after the opening of mainlanes of Segment 2 of the SRT. One reason for the variance along screenlines 8, 10, S2 and S3 could be that the travel demand model may not be fully replicating the travel pattern changes in the early months after the opening of the SRT Segment 2. In general, during the first few years of a new road, users experience a learning curve to consider this facility into their route choice decision. However, the traffic volumes forecasted by the travel demand model reflect the regular usage of the road after the "ramp-up" period.

The results of the final calibration were retained and, as needed, post processing adjustments were made to the future year traffic assignments to better reflect observed conditions. For example, in areas where the model tended to over-estimate current demand, manual adjustments were made to reduce modeled assignments in developing final estimates of traffic and revenue. In areas where the model tended to under-estimate demand, based on a comparison with the current observed volumes, slight increases in the modeled traffic results were made.

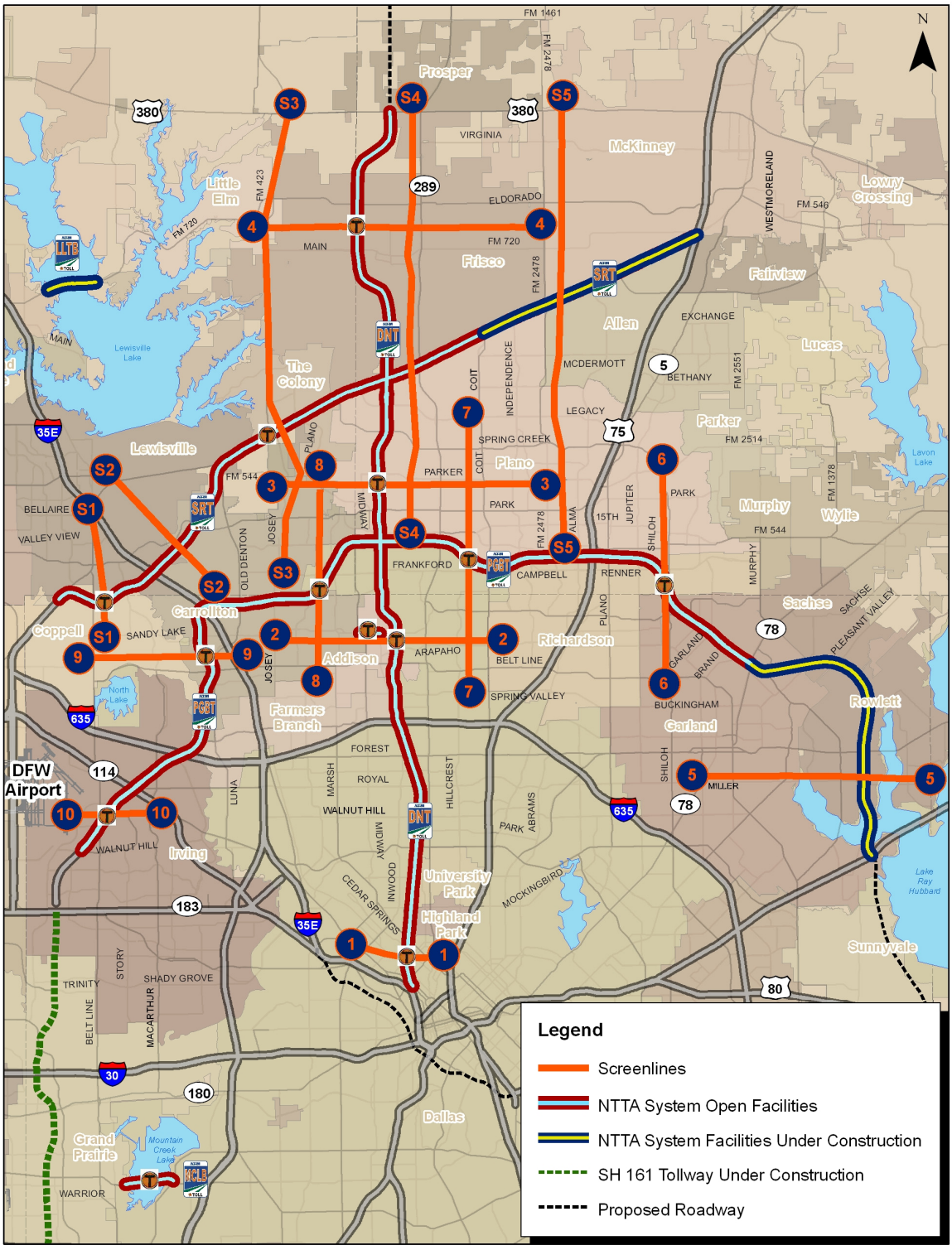

Figure 6-2. NTTAS Corridor Screenlines

Table 6-1
NTTAS Comparison of Traffic Counts and Model Output Volumes: Daily Total

	DNT Screenlines	Counts Total	Model Total	% Difference
1	MLP 1: Between Inwood North of Harry Hines Blvd. and Oaklawn North of Bower Ave	220,705	222,393	0.8%
2	MLP 2: Between Josey Rd. South of Keller Springs Rd. and Coit North of Arpaho Rd.	376,683	406,583	7.9%
3	MLP 3: Between Josey Rd. South of Parker Rd. and Custer Rd. South of W. Parker Rd.	340,784	354,562	4.0%
4	MLP 4: Between FM 423 North of Main St. and Custer Rd. (FM 2478) North of Main St.	156,589	135,906	-13.2%
	PGBT Screenlines	**Counts Total**	**Model Total**	**% Difference**
5	MLP 5: Between SH 78 North of Miller Rd. and Dalrock Rd. South of Watersway Dr.	150,385	152,586	1.5%
6	MLP 6: Between E Parker Rd. East of Spring Creek Pkwy. and Beltline west of N. Shiloh Rd.	254,164	290,142	14.2%
7	MLP 7: Between Legacy west of Coit Rd. and Spring Valley east of Meandering Way	359,238	404,709	12.7%
8	MLP 8: Between Plano Pkwy east of Tittle and Belt Line Rd. West of John Connally	244,868	288,192	17.7%
9	MLP 9: Between Denton Tap Road north of Bethel Road and IH 35E Frontage Rd. South of Luna Rd.	298,461	345,631	15.8%
10	MLP 10: Between Valley View North of Carbon Rd. and MacArthur North of Meadow Creek Dr	166,978	238,133	42.6%
	SRT Screenlines	**Counts Total**	**Model Total**	**% Difference**
S1	SRT MLG 1: Between B 121 and Sandy Lake Rd.	169,504	187,628	10.7%
S2	Elm Fork of Trinity River: Between B 121 and Frankford Rd.	158,640	206,804	30.4%
S3	East of FM 423: Between US 380 and Frankford Rd.	247,083	305,986	23.8%
S4	West of Preston Rd.: Between US 380 and Plano Pkwy.	321,662	289,949	-9.9%
S5	East of Custer Rd.: Between US 380 and Plano Pkwy.	328,805	278,838	-15.2%

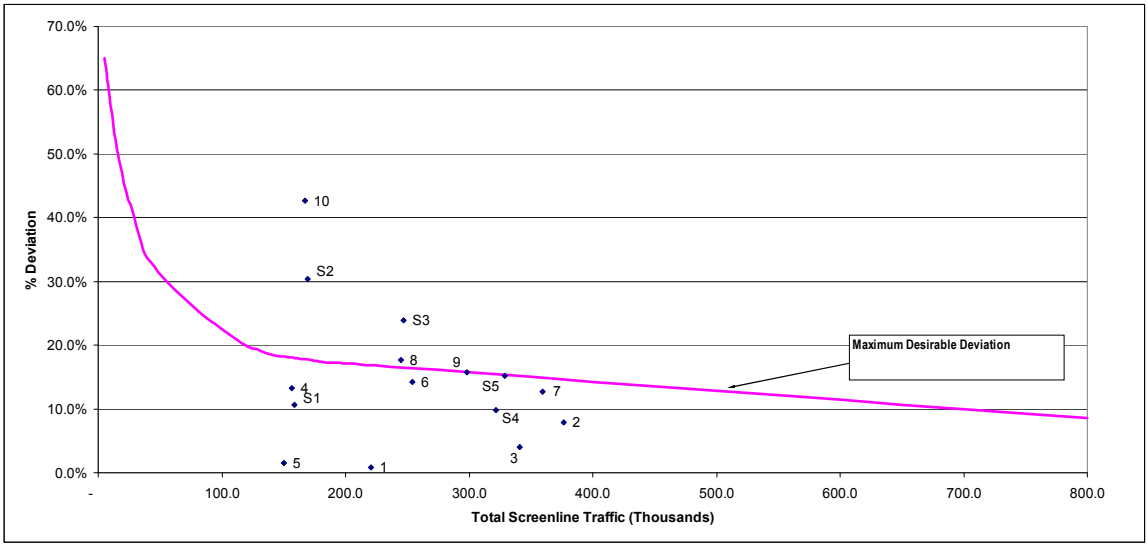

Figure 6-3. NTTAS Screenlines – Percentage Deviation

Note: The source of the maximum desirable deviation curve is: NCHRP 255 p.41 (cited in FHWA, Calibration and Adjustment of System Planning Models, Dec. 1990).

MODELING METHODOLOGY

Professional practices and procedures were used in the development of the traffic and revenue forecasts for the NTTAS facilities. The WSA market share diversion processes, which are designed specifically to emulate motorists' willingness to pay at different toll levels and congestion conditions were used to test the toll sensitivities within the corridor for the years 2009, 2019 and 2030.

The toll diversion traffic assignments were run using an equilibrium diversion technique to evaluate the toll feasibility of the corridor. In this process, the travel model builds two paths between each pair of zones, one including the toll project, and the other path excluding the project. The travel cost associated with using both travel paths is computed, and the amount of trips using the toll facility are then estimated based on travel time and cost savings between the two paths. The technique simulates the driver's decision to use a toll or toll free route, which depends to a large extent on marginal differences in time and cost between the routes.

TIME COST AND VEHICLE OPERATING COSTS

In addition to tolls, two other end-user costs are considered when calculating the total cost of a trip on the NTTAS: time cost and vehicle operating costs. The motorists' time cost is calculated using value of time estimates that are integrated into the modeling process. The value of time parameter provides a measure to convert travel time into an equivalent monetary cost for inclusion in the toll diversion process. Vehicle operating

costs include a multitude of additional costs to travelers such as wear and tear, maintenance, tires, oil, fuel and other variable costs.

Value of Time

The values of time used for this study were consistent with historical evaluation done for the NTTAS facilities. WSA develops value of time along the NTTAS corridors on a zone-by-zone basis. This provided an internal market segmentation of all origin/destination pairs so that lower value of time zone-to-zone interactions had a lower likelihood/willingness to use toll facilities.

For this study, values of time were assumed to inflate at an average annual rate of 2.75 percent. The peak and off peak period average values of time for the different counties are listed in Table 6-2.

Table 6-2

2009 Value of Time by County ($/Hour)

County	Peak	Off-Peak
Collin	$12.45	$12.45
Denton	$12.02	$12.02
Parker	$10.45	$9.38
Tarrant	$11.90	$8.96
Dallas	$10.42	$9.37
Rockwall	$13.84	$12.48
Kaufman	$10.28	$9.15
Ellis	$10.90	$9.77
Johnson	$11.42	$7.97

Vehicle Operating Costs

A vehicle operating cost of $0.16 per mile for passenger vehicles in 2010 was assumed and inflated at the rate of 2.75 percent per year. This includes motor fuel and limited other perceived out-of-pocket costs that are well below the full cost of operation which includes factors such as depreciation and insurance. These are generally not perceived by drivers as variable costs that affect their route decision choices.

REVISED DEMOGRAPHICS/TRIP TABLES

Traffic and revenue estimates along the NTTAS corridors that are presented in Chapter 7 of this report are based on the revised demographics datasets. Revised demographics for trip tables were created by updating NCTCOG's official demographic datasets based on findings of the following economic reviews that were performed by Insight Research Corporation (IRC), Research and Demographic Solutions (RDS) and Weinstein Clower and Associates (WCA) along the NTTAS and other corridors:

- Independent economic reviews were performed along the DNT, PGBT, AATT, MCLB and PGBT EE corridors by Insight Research Corporation (IRC) in April 2004. The results of these reviews are documented in the report, "Investment-Grade Traffic and Revenue Study: DNT System", dated July 2004
- An independent economic review was performed by IRC along the Lewisville Lake Toll Bridge (LLTB) corridor in November 2005. The findings of this report are presented in the draft report "Investment Grade Traffic and Toll Revenue Study: Lewisville Lake Toll Bridge", dated March 2006
- IRC performed an independent economic review along the Southwest Parkway/Chisholm Trail Parkway (SWP/CTP) corridor in March 2006. The findings of the economic review are included in the draft report "SH121 Southwest Parkway Traffic and Toll Revenue Investment Grade Study Independent Economic Overview and Development Updates", dated March 2006.
- IRC performed an independent economic review along the SRT corridor in August 2007. The findings of the economic review are included in the document "Investment Grade Traffic and Toll Revenue Study: Dallas North Tollway System and SH 121 Tollway", dated October 2007
- IRC performed an independent economic review along the SH 161 corridor in March 2008. The findings of the economic review are included in the draft report "Investment Grade Traffic and Toll Revenue Study: SH 161", dated October 2008
- Research and Demographic Solutions (RDS) and Weinstein, Clower and Associates (WCA) performed an independent economic review along the Trinity Parkway corridor in December 2008. This in included in the draft report "Trinity Parkway Independent Economic Review".
- WSA hired WCA in early 2009 to review the revised demographic forecasts that were developed along the DNT, PGBT, AATT, MCLB, PGBT EE, LLTB, SRT, SH 161, SWP/CTP and Trinity Parkway corridors as described above to estimate the impacts the current economic downturn is having on the demographic growth along the NTTAS corridors. WCA provided an assessment of recent economic trends in the North Central Texas region as well as an updated assessment of future growth in key demographic and socio-economic characteristics. WCA also assessed the impact of national economic trends on the North Texas economy and the regional economy's resilience to financial shocks, key national policies, such as immigration, and prospects for future growth in an increasingly global marketplace. WCA's demographics review report is included as an appendix at the end of this report.

Based on the recommendations of WCA's report, WSA applied a "lag" to the revised demographics along the SRT, SH 161 and Trinity Parkway corridors as described in Chapter 5. Using these "lagged" demographics as an input to the NCTCOG DFW Regional Transportation Model (DFWRTM) an alternate set of trip tables were generated. In addition, for the traffic and revenue estimates included in Chapter 7, WSA applied an additional lag to the trip tables, as described below:

- Two-Year Trip Table Lag (2009-2013)
- One-Year Trip Table Lag (2015)
- One-Year Trip Table Lag (2019)
- One-Year Trip Table Lag (2025)
- One-Year Trip Table Lag (2030)

The above trip tables are referred to as the "revised-lag" trip tables.

BASIC ASSUMPTIONS

The forecast volume and revenues obtained from this study are predicated on the following general assumptions which are considered reasonable for the purposes of this study:

1. The LLTB will be constructed as a toll bridge and will be opened to traffic on August 15, 2009.
2. SRT Tollway will open according to the following schedule:
    - September 1, 2009: East of Hillcrest Road to East of Custer Road (Segment 3S)
    - October 1, 2009: East of Custer Road to East of Lake Forest Drive (Segment 3N)
    - January 1, 2011: East of Lake Forest Drive to US 75, including the SRT/US 75 interchange (Segment 4)
    - January 1, 2012: SRT/DNT interchange (Segment 5)
3. PGBT EE from IH 30 to SH 78 will open as a toll facility on December 1, 2011.
4. The full opening of SH 161 from SH 183 to IH 20 as a toll facility on September 1, 2012. By January 1, 2020, SH 161 from IH 30 to IH 20 is expanded from two to three mainlanes each direction. By January 1, 2031, Conflans to north of Egyptian Way are restriped to four mainlanes each direction and north of Egyptian Way to IH 20 is expanded from three to four mainlanes each direction. TxDOT segment from south of PGBT to Conflans is expanded to six lanes by 2015 and eight lanes by 2031.
5. Capacity improvements on SRT (Denton Creek to US 75) from three lanes to four lanes per direction on January 1, 2019.
6. Improvements along DNT between SRT and PGBT assumed starting January 1, 2015. Starting from July 1, 2015 it was assumed that the southbound and northbound ramps on the DNT just south of Plano Parkway are converted to tolled ramps.

7. Expansion of PGBT from three lanes to four lanes per direction between IH 35E and SH 78 on January 1, 2019.
8. The current toll collection system and rates are as described in Table 2-4, the future toll collection concept and rates (including ZipCash differentials) for the NTTAS will be adopted as shown in Chapter 7 of this report.
9. The improvements along major highway facilities in the vicinity of the NTTAS corridors are described in Chapter 3.
10. All other improvements to the present highway system in the NTTAS corridors are limited to those currently included in the MTP 2030-2009 Update. No additional competing limited-access highways will be constructed in the NTTAS corridors at any time during the forecast period.
11. Economic growth in the NTTAS corridors will follow the assumptions described in Chapter 5 of this report.
12. In accordance with the existing practice of the Authority, the NTTAS will be well-maintained, efficiently operated, and effectively signed to encourage maximum usage.
13. A fully-monitored system including manual or electronic, with conversion to a fully electronic toll collection system according to the following schedule:
    - Remaining segments of SRT, LLTB and PGBT EE open as All-ETC facilities
    - All toll plazas on PGBT were converted to All-ETC on July 1, 2009
    - All toll plazas on DNT (except Wycliff Mainlane Plaza) and MCLB and AATT are converted to All-ETC on July 1, 2011. Coinciding with the All-ETC implementation on the rest of the DNT, it is assumed that the Mainlane Plaza 2 (MLP 2) on the DNT would be relocated to north of Keller Springs Rd. This MLP 2 relocation would warrant tolling on ramps south of Keller Springs Rd. and removal of tolling on ramps north of Keller Springs Rd.
14. Motor fuel will remain in adequate supply and will remain available at reasonable prices.
15. No local, regional, or national emergency will arise which would abnormally restrict the use of motor vehicles.

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CHAPTER 7

NTTA SYSTEM ESTIMATED TRANSACTIONS AND TOLL REVENUE

This chapter presents the traffic and annual toll revenue estimates for the North Texas Tollway Authority System (NTTAS) until 2062. The long-term traffic and revenue forecast was based on the configurations described in Chapter 1 and modeling methodologies defined in Chapter 6.

In addition, this chapter includes an outline of toll sensitivity analyses that were performed to estimate the revenue maximization toll rates. The chapter also provides estimated average weekday traffic for model years 2015 and 2030, and the resulting estimate of transactions and toll revenue until 2062.

TOLL SENSITIVITY ANALYSIS

The toll sensitivity analysis tested a series of toll rates to aid in the selection of a reasonable toll rate for the NTTAS. It is advisable that toll rates be less than the maximum toll rate on the toll sensitivity curves. The maximum rate is that which would produce the highest revenue, while any increase in price would result in lower revenue. Future flexibility should be maintained to increase tolls, if necessary, to generate additional revenue. Future year toll sensitivity curves are based on changes in traffic characteristics along the NTTAS such as congestion levels, values of time and attractiveness of competing facilities. These curves are essential in estimating the viability of future toll rate increases.

In general, the toll sensitivity curve suggests that when the toll rate increases, a portion of travelers will leave the toll facility and choose other routes. Therefore, as toll rate increases transactions would decrease. However, as the toll rate increases, the toll

revenue increases until it reaches the highest revenue point where an additional toll rate increment would generate a decrease in toll revenue.

Toll sensitivity analyses were conducted for the NTTAS for the years 2009, 2019 and 2030. Figures 7-1 through 7-5 illustrate the daily toll sensitivity curves for the DNT, PGBT, SRT, PGBT EE and NTTAS as a whole. The toll sensitivity curves for years 2019 and 2030 are shown for PGBT EE. The revenues and transactions shown in these figures do not account for ramp-up or violation rates. These toll sensitivity curves were developed by using the "revised-lag" trip tables, as described in Chapter 6. Toll rates, in nominal year dollars, ranging between $0.10 per mile and $0.50 per mile were tested as part of this toll sensitivity analysis.

For the purposes of this traffic and revenue analysis, the following two-axle TollTag toll rates have been assumed on various NTTAS facilities:

- DNT: $0.145/mile starting September 1, 2009 to June 30, 2011; $0.1531/mile starting July 1, 2011 with toll adjustments made every two years at an annual toll inflation of 2.75 percent.
- PGBT: $0.145/mile starting September 1, 2009 to June 30, 2011; $0.1531/mile starting July 1, 2011 with toll adjustments made every two years at an annual toll inflation of 2.75 percent.
- SRT: $0.145/mile starting September 1, 2009 to June 30, 2011; $0.153/mile starting July 1, 2011 with toll adjustments made every two years at an annual toll inflation of 2.75 percent.
- PGBT EE: $0.1538/mile starting December 1, 2011 (assumed open to traffic date) to June 30, 2013; $0.1632/mile starting July 1, 2013 with toll adjustments made every two years at an annual toll inflation of 3.0 percent.

Table 7-1 shows changes to the toll rates on DNT, PGBT, SRT and PGBT EE until and including the July 1, 2013 reset date.

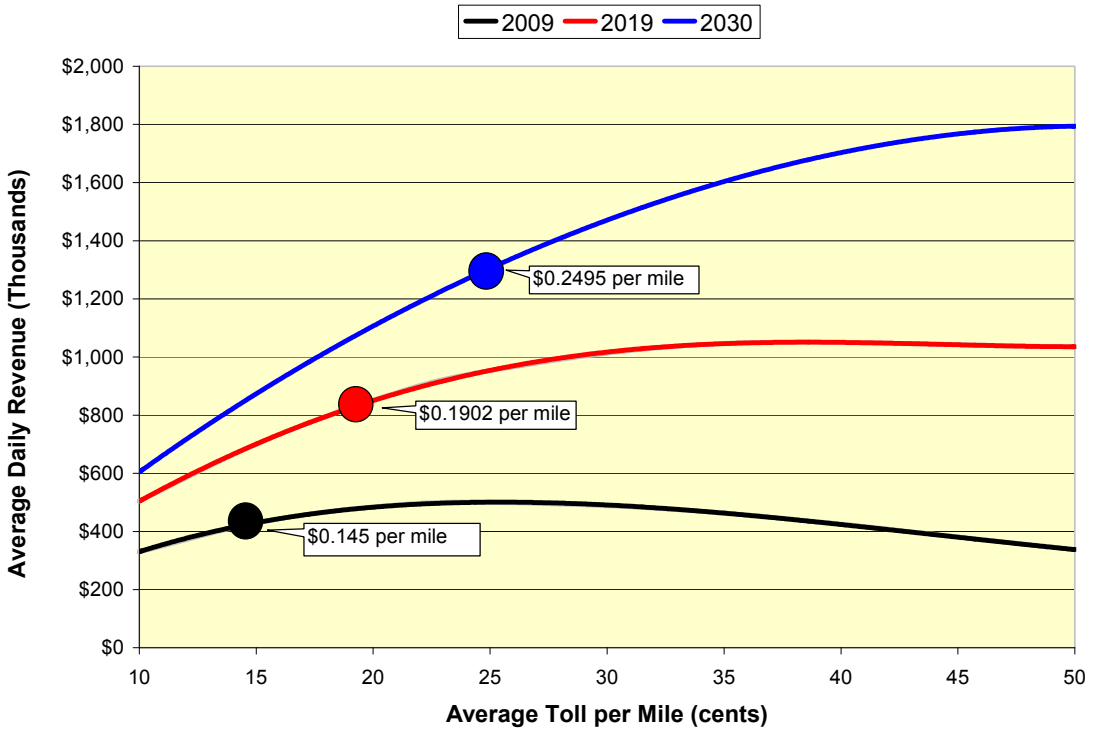
Table 7-1. Average TollTag Two-Axle Toll Rates ($/mile)

	September 1, 2009	July 1, 2011	July 1, 2013
DNT	$0.1450	$0.1531	$0.1616
PGBT	$0.1450	$0.1531	$0.1616
SRT*	$0.1450	$0.1530	$0.1620
PGBT EE**	…	$0.1538	$0.1632

* - SRT average toll rate rounded to nearest $0.001/mile to comply with the SRT Project Agreement

** - PGBT EE opens on December 1, 2011 with an average toll rate of $0.1538/mile

Also shown in Figures 7-1 through 7-4 are the proposed toll rates on NTTAS facilities in 2009, 2019 and 2030. As can be seen, the proposed toll rates are below the revenue maximization points. This demonstrates that, if needed, there is expected to be considerable potential for revenue enhancement through toll increases above those assumed for traffic and revenue forecasting purposes.



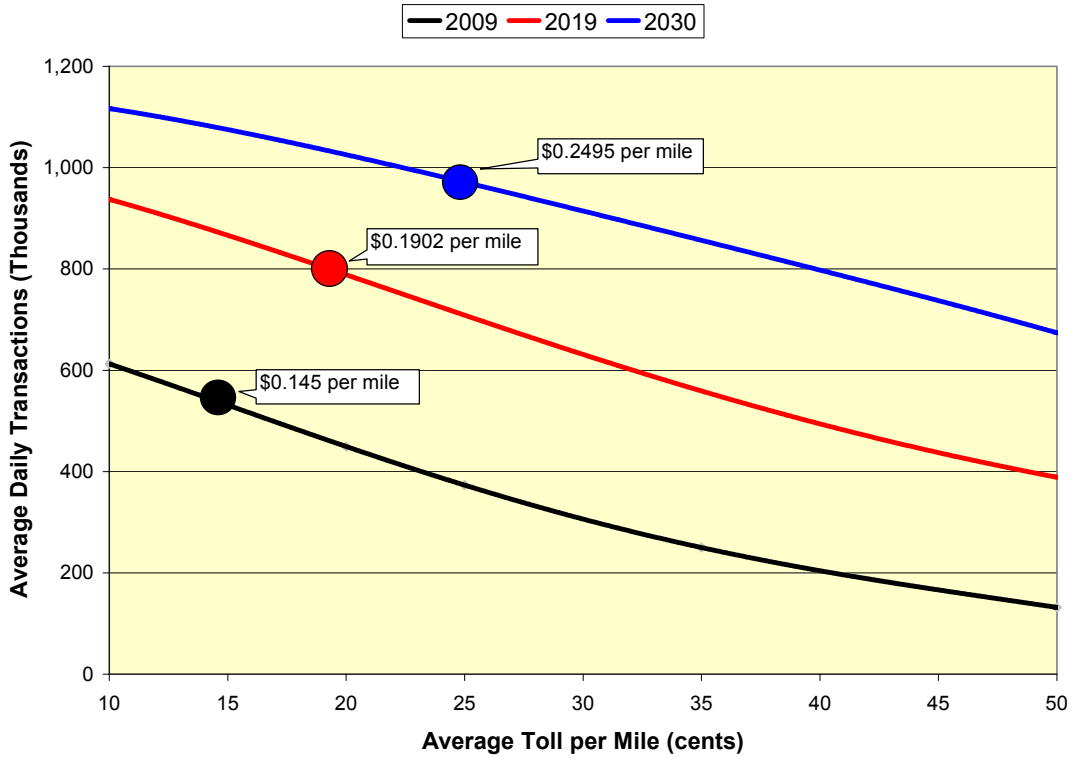
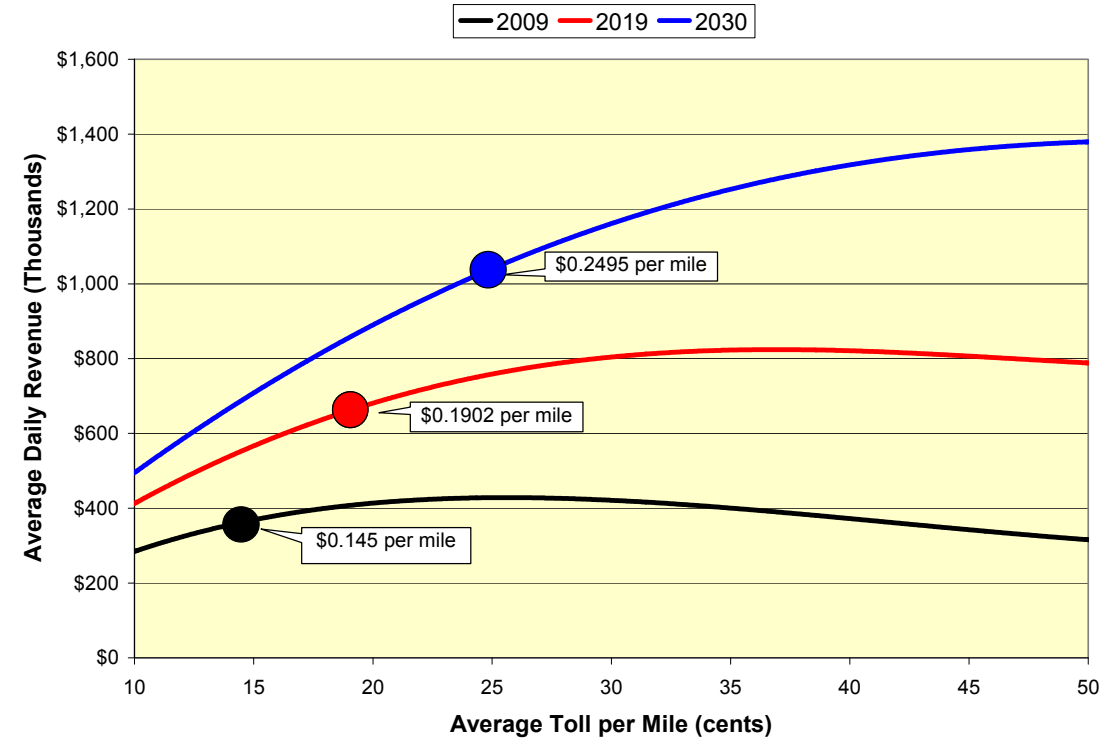


Figure 7-1. Toll Sensitivity Curves – DNT



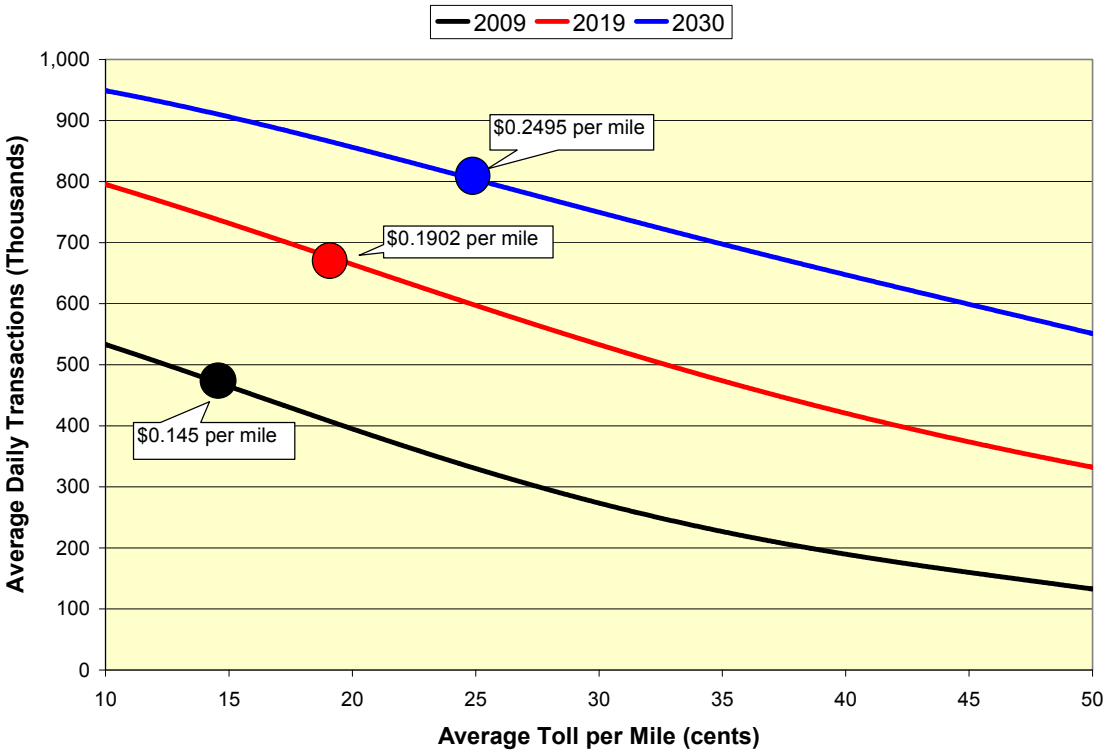
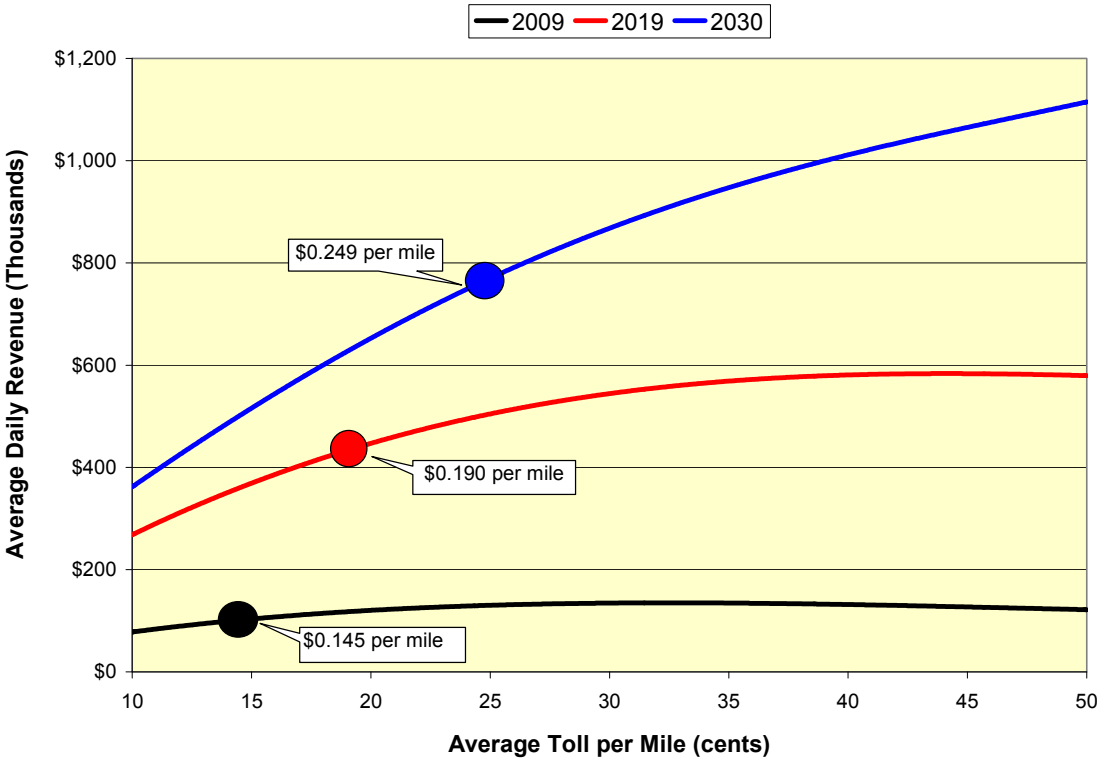


Figure 7-2. Toll Sensitivity Curves – PGBT



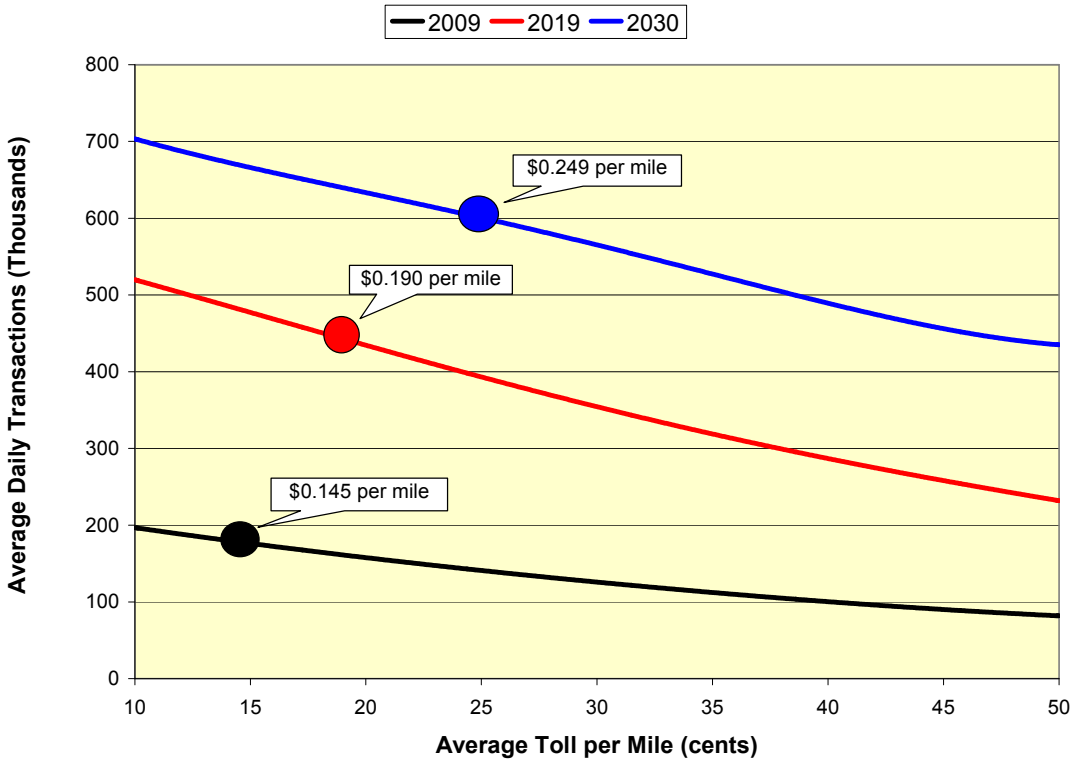
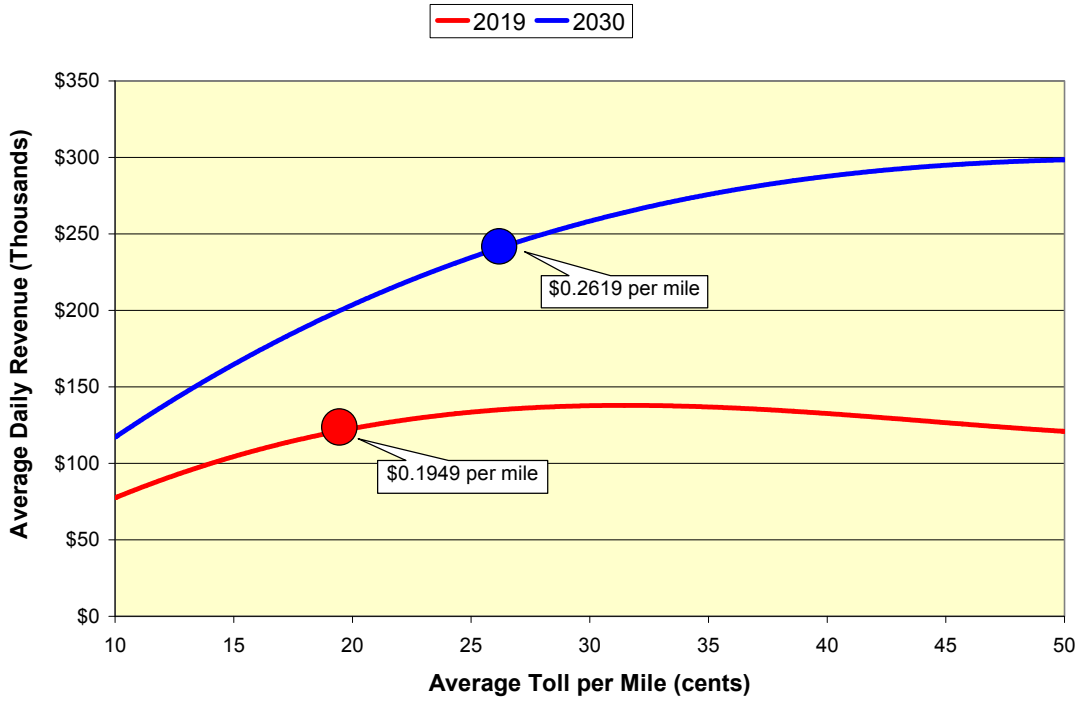


Figure 7-3. Toll Sensitivity Curves – SRT



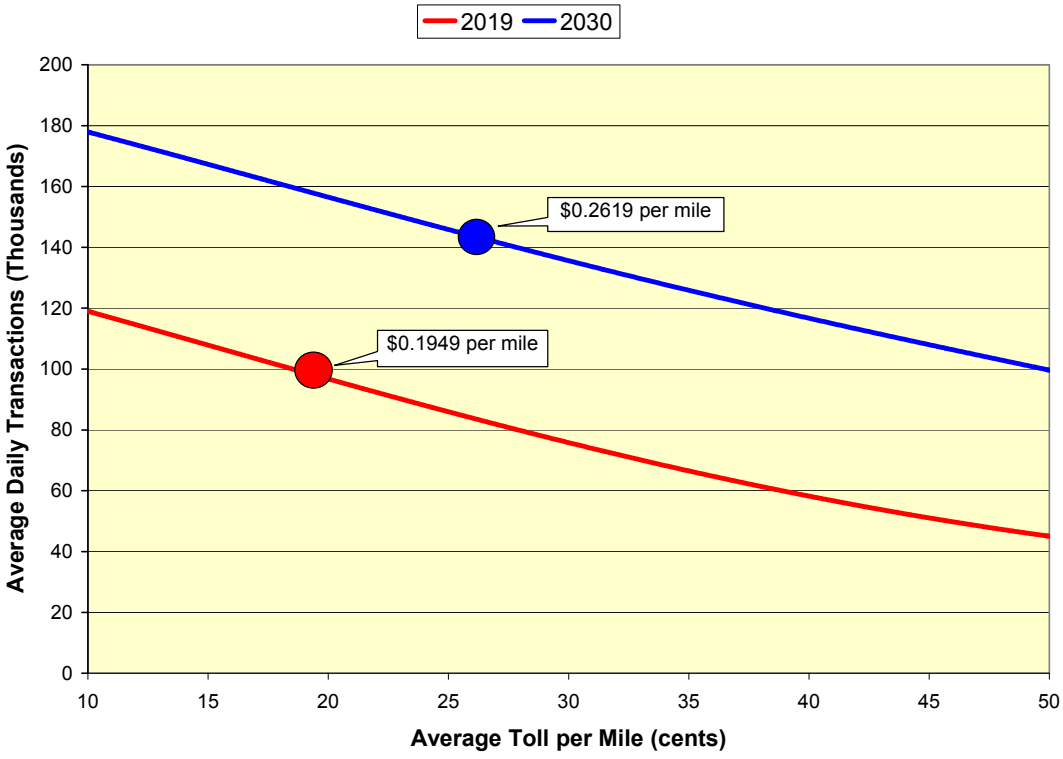
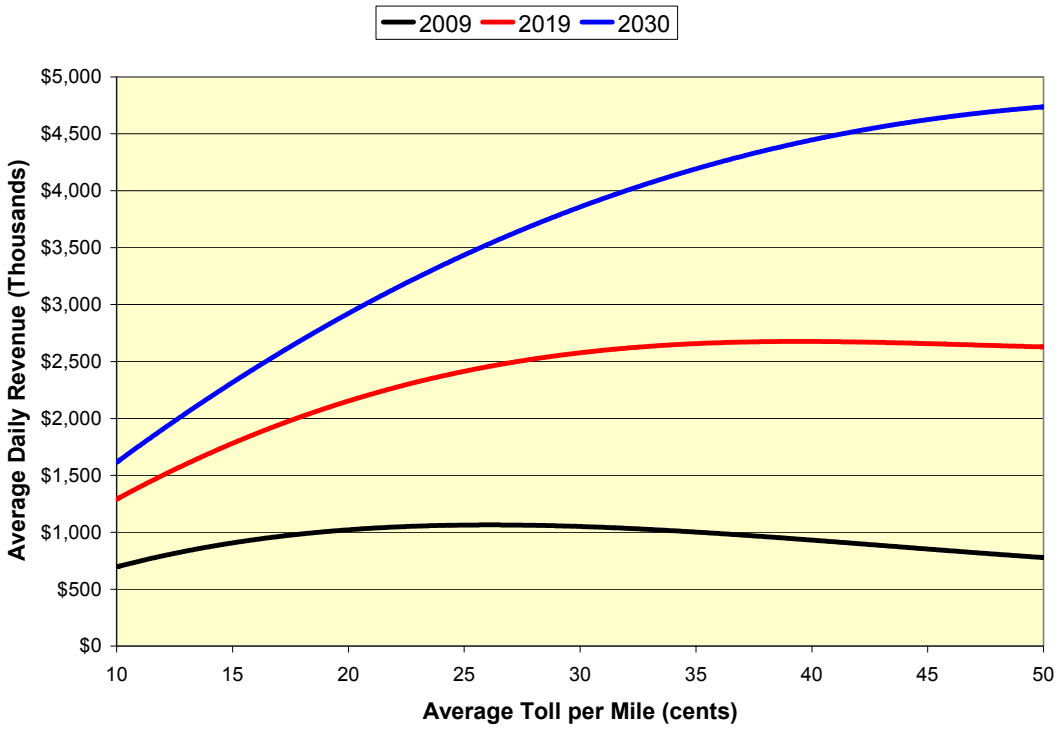


Figure 7-4. Toll Sensitivity Curves – PGBT EE



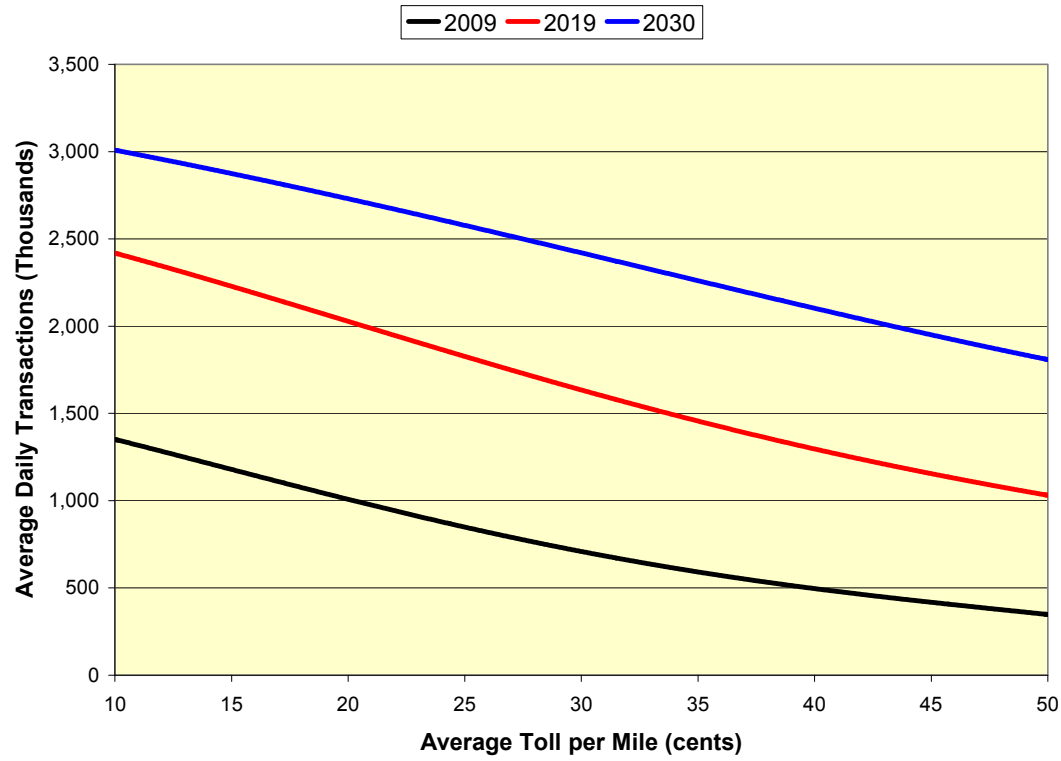


Figure 7-5. Toll Sensitivity Curves – NTTAS

NTTAS TOLL COLLECTION CONCEPT AND TOLL STRUCTURE

EXISTING TOLL COLLECTION SYSTEM

The NTTAS currently utilizes a mixed toll collection system that includes TollTag, cash and video tolling (known as "ZipCash"). Under ZipCash, users without TollTags are identified through the license plate number and invoiced for the toll charge incurred. The cash and ZipCash patrons are charged more than TollTag customers per transaction. Tolls are collected at fixed tolling points at rates determined generally upon the influence distance using a per mile toll rate. The current system of cash toll collection is being phased out by NTTA over the next few years transitioning to an all-electronic toll collection (all-ETC) system that will continue to include TollTag and ZipCash, but no cash collection. Figures 7-6 through 7-8 show the current TollTag and cash/ZipCash rates for the DNT, PGBT and SRT respectively.

FUTURE TOLL COLLECTION SYSTEM

The conversion of the NTTAS facilities to a TollTag/ZipCash configuration was assumed based on the schedule presented in Chapter 6. Future traffic on the NTTAS was estimated based on a TollTag/ZipCash system. Figures 7-9 and 7-10 illustrate 2009 (after September 1, 2009) and 2030 tolls for DNT. Figures 7-11 and 7-12 illustrate the toll charges for the PGBT for 2009 (from September 1, 2009 onwards) and 2030. Figures 7-13 through 7-15 illustrate the toll charges for the SRT on September 1, 2009, October 1, 2009 and in 2030. Figures 7-16 and 7-17 illustrate the toll charges for the PGBT EE for 2011 (upon opening) and 2030. Figure 7-18 shows the toll charges for the AATT, MCLB, and LLTB.

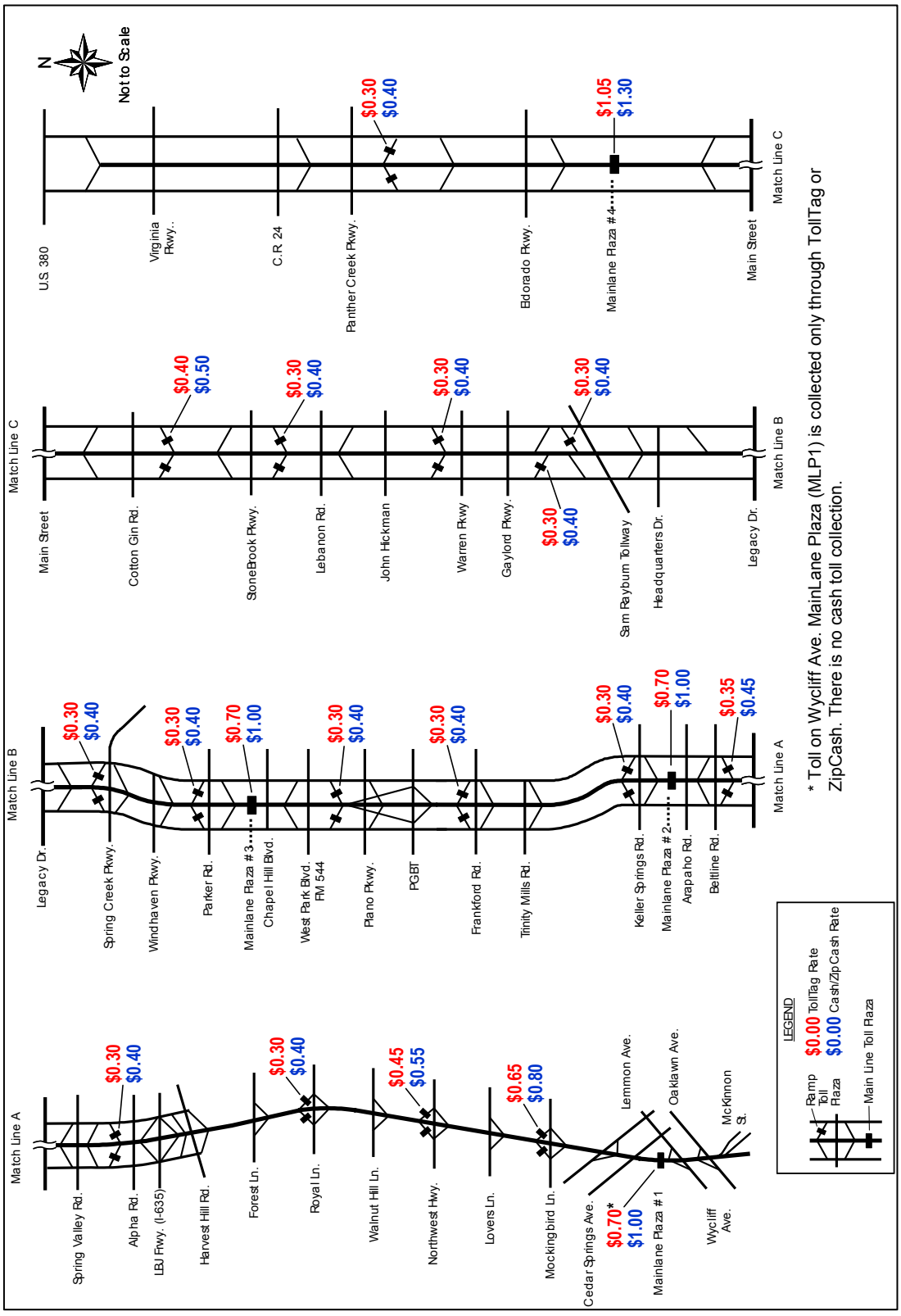


Figure 7-6. Current DNT Toll Configuration and Toll Charges

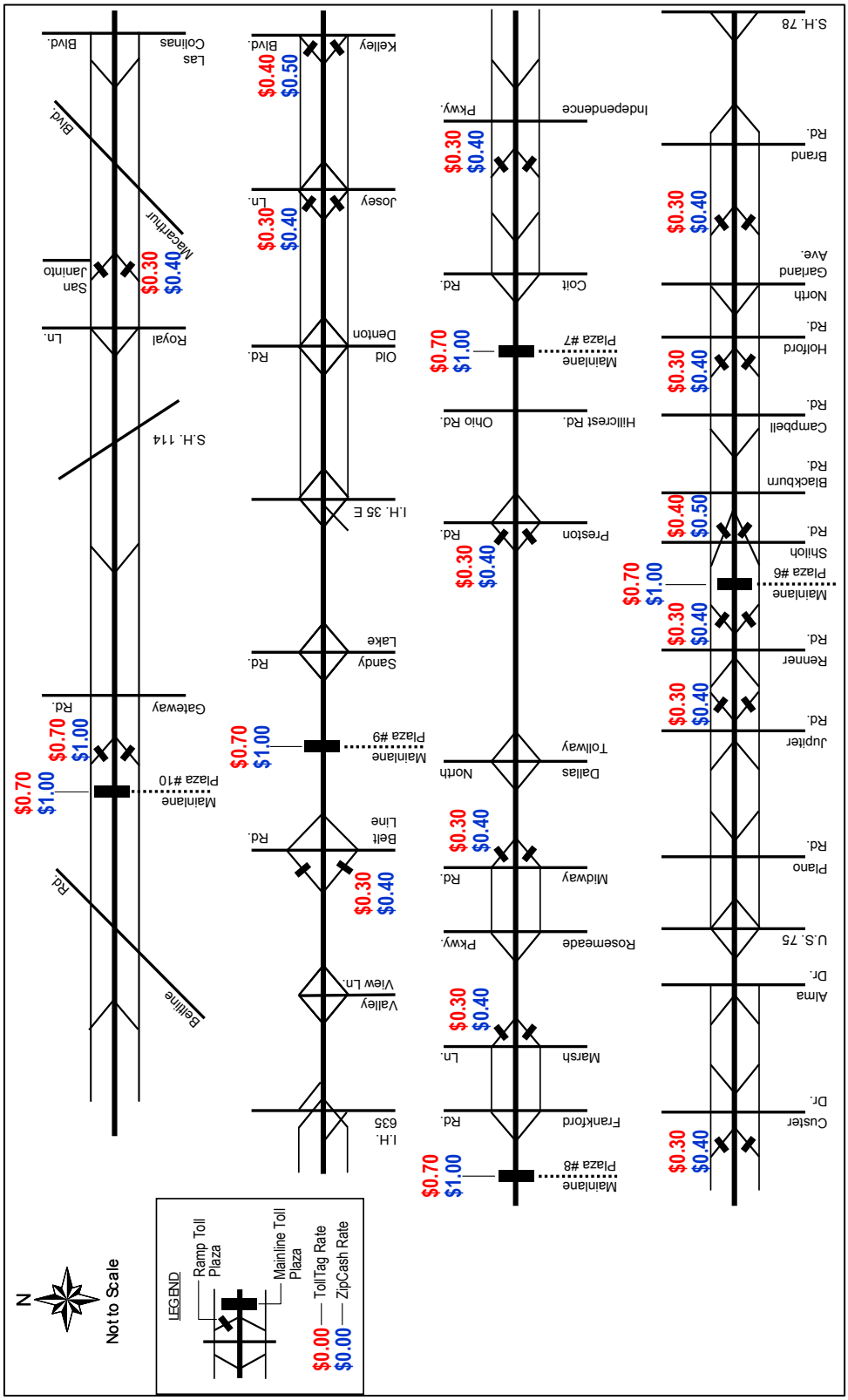


Figure 7-7. Current PGBT Toll Configuration and Toll Charges

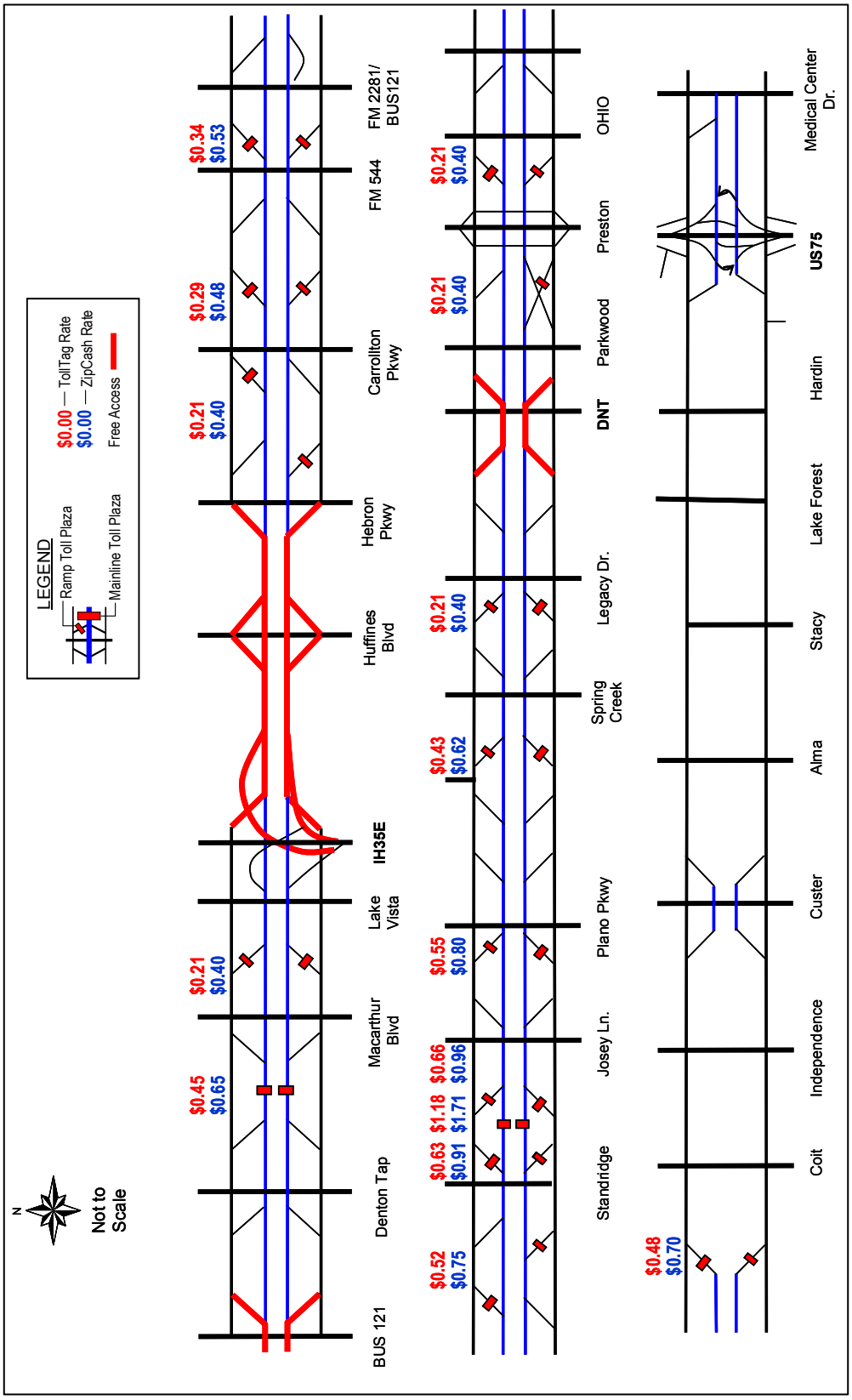


Figure 7-8. Current SRT Toll Configuration and Toll Charges

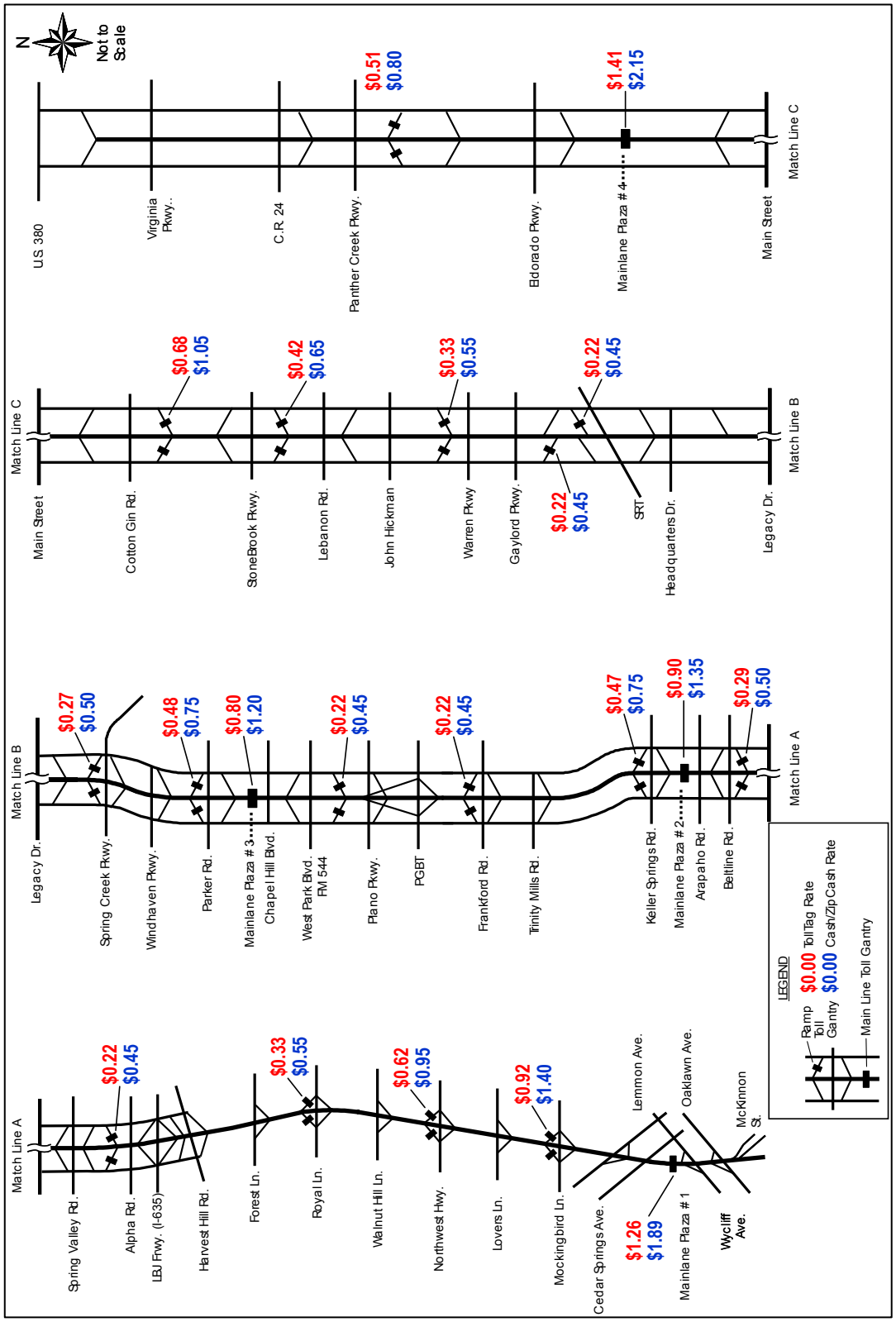


Figure 7-9. DNT Toll Configuration and Toll Charges – Starting September 1, 2009

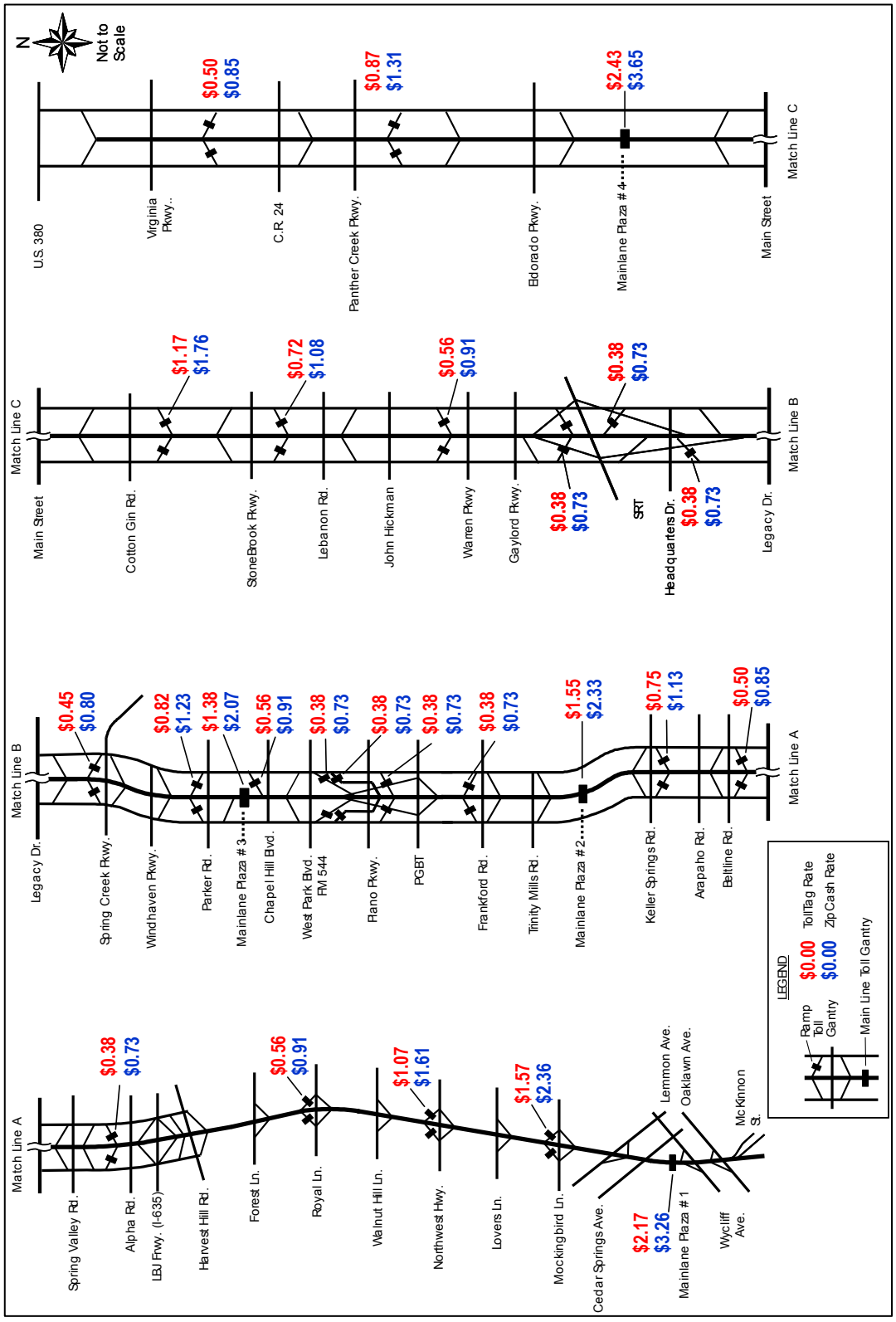


Figure 7-10. DNT Toll Configuration and Toll Charges – 2030

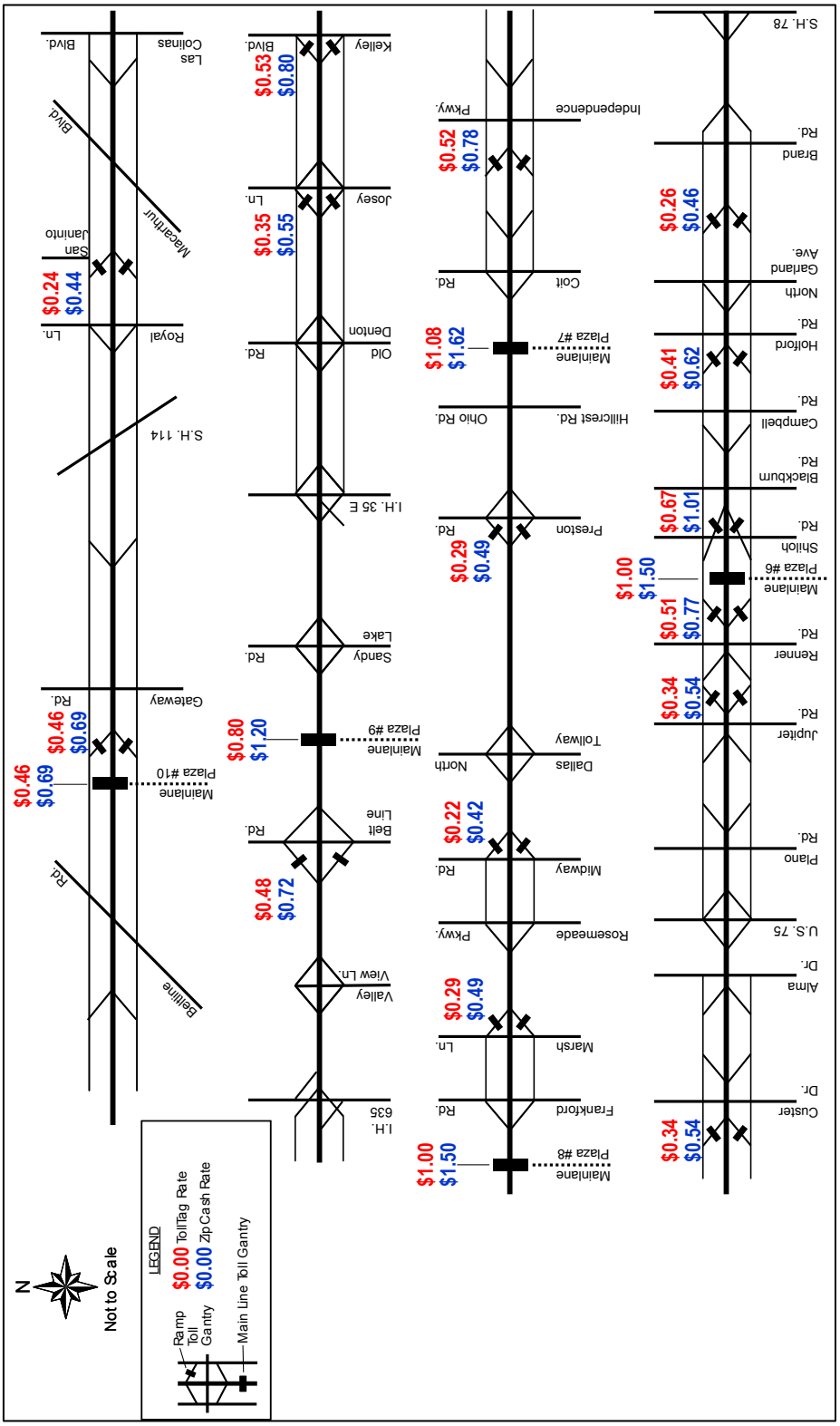


Figure 7-11. PGBT Toll Configuration and Toll Charges – Starting September 1, 2009

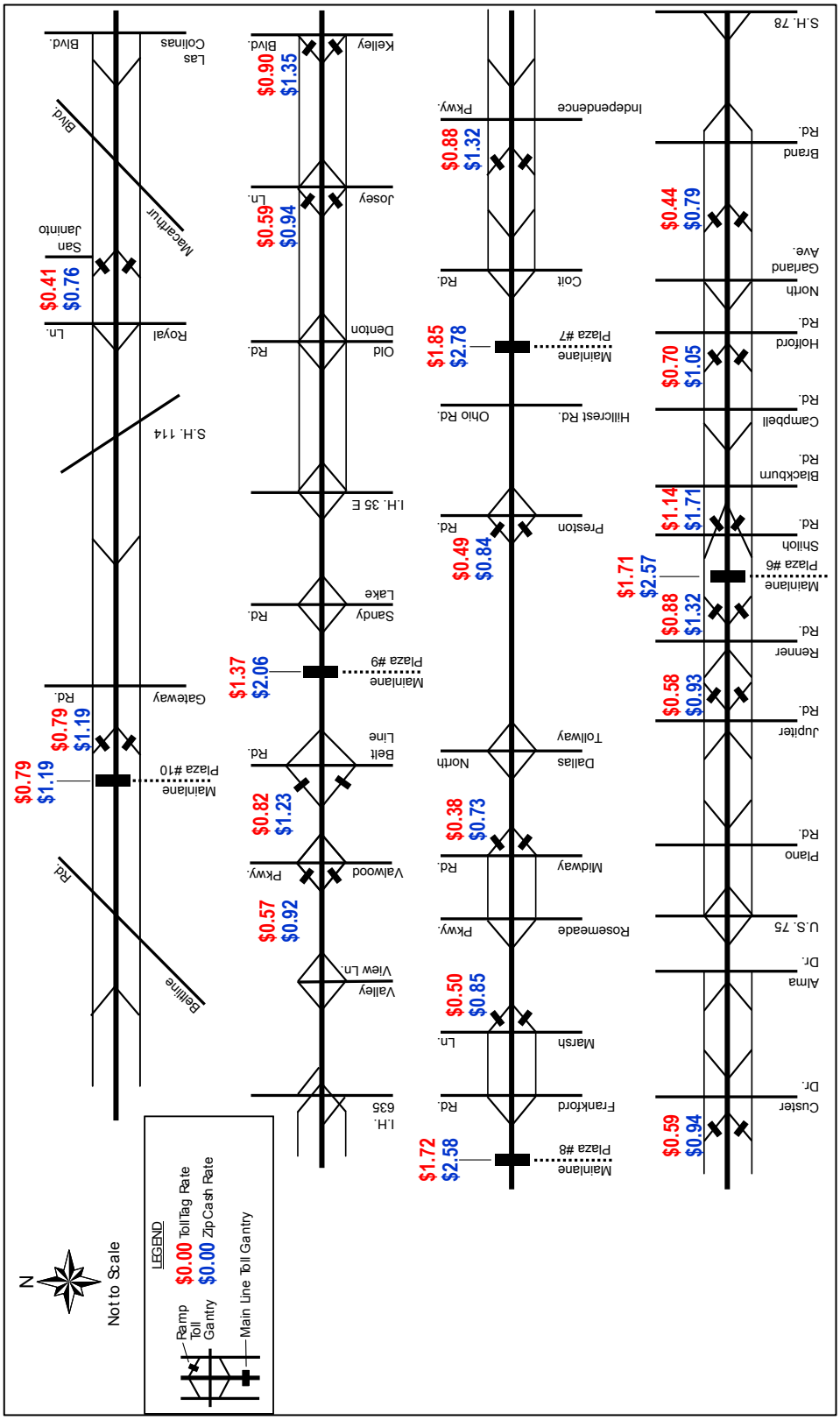


Figure 7-12. PGBT Toll Configuration and Toll Charges – 2030

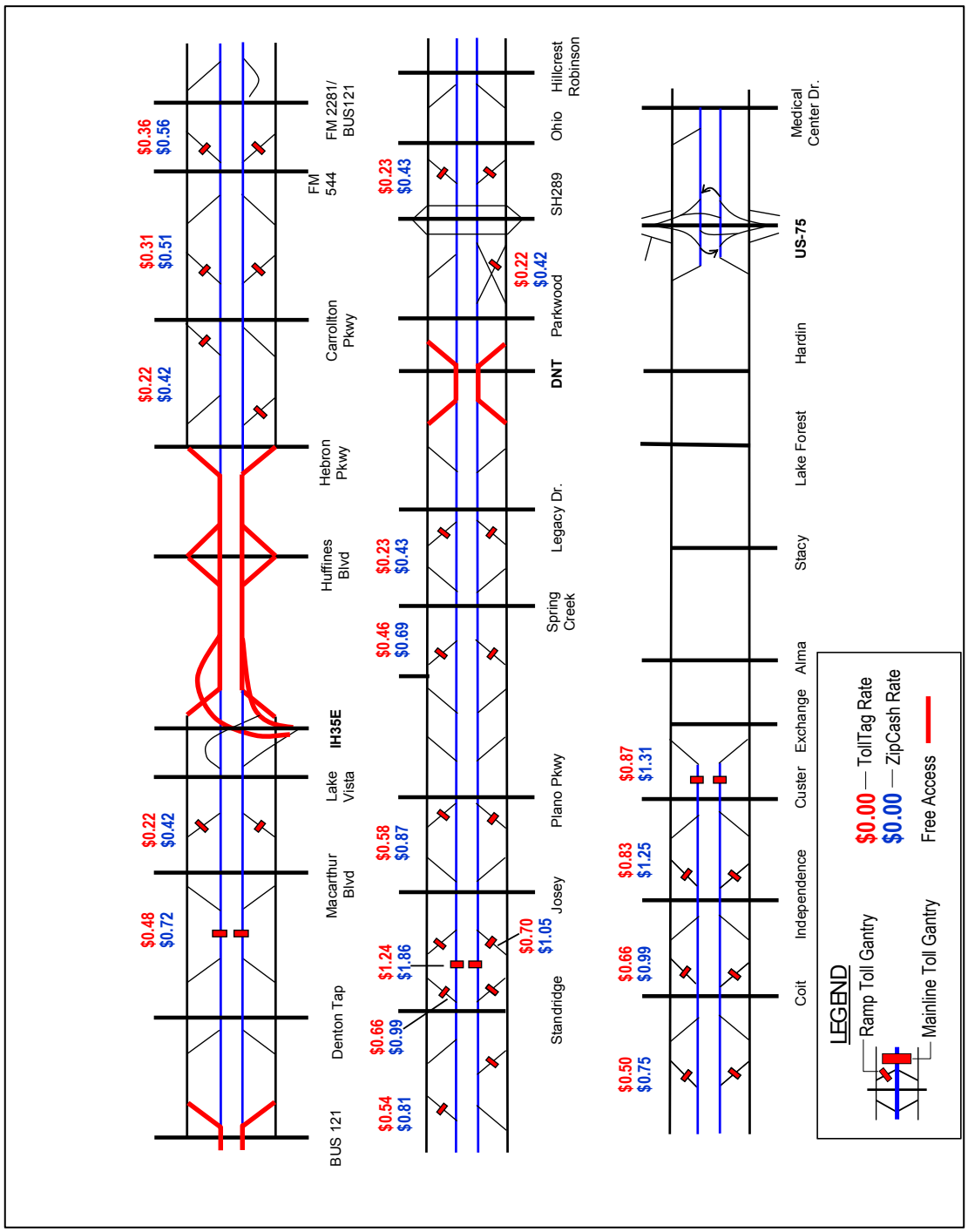


Figure 7-13. SRT Toll Configuration and Toll Charges – Starting September 1, 2009

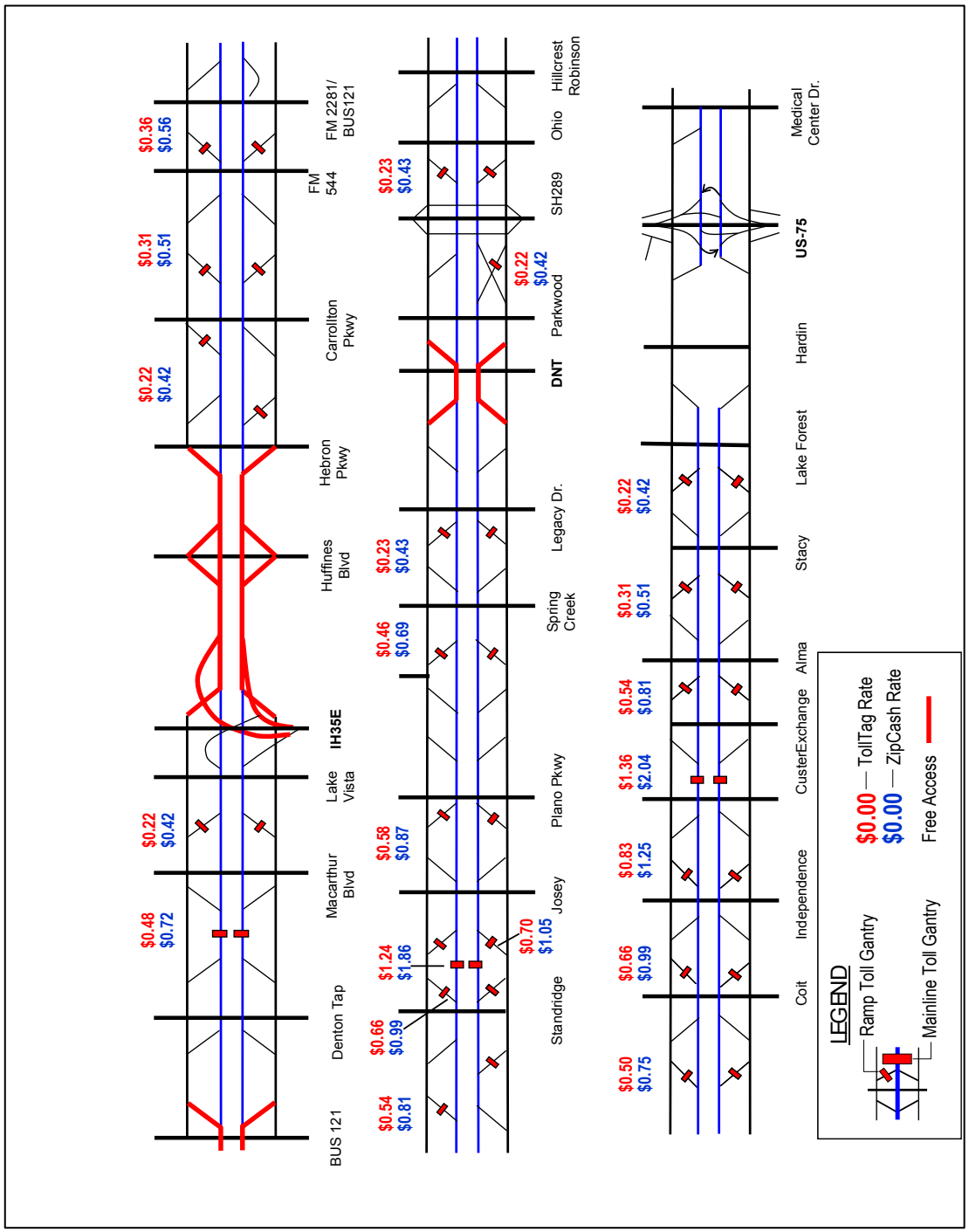


Figure 7-14. SRT Toll Configuration and Toll Charges – Starting October 1, 2009 (Opening of Section between Hillcrest and Hardin Road)

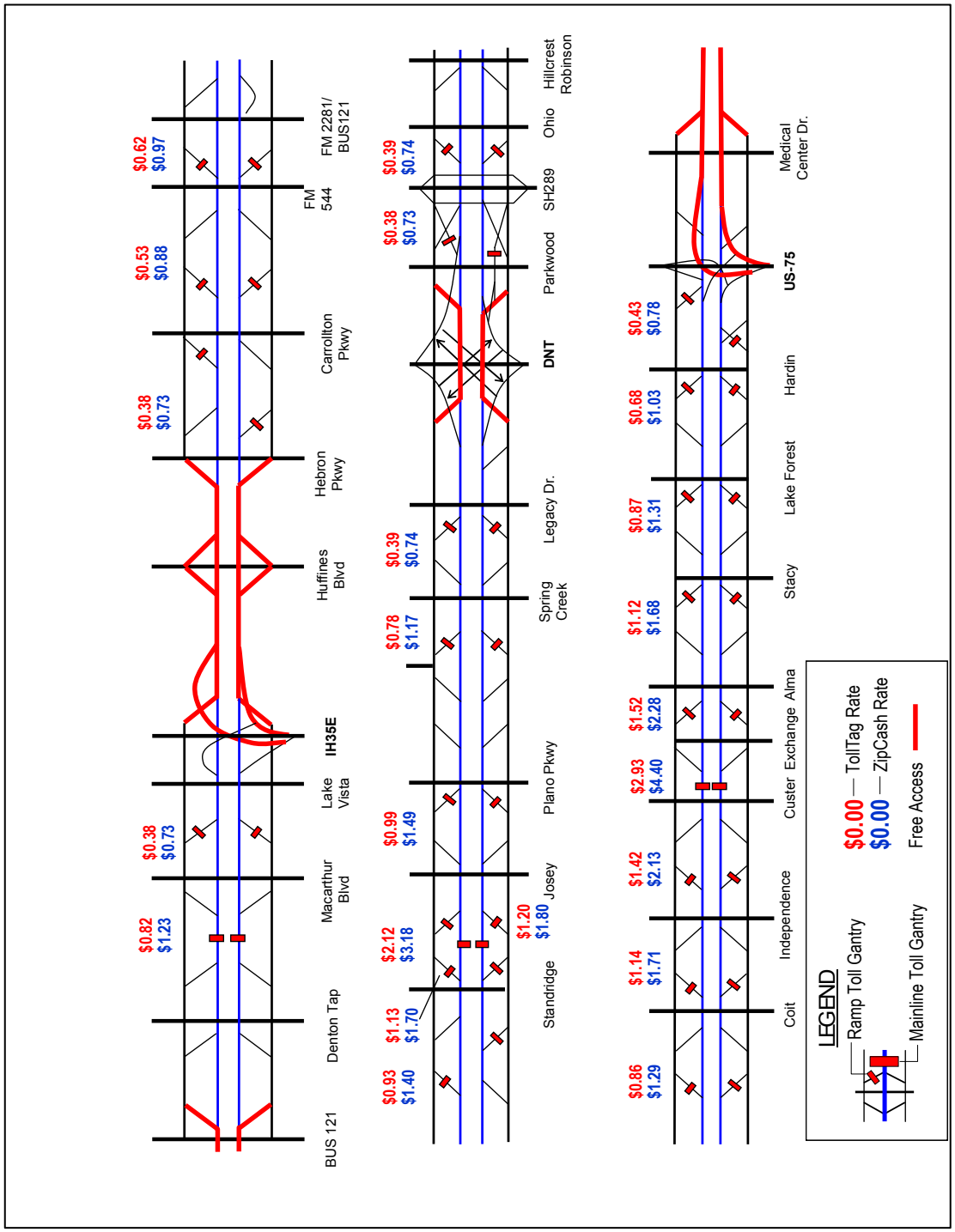


Figure 7-15. SRT Toll Configuration and Toll Charges – 2030

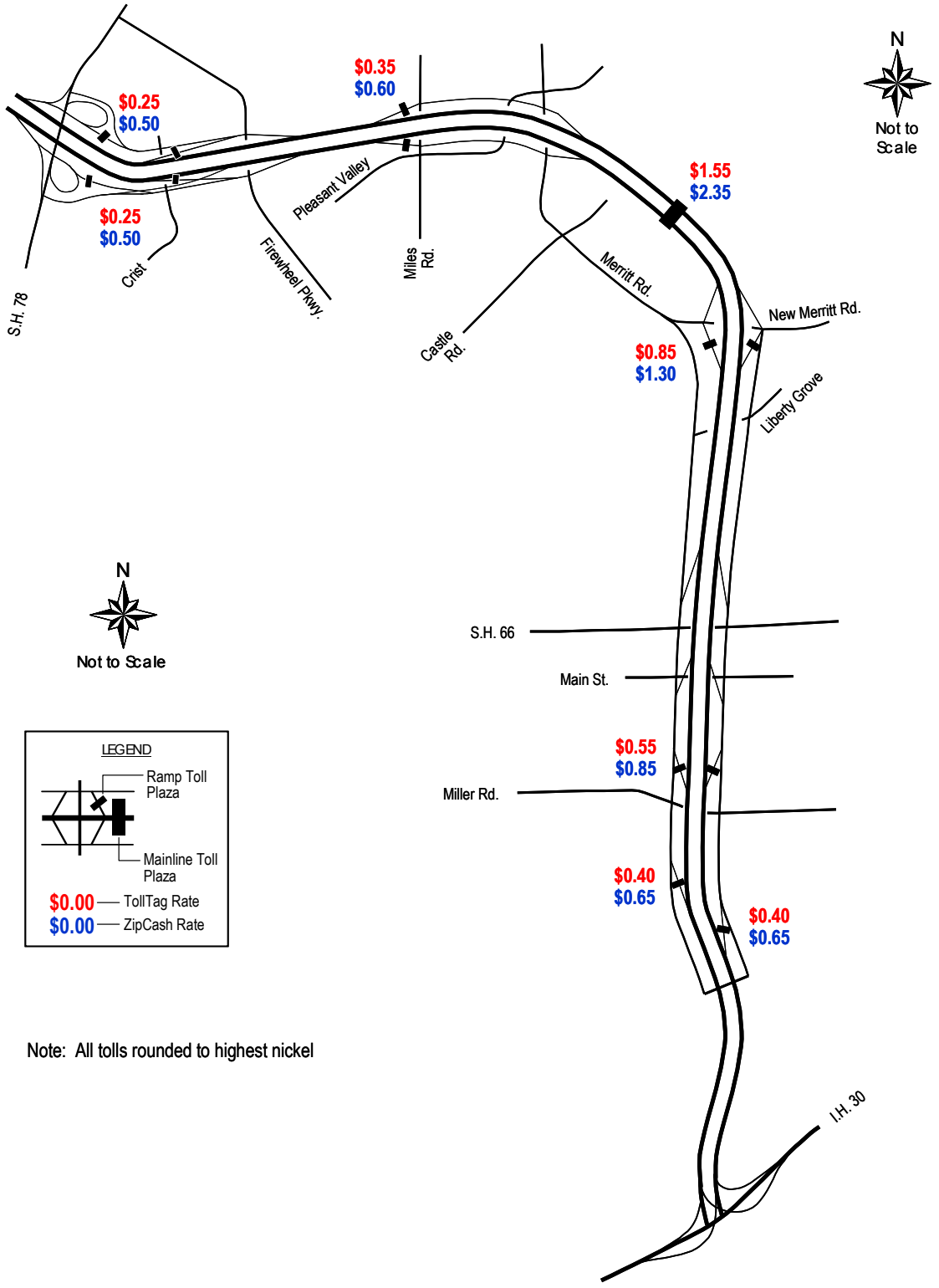


Figure 7-16. PGBT EE Toll Configuration and Toll Charges – 2011

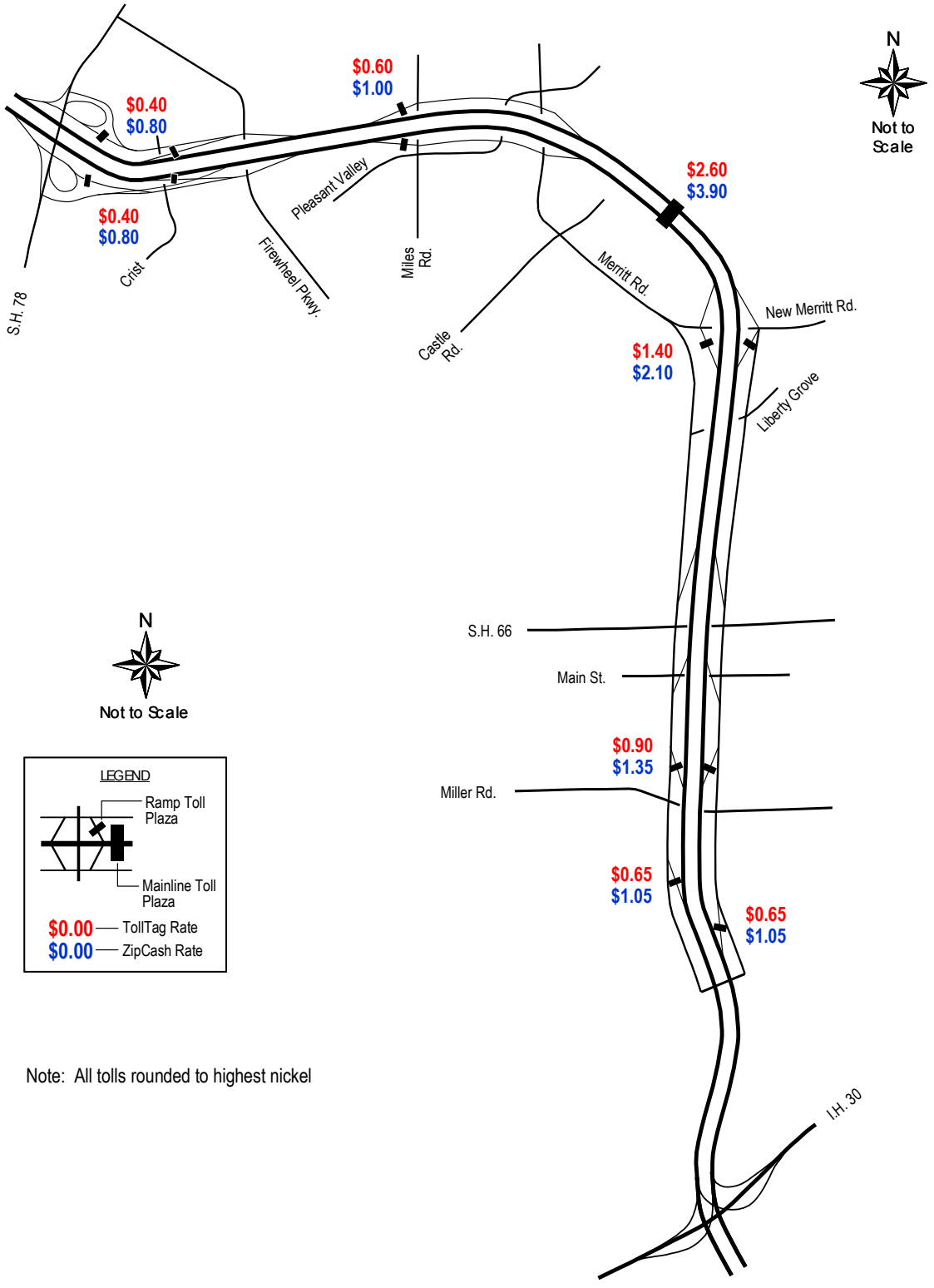


Figure 7-17. PGBT EE Toll Configuration and Toll Charges –2030

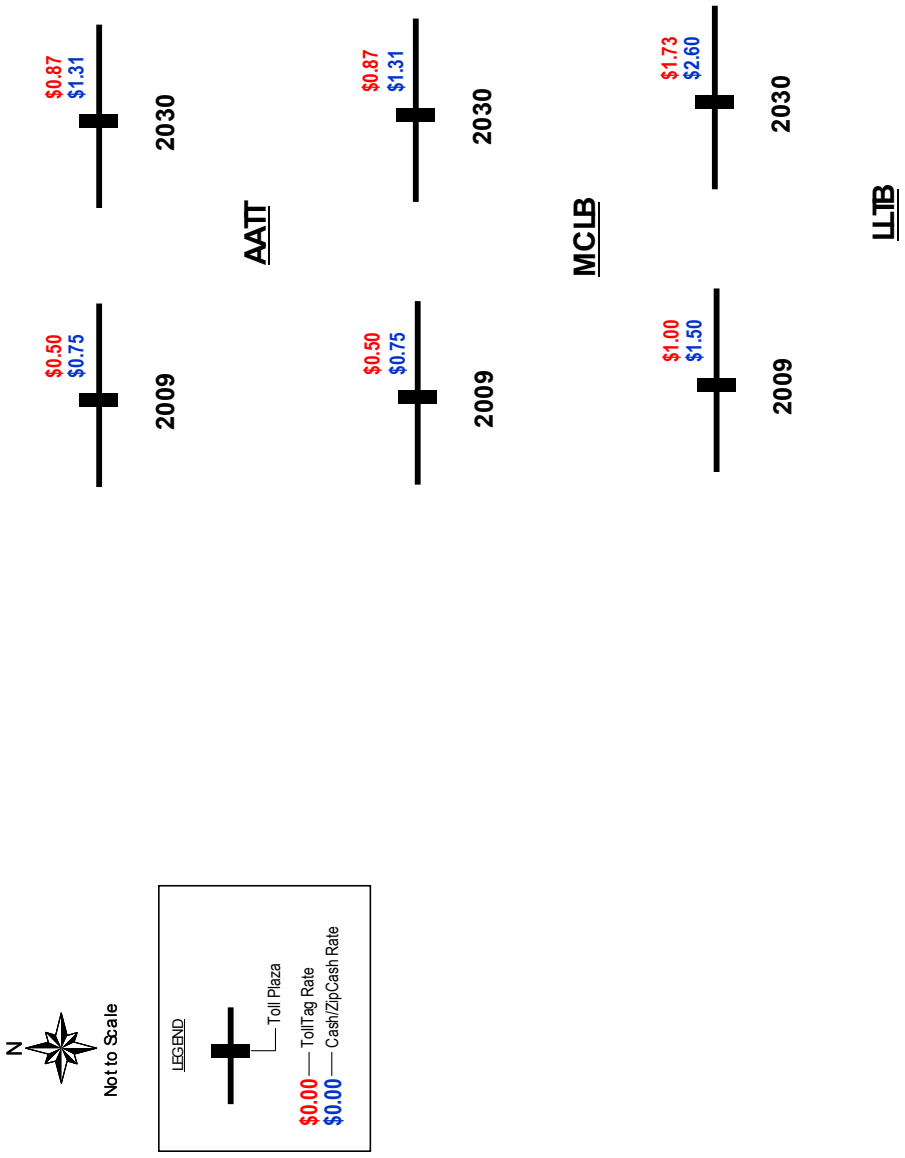


Figure 7-18. AATT, MCLB, LLTB Toll Charges (2009 tolls shown are from September 1, 2009 onwards)

TRAFFIC AND TOLL REVENUE ESTIMATION ASSUMPTIONS

The transaction and toll revenue estimates for the NTTAS facility are predicated on the following specific assumptions, which are considered reasonable for the purposes of this study.

TOLL RATE ASSUMPTIONS:

DNT:

- Auto: $0.145/mile starting September 1, 2009 to June 30, 2011; $0.1531/mile starting July 1, 2011 with adjustments every two years @ 2.75 percent per year.
- Video toll surcharge is the maximum of, a) 50 percent of the TollTag rate or b) $0.20 per transaction on July 1, 2009 inflated by 2.75 percent per year.
- No congestion pricing is assumed.
- Minimum toll charge is based on a trip length of 1.5 miles.
- Tolls charged to users are rounded to the next highest penny (after all-ETC conversion).

PGBT:

- Auto: $0.145/mile starting September 1, 2009 to June 30, 2011; $0.1531/mile starting July 1, 2011 with adjustments every two years @ 2.75 percent per year.
- Video toll surcharge is the maximum of, a) 50 percent of the TollTag rate or b) $0.20 per transaction on July 1, 2009 inflated by 2.75 percent per year.
- No congestion pricing is assumed.
- Minimum toll charge is based on a trip length of 1.5 miles.
- Tolls charged to users are rounded to the next highest penny (after all-ETC conversion).

PGBT EE:

- Auto: $0.145/mile on July 1, 2009 with adjustments every two years @ 3.0 percent per year. This is the "Unified Toll", which is the publicly announced toll, as defined in the PGBT EE project agreement.
- Video toll surcharge is the maximum of, a) 50 percent of the TollTag rate or b) $0.20 per transaction on July 1, 2009 inflated by 3.0 percent per year.
- No congestion pricing is assumed.
- Minimum toll charge is based on a trip length of 1.5 miles.
- Tolls charged to users are rounded to the highest nickel.
- The ratio between the NTTA toll and the Unified Toll remains constant at 80 percent.

SRT:

- Auto (Maximum Base Toll - MBT): $0.145/mile starting September 1, 2009 to June 30, 2011; $0.153/mile starting July 1, 2011 with adjustments every two years @ 2.75 percent per year.
- Video toll surcharge is the maximum of, a) 50 percent of the TollTag rate or b) $0.20 per transaction on July 1, 2009 inflated by 2.75 percent per year.

- Congestion pricing beginning July 1, 2019:
  - Peak Periods (6:30 a.m. - 9:00 a.m. and 3:00 p.m. - 6:30 p.m.): 1.30 x MBT
  - Low-Volume Period (weekdays from 11:00 p.m. to 5:00 a.m.): 0.80 x MBT
  - Off-Peak (hours outside of Peak or Low-Volume periods), including Holidays and Weekends: MBT
- Minimum toll charge is based on a trip length of 1.5 miles.
- Tolls charged to users are rounded to the next highest penny.
- MBT rounded to $0.001/mile.

AATT/MCLB:

- Auto: $0.50 starting July 1, 2009 with adjustments every two years @ 2.75 percent per year.
- Video toll surcharge is the maximum of, a) 50 percent of the TollTag rate or b) $0.20 per transaction on July 1, 2009 inflated by 2.75 percent per year.
- No Congestion pricing.
- Tolls charged to users are rounded to the next highest penny (after all-ETC conversion).

LLTB:

- Auto: $1.00 starting July 1, 2009 with adjustments every two years @ 2.75 percent per year.
- Video toll surcharge is 50 percent of the TollTag rate.
- No Congestion pricing.
- Tolls charged to users are rounded to the next highest penny.

TRUCK TRAFFIC SHARES/TRUCK TOLL ASSUMPTIONS:

- Truck traffic (greater than two axles) shares are applied on a plaza by plaza basis and averages assumed for each facility are shown below:

DNT	0.9 %
PGBT	1.1 %
SRT	2.5 %
PGBT EE	2.5%
AATT	0.6 %
MCLB	0.1 %
LLTB	3.0 %

- Tolls for vehicles with more than two axles are calculated based on "N-1" weighting, where "N" is the number of axles. For example, the toll paid by a five axle vehicle would be four times the toll paid by a two axle vehicle. Average truck toll factor is a ratio of the weighted average of the truck tolls charged to vehicles with greater than two axles to the tolls charged to two-axle vehicles. For example, a high truck toll factor would mean a higher proportion of higher axle

vehicles on a toll facility. If all the trucks using the facility were five axle vehicles, then the average truck toll factor for that facility would be 4.0. The average truck toll factor assumed for various facilities on the NTTAS are shown below:

DNT	2.77
PGBT	2.76
SRT	2.93
PGBT EE	3.00
AATT	2.50
MCLB	3.29
LLTB	2.90

TOLLTAG / ZIPCASH TRANSACTION SHARES:

- LLTB and PGBT EE are assumed to have TollTag participation in their opening years of 65 percent and 75 percent respectively.
- TollTag/ZipCash transaction shares are assumed to follow a logistic function increasing to 95 percent/5 percent for the plazas which have current TollTag share greater than or equal to 87 percent and the remaining plazas, with current TollTag share less than 87 percent, are increased to 90 percent/10 percent.

ANNUAL REVENUE DAYS:

- "Annual revenue days" is a parameter used in the revenue estimation to convert the daily revenue to annual revenue. Ratio of the weekend to weekday traffic on any facility is used to estimate the annual revenue days. Annual revenue days are applied on a plaza by plaza basis and averages for each facility in 2009 are shown below:

DNT	329
PGBT	322
SRT	343
AATT	306
MCLB	357

- Annual revenue days for PGBT EE are assumed to start at 329 in opening year and linearly increase to 335 days per year by 2020 and remain constant thereafter.
- Annual revenue days are assumed to be 328 days per year on LLTB.

DISCOUNT ASSUMPTIONS:

- A "discount" factor is applied to the potential revenue from the TollTag, ZipCash and cash transactions to obtain estimated actual annual revenue collected by NTTAS. Some of the contributing factors to the discount are TollTag read failure, inactive credit cards linked to TollTag accounts, failure to capture license plate information in case of ZipCash transactions, inability to match with the DMV

records in case of ZipCash transactions, non-payment of ZipCash invoices and violation notices, etc.
- TollTag Transaction Discount: one percent for all years.
- ZipCash Transaction Discount: 50 percent in 2009 decreased to 37 percent in 2013, and remains constant thereafter. ZipCash revenue collection lag of three months is assumed.
- Cash Revenue Discount: 25 percent until June 2011.

RAMP-UP ASSUMPTIONS:

- Ramp-up on the future NTTA System facilities is indicated below. Once the ramp-up reaches 100%, it remains constant thereafter.

Year	LLTB	SRT Segment 3	PGBT EE
2010	70%	80%	--
2011	80%	90%	80%
2012	90%	100%	80%
2013	100%	100%	90%
2014	100%	100%	100%

ESTIMATED AVERAGE WEEKDAY TRAFFIC AND TRANSACTIONS

An equilibrium diversion technique was used to carry out traffic assignment runs for three periods, AM peak, PM peak, and off-peak. The model runs were conducted for the years 2009, 2010, 2011, 2012, 2013, 2015, 2019, 2025 and 2030. Traffic volumes were estimated using the "revised-lag" trip tables as described in Chapter 6.

As the NTTAS currently employs a TollTag/Cash/ZipCash toll collection procedure, two separate traffic assignments, one with TollTag toll charges and the other with Cash/ZipCash charges were conducted for representative years. The traffic volumes obtained by the TollTag toll charge assignment were factored by a TollTag factor to obtain the volume of traffic using TollTag facilities. The traffic volumes obtained by the Cash/ZipCash charge assignment run were factored by (1 – TollTag factor) to get the Cash/ZipCash traffic volume. The sum of TollTag and Cash/ZipCash volumes provided the total traffic using the NTTAS. In this manner volume totals on the NTTAS facilities were estimated for representative years. All other years were interpolated or extrapolated between or beyond the modeled years to obtain the yearly traffic and revenue estimates.

The traffic assignment results at each of the analysis years were reviewed for reasonableness and post-model adjustments made as necessary. This included adjustments to reflect model calibration results in the NTTAS corridors. Figures 7-19 through 7-23 illustrate average 2015 and 2030 weekday volumes on each of the NTTAS facilities.

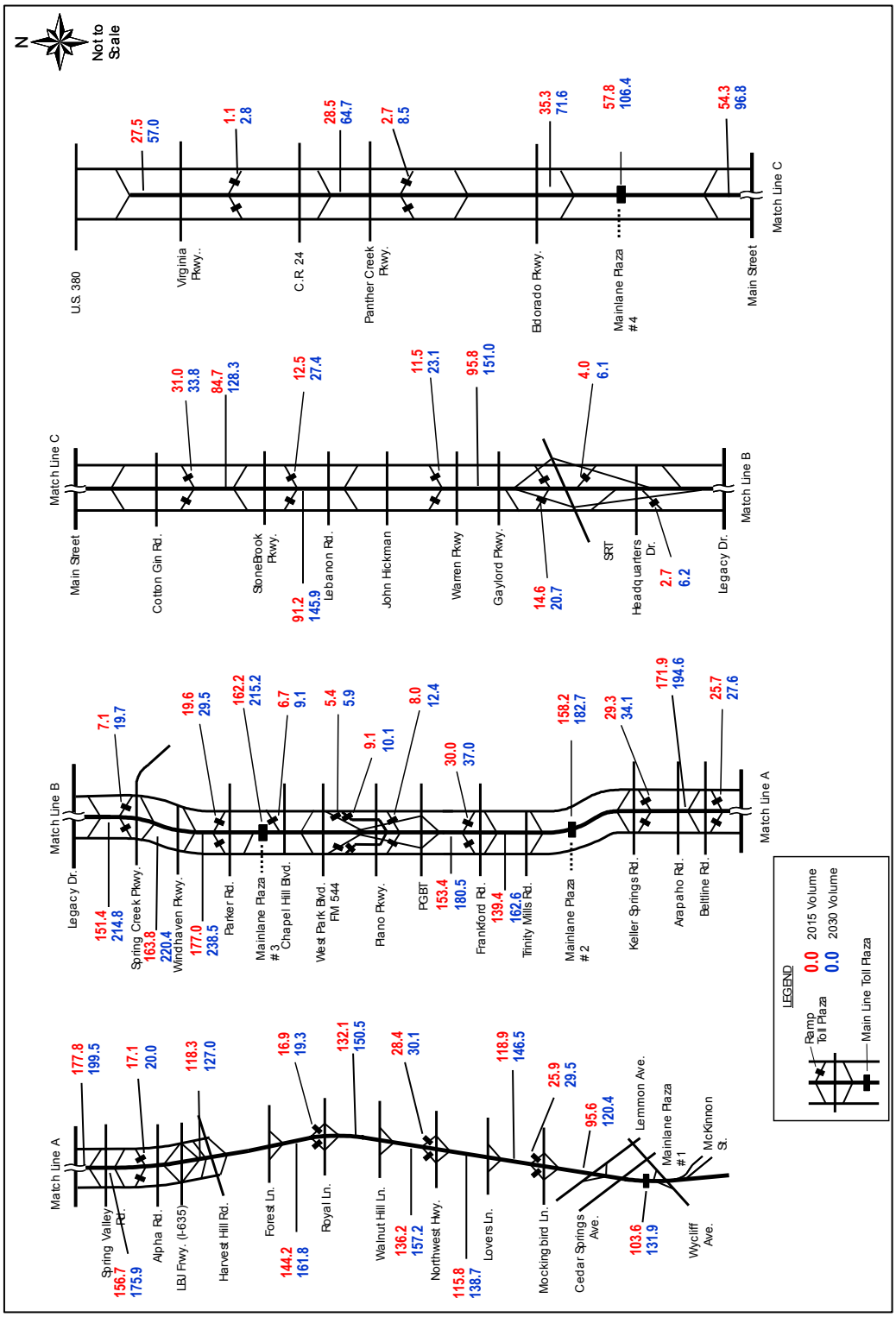


Figure 7-19. Estimated 2015 and 2030 Average Weekday Traffic Volumes – DNT (Volumes Shown in Thousands)

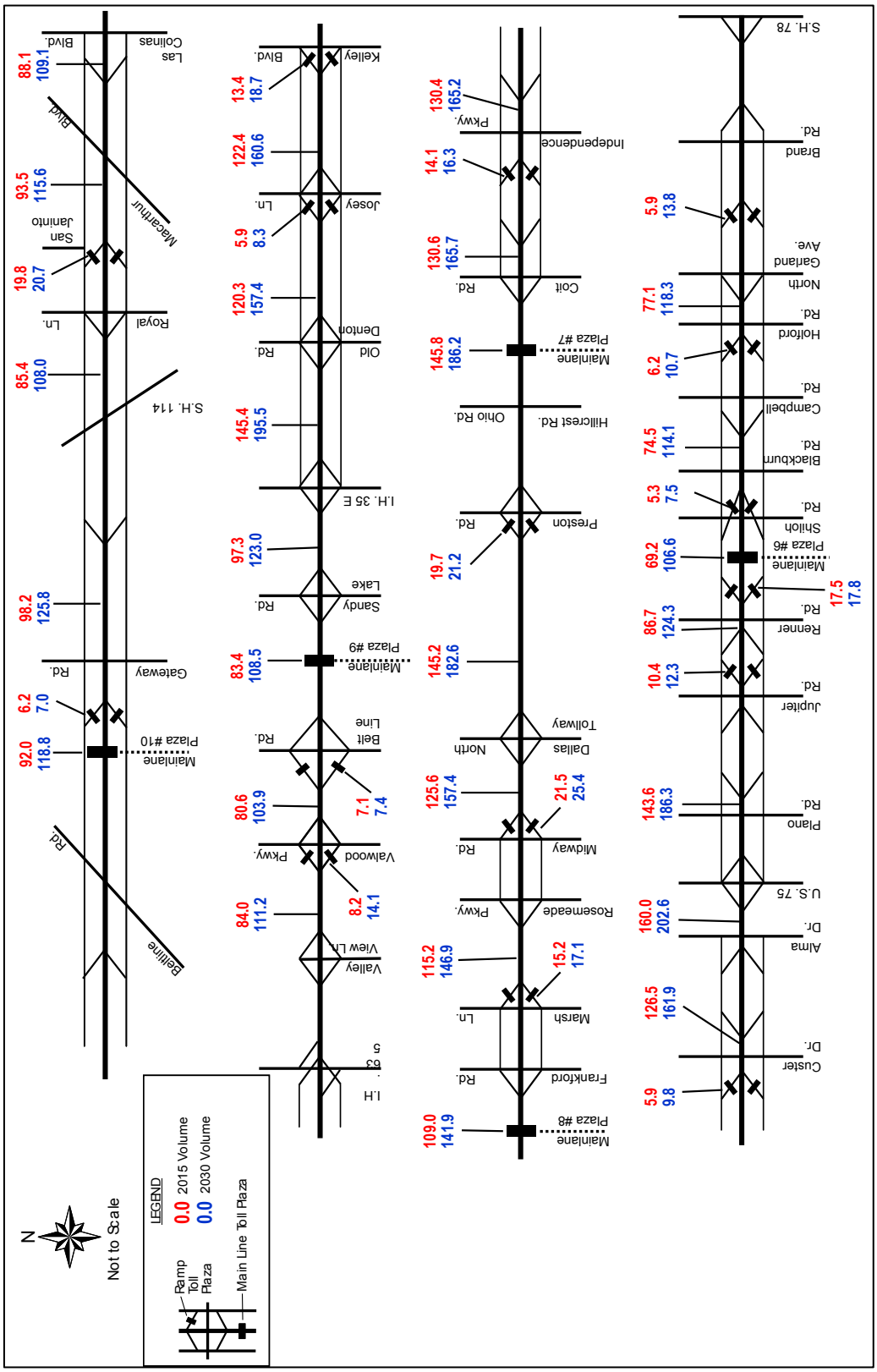


Figure 7-20. Estimated 2015 and 2030 Average Weekday Traffic Volumes – PGBT (Volumes Shown in Thousands)

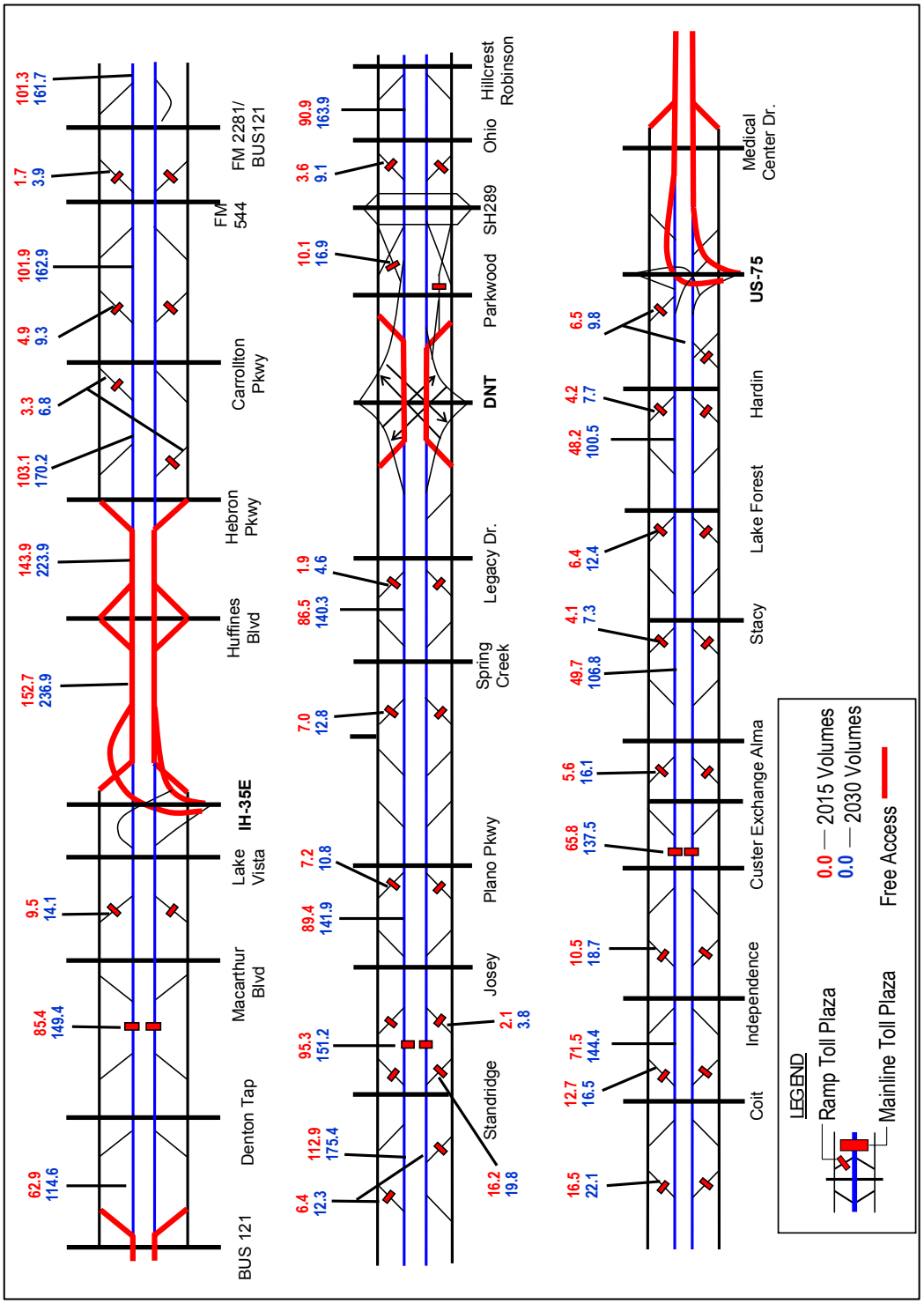


Figure 7-21. Estimated 2015 and 2030 Average Weekday Traffic Volumes – SRT(Volumes Shown in Thousands)

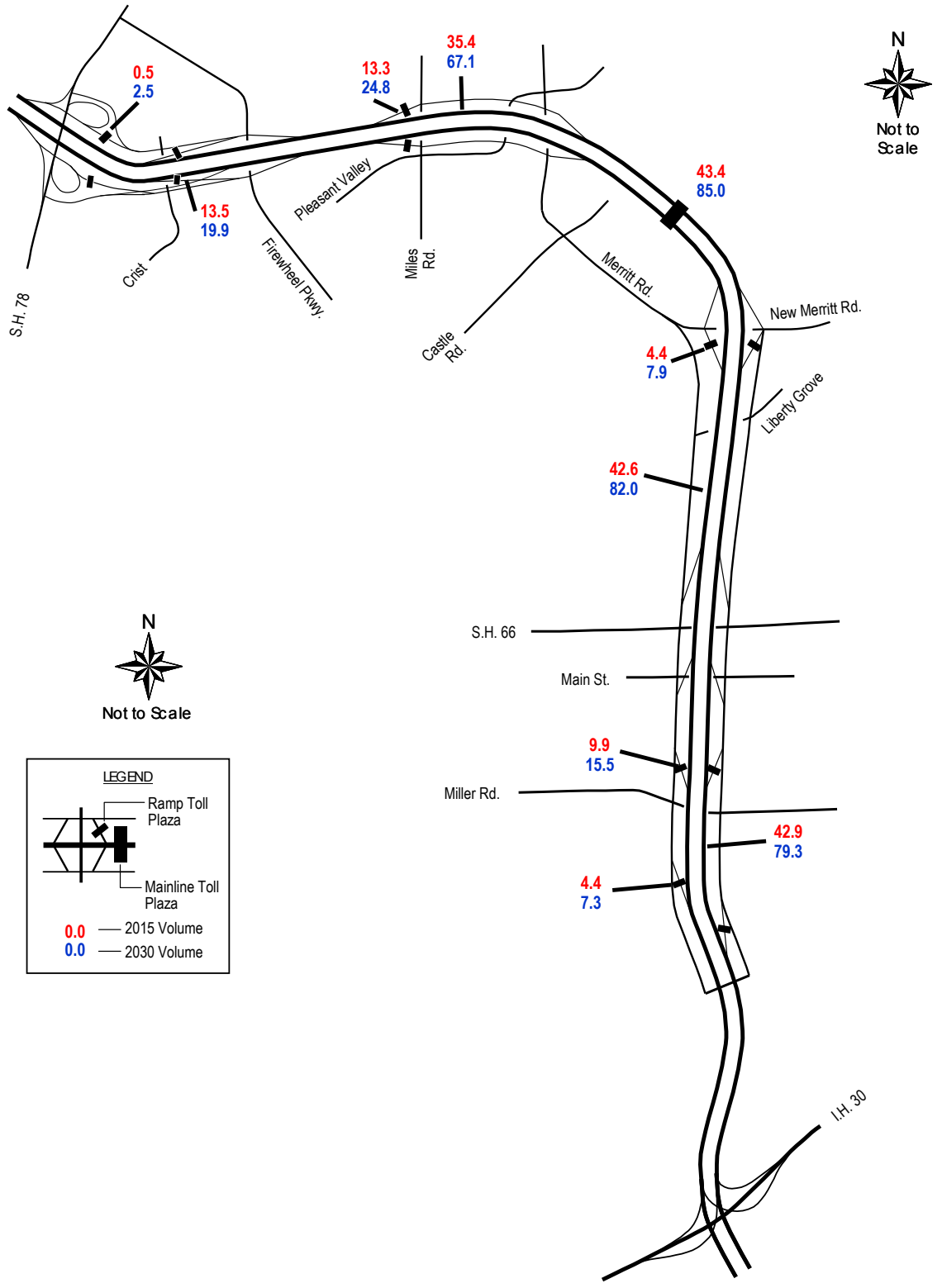


Figure 7-22. Estimated 2015 and 2030 Average Weekday Traffic Volumes – PGBT EE (Volumes Shown in Thousands)

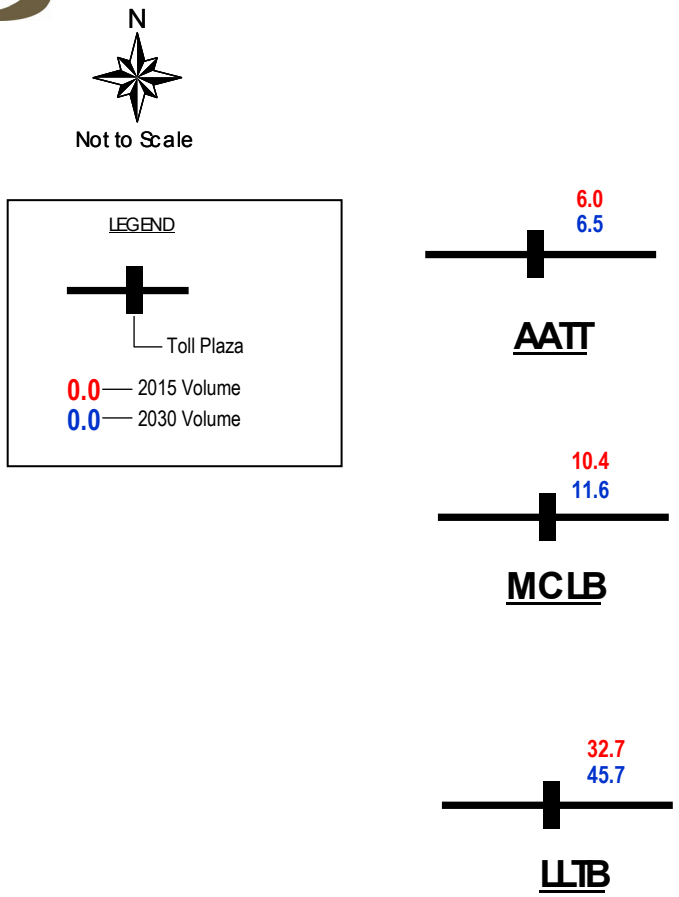


Figure 7-23. Estimated 2015 and 2030 Average Weekday Traffic Volumes – AATT, MCLB, LLTB (Volumes Shown in Thousands)

ESTIMATED ANNUAL NTTAS TOLL REVENUE

Based on the traffic forecast at each toll plaza location, annual forecasts for each facility of the NTTAS were prepared until 2062. The projections extend from 2009 through 2062, and include the revenue forecasts for DNT, PGBT, AATT, MCLB, LLTB, PGBT EE and SRT. In each case, forecasts for each of the facilities are based on modeled traffic estimates at each toll collection location, through the year 2030. These modeled estimates were refined, in "post-model" adjustments, reflecting calibration factors used to match observed 2009 traffic data at each plaza location.

The average toll at each location was based on the current mix of passenger car and commercial vehicle traffic, and the current average tolls, modified in future years to reflect changing assumptions in the proportion of TollTag, cash, and ultimately ZipCash transaction processing. Toll rates for ZipCash transactions will be nominally 50 percent higher than the equivalent TollTag rate (with a minimum differential of $0.20 in 2009$) in each case, as noted previously.

Estimates beyond year 2030 are based on nominal assumptions regarding future traffic growth, with assumed toll rate increases as noted previously. Between 2030 and 2035, traffic is estimated to increase at an average annual rate equivalent to that projected between 2025 and 2030. The growth rate beyond 2035 is assumed to be one percent per year on PGBT and DNT except DNT Phase 3; DNT Phase 3 is assumed to grow at two percent from 2035 to 2040; the growth rate decreases to 1.5 percent between 2040 and 2045 and decreases to one percent after 2045. The growth rates after 2035 are assumed to be 0.4 and 0.5 percent on AATT and MCLB respectively. Growth rates on LLTB are assumed to be 1.8 percent between 2035 and 2045; reducing to 1.5 percent after 2045. Growth rates on PGBT EE are assumed to be 1.3 percent between 2035 and 2045 and one percent after 2045. Growth rate on the section of the SRT west of IH 35 E is assumed to be 1.4 percent beyond 2035. Growth rate on the section of the SRT to the east of IH 35E is assumed to be 1.8 percent between 2035 and 2040 and 1.5 percent beyond 2040.

As shown in Table 7-2, the estimated annual revenue on the DNT is expected to increase from $129.4 million in 2009 to $304.7 million by 2020 and $464.5 million by 2030. Revenue on the PGBT is expected to be $106.0 million in 2009, increasing to almost $245.9 million by 2020 and $375.5 million by 2030. NTTA's share of the revenue on the PGBT EE is expected to be $13.7 million in 2012, increasing to about $40.3 million by 2020 and $75.5 million by 2030. Revenue on the SRT is expected to be $44.3 million in 2009, increasing to $229.7 million by 2020 and $400.6 million by 2030. As 2058 is the end of the fifty-year operational agreement of the SRT between NTTA and TxDOT, the revenue from SRT is included until August 31, 2058. Together, the DNT, PGBT and SRT account for the majority of revenue on the entire NTTAS.

Revenue from the AATT, MCLB and LLTB are expected to be about $3.9 million, combined, in 2009. By 2020 this is estimated to reach a combined $20.4 million, still a very small share of total NTTAS revenue.

Total revenue on the existing NTTAS, is expected to increase from about $283.6 million in 2009 to more than $840.9 million in 2020 and $1,347.9 million in 2030. Driven by nominal traffic growth and continued assumed modest inflationary adjustments in toll rates, revenue on the NTTAS is expected to reach more than $2 billion per year by 2040. Future traffic growth on the NTTAS facilities is constrained to reflect available capacity, although widening of PGBT from six to eight lanes is assumed between IH 35E and SH 78 and the widening of the mainlanes of SRT from six to eight lanes is also assumed.

Figure 7-24 shows the distribution of estimated transactions and toll revenue between mainlane and ramp plazas. Mainlane plazas account for 66.9 percent of total transactions in 2010, decreasing to 65.5 percent by 2030. This reflects the impact of continued strong economic growth in the local areas served by the major tollways, which intends to increase traffic growth at local interchanges. About 81.6 percent of the annual revenue is collected at mainlane plazas in 2010, estimated to increase to about 83.3 percent by 2030. Notwithstanding the small increase in ramp plaza share, traffic and revenue will continue to be dominated by the mainlane plazas on the DNT, PGBT, PGBT EE and SRT.

Figure 7-25 graphically displays the annual revenue forecasts shown previously in Table 7-2 by toll facility. It is clear that the DNT, PGBT and SRT will continue to provide the vast majority of revenue on the existing NTTAS throughout the forecast period. This is further shown in Figure 7-26, which displays the share of total annual revenue contributed by each of the major components. The DNT will provide about 46 percent of all NTTAS revenue in 2009; the share decreases to 34 percent in 2030 and to 32 percent in 2050. The PGBT will provide about 37 percent of all NTTAS revenue in 2009; the share decreases to 28 percent in 2030 and to 27 percent in 2050. The SRT will provide about 16 percent of all NTTAS revenue in 2009; the share increases to 30 percent in 2030 and to 33 percent in 2050. The PGBT EE will provide about three percent of all NTTAS revenue in 2012; the share increases to six percent in 2030 and remains at six percent in 2050. The AATT, MCLB, and LLTB will contribute about two percent of revenue until 2050. This is still a relatively small share and demonstrates the significant importance of the DNT, PGBT and SRT to NTTA revenue and to mobility in the region.

Table 7-2: Estimated NTTAS Annual Toll Revenue						
	DNT	**PGBT**	**AATT/MCLB/LLTB**	**PGBT EE**	**SRT**	**NTTA System**
2009	$129,377,300	$105,992,500	$3,934,900	$0	$44,252,900	**$283,557,600**
2010	$168,535,000	$135,324,000	$7,921,700	$0	$65,352,100	**$377,132,800**
2011	$174,547,800	$147,638,100	$9,539,300	$923,840	$85,559,900	**$418,208,940**
2012	$189,226,700	$160,023,000	$11,627,100	$13,709,680	$102,403,100	**$476,989,580**
2013	$201,487,100	$170,413,600	$13,651,800	$18,433,920	$114,725,300	**$518,711,720**
2014	$213,569,400	$179,893,800	$14,685,100	$22,846,960	$125,776,400	**$556,771,660**
2015	$229,504,700	$189,041,200	$15,555,300	$25,428,880	$136,294,600	**$595,824,680**
2016	$244,193,900	$198,308,800	$16,467,400	$28,341,520	$148,453,700	**$635,765,320**
2017	$258,700,000	$207,506,800	$17,397,700	$31,264,720	$160,806,700	**$675,675,920**
2018	$274,737,500	$217,633,900	$18,466,700	$34,617,840	$174,725,900	**$720,181,840**
2019	$291,019,700	$235,045,500	$19,454,300	$38,043,600	$204,409,300	**$787,972,400**
2020	$304,705,500	$245,890,500	$20,383,800	$40,264,560	$229,684,200	**$840,928,560**
2021	$319,185,000	$257,100,600	$21,296,300	$42,829,760	$244,435,100	**$884,846,760**
2022	$334,984,800	$269,355,900	$22,323,200	$45,661,040	$260,775,700	**$933,100,640**
2023	$350,874,500	$281,087,600	$23,369,900	$48,071,920	$277,805,900	**$981,209,820**
2024	$368,202,100	$293,880,800	$24,536,500	$50,734,720	$296,648,200	**$1,034,002,320**
2025	$385,162,500	$307,463,100	$25,667,900	$57,733,280	$315,986,500	**$1,092,013,280**
2026	$399,869,800	$320,614,600	$26,819,100	$61,223,200	$331,832,700	**$1,140,359,400**
2027	$414,798,900	$332,998,000	$27,922,900	$64,810,000	$347,386,700	**$1,187,916,500**
2028	$430,957,800	$346,456,700	$29,129,500	$68,726,720	$364,334,700	**$1,239,605,420**
2029	$447,060,900	$360,357,800	$30,468,300	$71,966,400	$381,685,300	**$1,291,538,700**
2030	$464,452,100	$375,467,900	$31,935,300	$75,493,280	$400,575,800	**$1,347,924,380**
2031	$482,158,100	$390,366,900	$33,242,400	$80,158,880	$419,889,500	**$1,405,815,780**
2032	$501,235,900	$406,538,200	$34,660,500	$85,275,360	$440,919,900	**$1,468,629,860**
2033	$519,716,200	$422,903,400	$36,146,500	$89,723,760	$462,327,500	**$1,530,817,360**
2034	$539,612,200	$440,651,000	$37,761,300	$94,597,040	$485,638,700	**$1,598,260,240**
2035	$559,996,600	$458,823,700	$39,441,000	$100,257,600	$509,827,800	**$1,668,346,700**
2036	$581,694,700	$477,069,400	$41,264,900	$105,100,880	$534,137,100	**$1,739,266,980**
2037	$603,578,100	$494,379,200	$42,999,300	$108,709,840	$557,690,200	**$1,807,356,640**
2038	$627,099,500	$513,124,200	$44,880,300	$112,606,720	$583,236,200	**$1,880,946,920**
2039	$651,211,700	$532,058,600	$46,828,100	$117,418,960	$608,834,800	**$1,956,352,160**
2040	$677,061,600	$552,609,400	$48,943,200	$122,639,760	$636,603,300	**$2,037,857,260**
2041	$701,177,100	$572,560,000	$51,113,600	$128,563,040	$663,434,800	**$2,116,848,540**
2042	$726,286,500	$594,160,200	$53,472,900	$135,054,240	$692,498,600	**$2,201,472,440**
2043	$751,049,000	$615,849,300	$55,729,300	$140,142,320	$722,029,600	**$2,284,799,520**
2044	$777,513,600	$639,355,400	$58,173,500	$145,637,200	$754,078,800	**$2,374,758,500**
2045	$804,024,300	$663,018,500	$60,683,800	$152,069,440	$785,430,700	**$2,465,226,740**
2046	$831,467,500	$688,668,400	$63,250,400	$158,600,160	$819,417,600	**$2,561,404,060**
2047	$858,699,300	$714,112,800	$65,855,900	$164,763,920	$853,935,900	**$2,657,367,820**
2048	$887,848,000	$741,693,300	$68,686,000	$171,494,880	$891,389,500	**$2,761,111,680**
2049	$916,514,200	$769,299,300	$71,379,200	$177,864,800	$928,347,600	**$2,863,405,100**
2050	$947,257,000	$799,219,300	$74,293,400	$184,768,480	$968,259,500	**$2,973,797,680**
2051	$977,984,700	$828,806,800	$77,392,900	$192,424,960	$1,008,186,600	**$3,084,795,960**
2052	$1,010,966,700	$860,877,800	$80,761,200	$200,733,200	$1,051,469,000	**$3,204,807,900**
2053	$1,044,273,800	$892,372,800	$83,971,800	$208,298,560	$1,095,425,300	**$3,324,342,260**
2054	$1,080,007,500	$926,494,700	$87,448,300	$216,526,400	$1,143,098,800	**$3,453,575,700**
2055	$1,114,946,200	$960,627,400	$91,103,600	$225,291,680	$1,190,719,800	**$3,582,688,680**
2056	$1,152,399,400	$997,615,000	$95,074,300	$234,838,080	$1,242,117,800	**$3,722,044,580**
2057	$1,189,449,400	$1,032,619,900	$98,866,800	$243,448,240	$1,293,108,000	**$3,857,492,340**
2058*	$1,228,996,300	$1,069,478,300	$102,973,000	$252,793,040	$905,868,400	**$3,560,109,040**
2059	$1,268,867,900	$1,105,862,800	$107,254,300	$263,248,000	$0	**$2,745,233,000**
2060	$1,311,653,300	$1,145,352,000	$111,904,800	$274,635,200	$0	**$2,843,545,300**
2061	$1,353,458,900	$1,184,234,500	$116,352,800	$284,780,160	$0	**$2,938,826,360**
2062	$1,398,283,300	$1,226,435,500	$121,169,200	$295,775,280	$0	**$3,041,663,280**

* - Revenue on SRT is included until August 31, 2058.

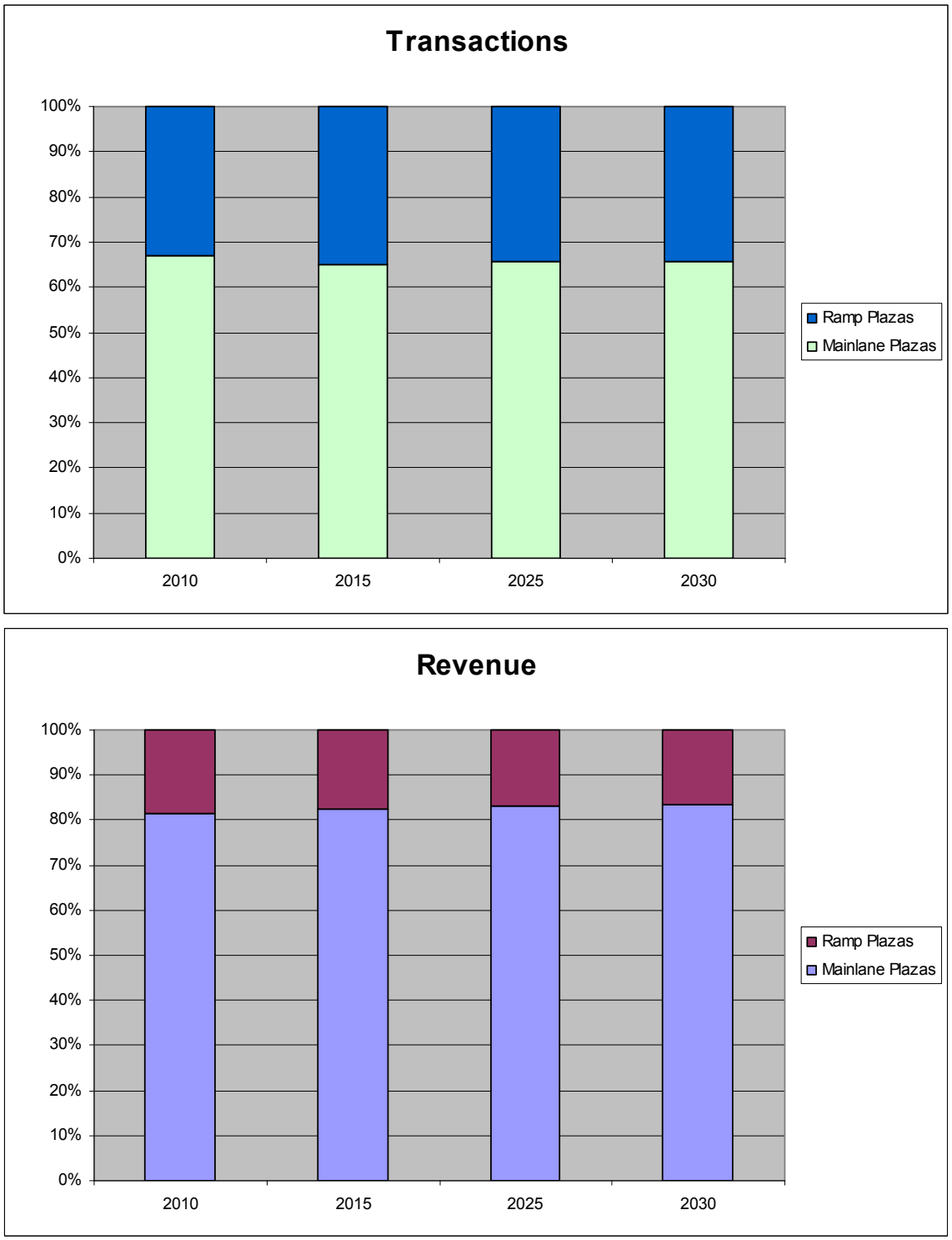


Figure 7-24. Daily Transactions and Annual Revenue Share between Main Lane Plazas and Ramp Plazas of the NTTAS

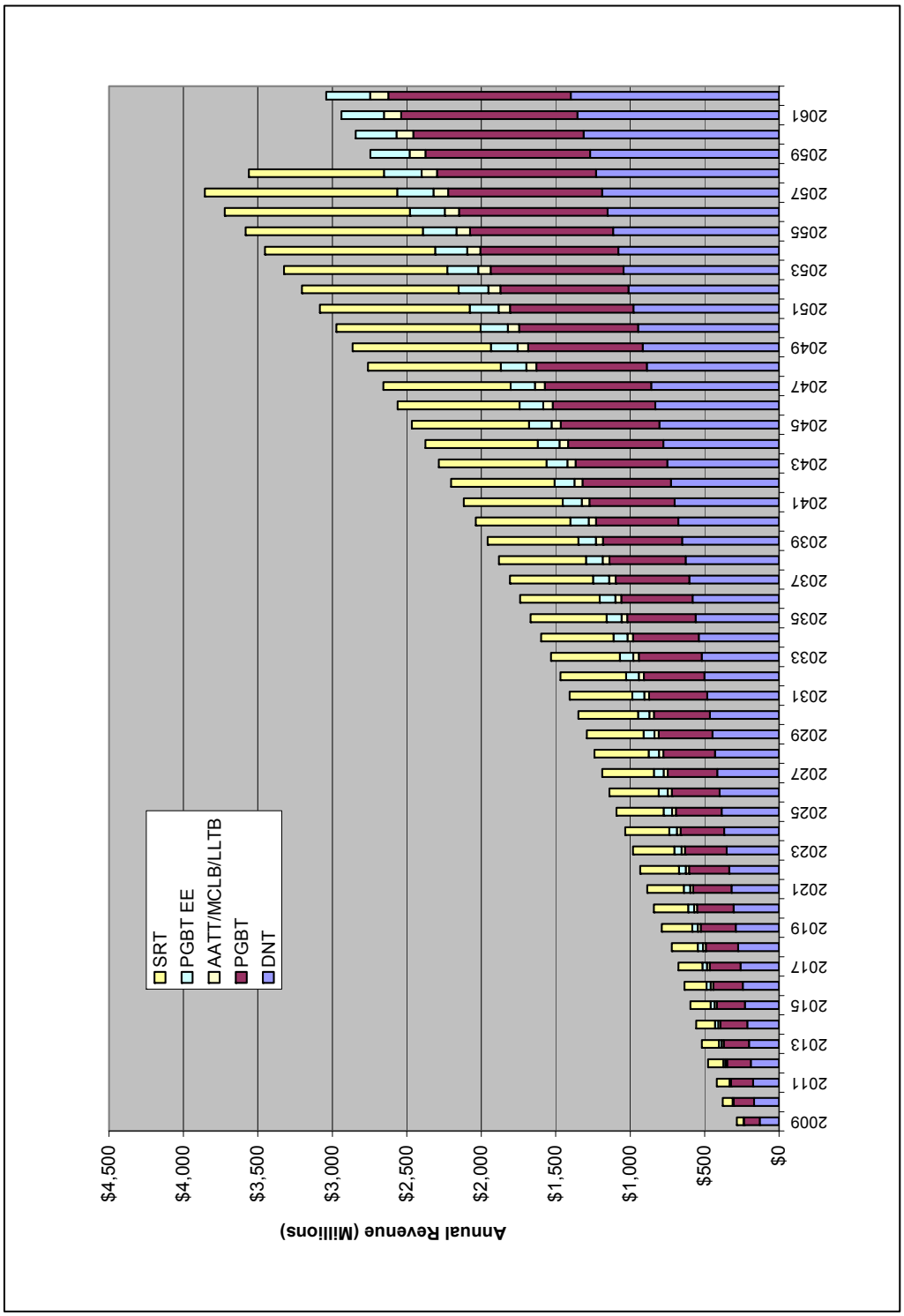


Figure 7-25. Estimated Annual Revenue by Facility - NTTAS

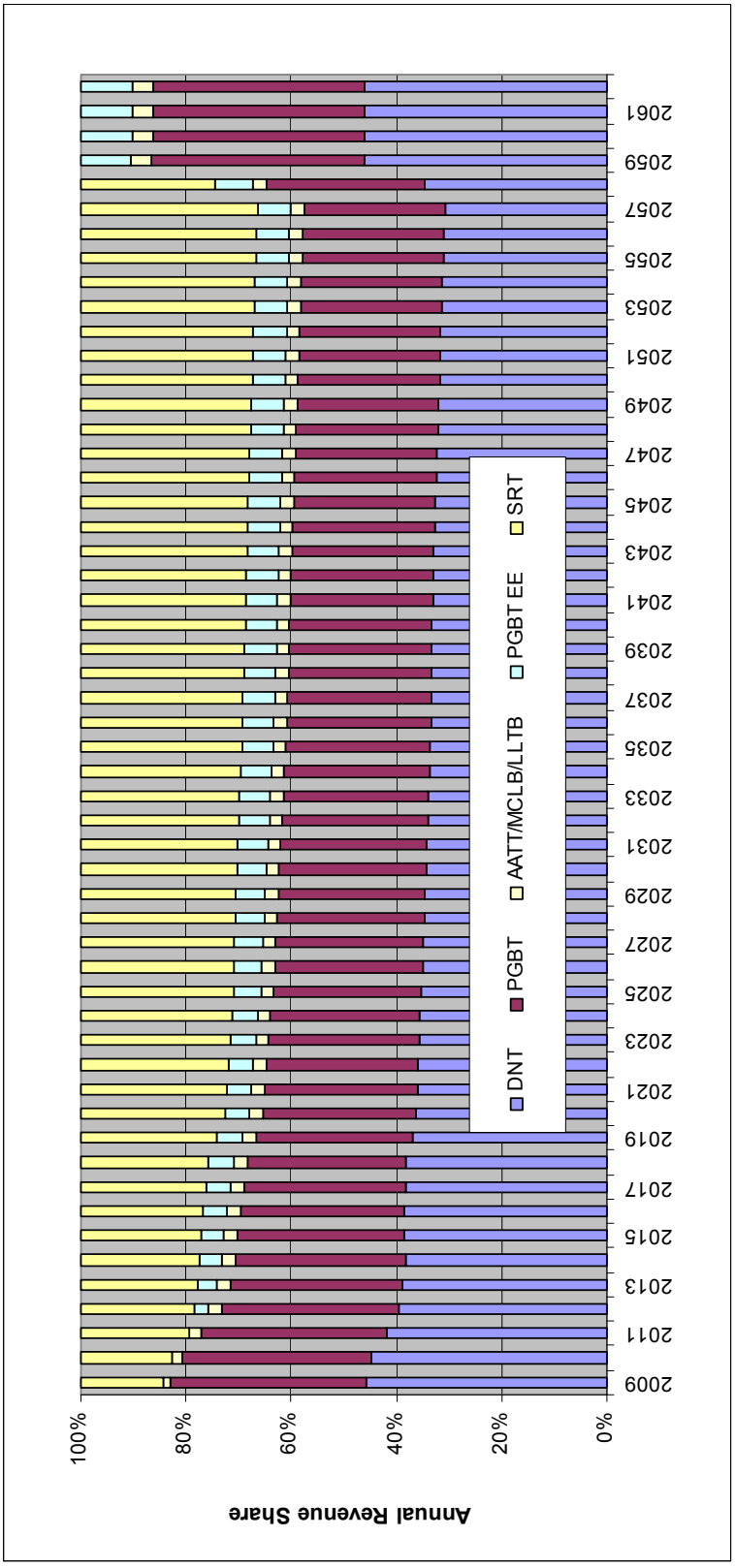


Figure 7-26. Revenue Share of NTTAS Toll Facilities

SENSITIVITY TESTS OF KEY INPUT VARIABLES

IMPACTS OF VALUE OF TIME

Values of time (VOT) assumed to produce the traffic and revenue forecast on NTTAS are shown in Table 6-2. Two alternative scenarios with low VOT and high VOT were created to test the sensitivity of the traffic and revenue forecasts to the VOT. The alternative VOTs were created by assuming a 15 percent decrease and increase for the low and high VOT scenarios, respectively. The scenarios were tested for years 2019 and 2030, and the traffic forecast and revenue comparison is shown in Table 7-3.

In Table 7-3, for year 2019 a 15 percent decrease in VOT, revenue and transactions are expected to decrease by 6.2 percent. In 2030 for a 15 percent decrease in VOT, revenue is expected to drop by 4.9 percent and transactions will decrease by 4.4 percent. In 2019 for a 15 percent increase in VOT, revenue is expected to increase by 5.4 percent and transactions will increase by 4.9 percent. In 2030 for a 15 percent increase in VOT, revenue is expected to increase by 4.2 percent and traffic will increase by 4.0 percent.

Table 7-3: Impacts of Value of Time

Year	Revenue			Revenue Index		
	Base VOT	0.85 VOT	1.15 VOT	Base VOT	0.85 VOT	1.15 VOT
2019	$787,972,400	$739,089,160	$830,373,860	100.0	93.8	105.4
2030	$1,347,924,380	$1,282,416,280	$1,404,545,740	100.0	95.1	104.2
	Transactions			Transactions Index		
Year	Base VOT	0.85 VOT	1.15 VOT	Base VOT	0.85 VOT	1.15 VOT
2019	760,772,700	713,360,000	798,070,700	100.0	93.8	104.9
2030	936,119,200	895,059,500	973,151,600	100.0	95.6	104.0

IMPACTS OF OFFICIAL DEMOGRAPHICS

Traffic and revenue forecasts under the NCTCOG Mobility 2030-2009 Update official demographics/triptables were tested for years 2019 and 2030. As can be seen in Table 7-4, the official demographics/trip tables result in a revenue decrease of 11.6 percent and a transaction decrease of 10.4 percent in 2019. In 2030, the decrease in revenue and transactions are 10.5 percent and 9.8 percent respectively.

Table 7-4: Impacts of Official Demographics

	Revenue		Revenue Index	
Year	Base	Official Demographics	Base	Official Demographics
2019	$787,972,400	$696,694,700	100.0	88.4
2030	$1,347,924,380	$1,206,349,380	100.0	89.5
	Transactions		Transactions Index	
Year	Base	Official Demographics	Base	Official Demographics
2019	760,772,700	681,420,800	100.0	89.6
2030	936,119,200	844,821,000	100.0	90.2

IMPACTS OF SEVERE DEMOGRAPHIC GROWTH STAGNATION

Traffic and revenue forecasts were tested under severe demographic growth stagnation scenarios. The demographics are assumed to lag by five and ten years, and the corresponding traffic and revenue estimates were evaluated for 2019 and 2030. As can be seen in Table 7-5, the 5 year lag demographics/trip tables result in a revenue decrease of 19.0 percent in 2019 and 6.1 percent in 2030. In the case of a 10 year lag in demographics as shown in Table 7-6, the revenue drops are 36.3 percent and 15.9 percent in 2019 and 2030 respectively. The decrease in transactions follows a similar pattern as that of the revenue.

Table 7-5: Impacts of 5 year Lag in Demographics

	Revenue		Revenue Index	
Year	Base	5 year Lag in Demographics	Base	5 year Lag in Demographics
2019	$787,972,400	$638,086,300	100.0	81.0
2030	$1,347,924,380	$1,266,239,300	100.0	93.9
	Transactions		**Transactions Index**	
Year	Base	5 year Lag in Demographics	Base	5 year Lag in Demographics
2019	760,772,700	630,506,700	100.0	82.9
2030	936,119,200	884,719,400	100.0	94.5

Table 7-6: Impacts of 10 year Lag in Demographics

	Revenue		Revenue Index	
Year	Base	10 year Lag in Demographics	Base	10 year Lag in Demographics
2019	$787,972,400	$502,312,300	100.0	63.7
2030	$1,347,924,380	$1,134,068,500	100.0	84.1
	Transactions		**Transactions Index**	
Year	Base	10 year Lag in Demographics	Base	10 year Lag in Demographics
2019	760,772,700	514,627,600	100.0	67.6
2030	936,119,200	795,947,300	100.0	85.0

DISCLAIMER

Results, findings, conclusions and recommendations found in this report are the direct result of the application of current state-of-the-practice processes and procedures in traffic and toll revenue forecasting. WSA believes that projections and other forward-looking statements contained within this report are based on reasonable assumptions as of the date of this report. However, there is considerable uncertainty inherent in forecasting traffic and revenue for any toll facility. There may sometimes be differences between forecasted and actual results caused by events and circumstances beyond the control of the forecasters. These differences could be material. Also, it should be recognized that traffic and revenue forecasts in this document reflect the overall estimated long-term trend. Actual experience in any given year may vary due to changing economic conditions or other factors.

In developing these forecasts, WSA has reasonably relied upon the accuracy and completeness of information provided (both written and oral) by North Texas Tollway Authority staff and consultants, North Central Texas Council of Governments staff and other local and state agencies. WSA has also relied upon the reasonable assurances of some independent parties and is not aware of any facts that would make such information misleading. Determination of several key variables impacting the traffic and revenue forecasts are the result of WSA's professional qualitative judgment based upon years of industry experience. These variables must be considered together as a whole rather than as discrete variables. Misleading or inaccurate conclusions could result without appropriate consideration of the intent or application of these variables or the underlying methodologies used to obtain the results.

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APPENDIX A

INDEPENDENT ECONOMIC REVIEW

This appendix contains the documentation of the independent economic review as provided by the subconsultant, Weinstein, Clower & Associates.

WEINSTEIN, CLOWER & ASSOCIATES
Economic and Policy Analysis

P.O. Box 795001, Dallas, Texas 75379
(214) 202-4692 (214) 707-1834

May 7, 2009

Mr. Michael Copeland
Senior Project Manager
Wilbur Smith Associates
4925 Greenville Ave, Suite 1300
Dallas, TX 75206

Re: Contingency Planning: Traffic and Revenue Analysis

Dear Mr. Copeland:

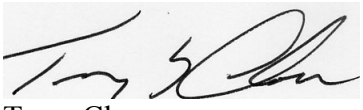
Weinstein and Clower Associates (WCA) is pleased to submit this Recent Economic Trends: Impacts on Socioeconomic Projections of the North Texas Tollway Authority Service Area report for the Contingency Planning: Traffic and Revenue Analysis project. The report offers a view of recent economic conditions –with some historical context – and our outlook for near term national and regional economic recovery. We specifically review five separate projections of population and employment trends previously conducted for NTTA and assess whether current economic conditions invalidate the findings of these previous analyses.

It is hereby certified that, in our opinion the population and employment projections offered in previous analyses require little to no adjustment. The depth and duration of the current economic recession remain unknown, though we anticipate recovery late in 2009 through mid-year 2010. However, current national and local economic conditions are not expected to substantially impact long range growth potential. It would be prudent for planning purposes to assume that growth will be delayed by one to two years.

We gratefully acknowledge the assistance and cooperation received from WSA, as well as others contacted during the course of the study. WCA sincerely appreciates the opportunity to have participated in this important project.

Respectfully submitted,

Weinstein Clower and Associates



Terry Clower
Principal, WCA

Recent Economic Trends: Impacts on Socioeconomic Projections of the North Texas Tollway Authority Service Area.

Prepared by:

Weinstein, Clower & Associates
Dallas Texas

May 2009

Introduction

In the following, we offer an assessment of the validity of previous socio-economic forecasts for the North Texas Tollway Authority (NTTA) service area in light of current economic conditions in the North Central Texas region. The approach used for this effort is to first describe a picture of the regional economy as we endure what many believe, including the authors of this report, to be the worst national economic downturn since the Great Depression. We conclude this introductory section with our outlook for the depth and duration of the downturn for the regional economy, our foretelling of how the local economy will perform as the national economy returns to growth, and examination of the impact of economic trends on historical NTTA toll revenues. We then offer brief reviews of five separate forecasts previously conducted for NTTA over the past few years and assess whether current economic conditions invalidate the findings of these previous analyses. Finally, we examine population and employment projections at the county level before drawing last conclusions. In entering this project, we were looking for four possible conclusions for the reviewed forecasts; existing

forecasts are valid within current parameters, existing forecasts remain valid with minor adjustments, continued forecast validity requires moderate adjustments with possible significant adjustments in specific parameters, and the reviewed forecast is no longer valid.

It is important to note that this assessment does not take into account any specific development projects that could be funded by the $75 billion federal economic stimulus package. However, it is implicit in our overall assumptions that new government spending will tend to lessen the depth and duration of the current recession with attendant impacts on regional population and employment growth.

For this report there is no need to create suspense before the conclusions are revealed. Our review of the forecasts finds that with, at most, minor adjustment these forecasts offer reasonable long term projections of socio-economic trends given current and near term economic conditions. The North Central Texas region has weathered economic storms before consistently recovering with comparative rapidity. We find little evidence that the current national economic malaise will do more than to slow regional economic and population growth and that, at most, the long range projections will be delayed by one to two years.

Overview and Outlook for the Dallas-Fort Worth Metropolitan Area

The Dallas-Fort Worth metropolitan area is currently the 4th largest urban region in the United States with a population of about 6.1 million at the end of 2007 (see Table 1). What's more, since 1990 DFW has been the second-fastest growing major metropolitan area in the country, adding almost 2.2 million residents during that 17-year period (see Table 2).

Table 1
US Population Ranking

MSA	July 2007
New York-Northern New Jersey-Long Island, NY-NJ-PA	18,815,988
Los Angeles-Long Beach-Santa Ana, CA	12,875,587
Chicago-Naperville-Joliet, IL-IN-WI	9,522,879
Dallas-Fort Worth-Arlington, TX	**6,144,489**
Philadelphia-Camden-Wilmington, PA-NJ-DE-MD	5,827,962
Houston-Sugar Land-Baytown, TX	5,629,127
Miami-Fort Lauderdale-Miami Beach, FL	5,413,212
Washington-Arlington-Alexandria, DC-VA-MD-WV	5,306,125
Atlanta-Sandy Springs-Marietta, GA	5,271,550
Detroit-Warren-Livonia, MI	4,467,592

U.S. Census Bureau, Population Estimates Program, 2008

Table 2
Major Metro Areas by Growth Rate
1990 to 2007

	Metropolitan Area	1990 Population	2007 Population	% Change
1	Atlanta-Sandy Springs-Marietta	3,069,425	5,271,550	71.7%
2	Dallas-Fort Worth-Arlington	3,989,294	6,144,489	54.0%
3	Houston-Baytown-Sugar Land	3,767,218	5,629,127	49.4%
4	Miami-Fort Lauderdale-Miami Beach	4,056,228	5,413,212	33.5%
5	Washington-Arlington-Alexandria	4,122,259	5,306,125	28.7%
6	Chicago-Napier-Joliet	8,181,939	9,522,879	16.4%
7	Los Angeles-Long Beach-Santa Ana	11,273,720	12,875,587	14.2%
8	New York-No. New Jersey-Long Island	16,863,671	18,815,988	11.6%
9	Philadelphia-Camden-Wilmington	5,435,550	5,827,962	7.2%
10	Detroit-Warren-Livonia	4,248,699	4,467,592	5.2%

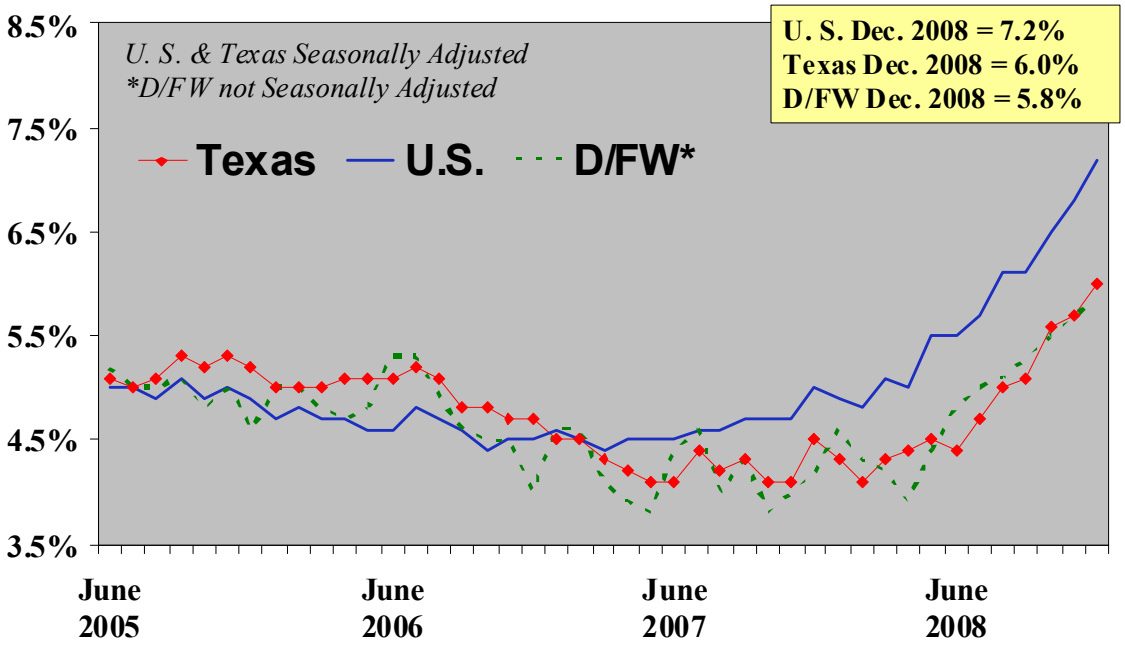
Source: U.S. Census Bureau

On the employment front, DFW's recent performance has been even more remarkable. In the three-year period between 2004 and 2007, the Metroplex added almost 300,000 jobs—a greater numerical increase than in any previous three-year period (see Table 4). Though job growth slowed in 2008 in tandem with the national recession, DFW still managed to add about 40,000 jobs according to preliminary data from the Texas Workforce Commission. By contrast,

payroll employment shrank by almost 3 million nationwide during 2008. The relative strength of the DFW economy is also evidenced by an unemployment rate well below the national average at the end of 2008 (see Figure 1).

Figure 1

Unemployment Rate, U. S., Texas, & D/FW



Source: Texas Workforce Commission

With the nation entering year two of the most severe economic downturn since the 1930s, the Texas Comptroller of Public Accounts has forecast a net loss of about 110,000 jobs statewide during 2009. As the Dallas-Fort Worth region accounts for about one-third of the state's economic activity, net job losses of between 30,000 and 40,000 can be expected in the Metroplex during 2009. The information technology and logistics sectors are especially vulnerable to job losses over the next year, as well as retail trade. However, it should be kept in mind that with nearly 3 million Metroplex residents employed at the end of 2008, the projected job loss would amount to only about one percent of current employment.

The Metroplex housing market has also held up much better than most other markets (see Table 3). While median home values plummeted more than 20 percent in many parts of the U.S. last year, Dallas-Fort Worth's 1.8% drop was the smallest of any major metropolitan area. Because home price increases in the Dallas area were relatively moderate during the first half of this decade, the recent drop in median home values has been modest (see Figure 2)

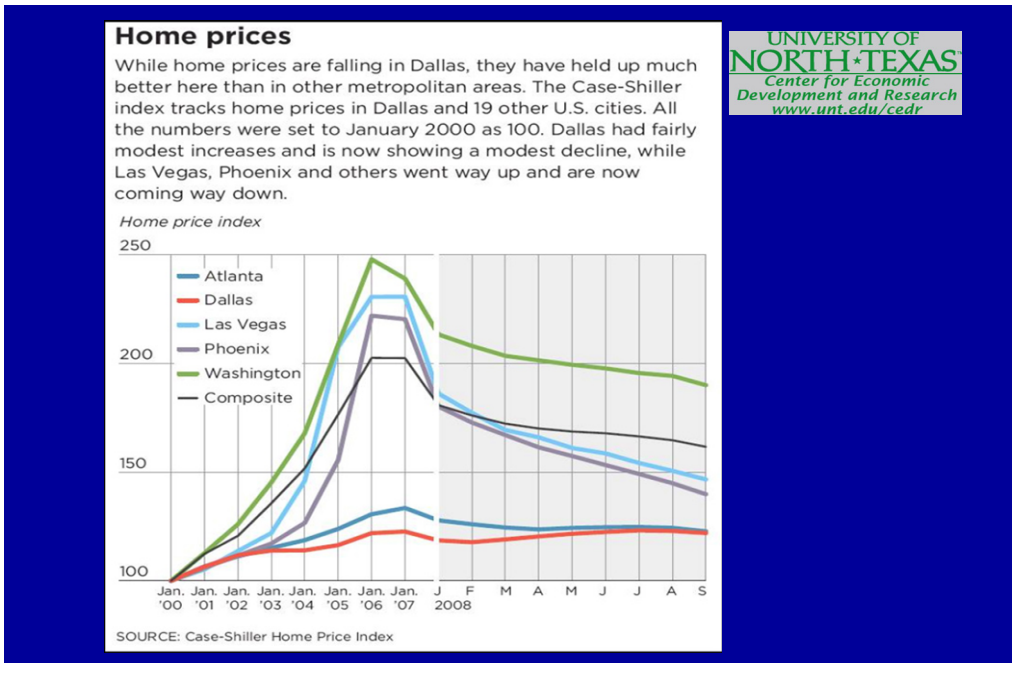
Table 3

Median Home Prices by Metro Area

Area	2008 Value	Change from 2007
Las Vegas	$ 182,484	-26.8%
Phoenix	$ 179,847	-22.3%
Orlando	$ 172,188	-20.7%
Los Angeles	$ 410,692	-21.0%
New York	$ 395,478	-6.2%
DALLAS-FORT WORTH	$ 132,312	-1.8%
US Median	$ 192,119	-11.6%
Source: Zillow		

Figure 2

Home Price Trends for Selected Major Metropolitan Areas



It is also important to remember that the Dallas-Fort Worth region evinced a remarkable ability to rebound smartly after past economic downturns. For example, in the aftermath of the collapse of the north Texas banking and real estate industries in the mid-1980s, the Metroplex lost about 50,000 jobs. But between 1988 and 1991, 111,000 jobs were added to area payrolls.

Similarly, following the "tech wreck" that occurred between 2001 and 2003, and which hit the Metroplex especially hard due to the prevalence of many telecommunications and other information technology companies in the region, the north Texas area lost about 100,000 jobs. But, as we see in Table 4, between 2004 and 2007 the Dallas-Fort Worth area recorded net job growth nearly triple the number of jobs lost in the 2001-2003 period.

If past is prologue, once the national economy begins to recover the Metroplex will once again outperform the U.S. in terms of job and income growth. All of the factors that have made DFW a desirable place to live and work are still in place: a moderate climate, central location, low cost-of-living, excellent transportation infrastructure, economic diversity, and low personal and business tax burdens. What's more, because the long-term prospects are so bleak in places like the industrial Midwest and California, we can expect a renewed influx of people and businesses into north Texas when the national economy rebounds.

Table 4
Employment Change 2004-2007

	DFW	Houston	Austin	San Antonio	Texas
2004	2,698,200 (1.2%)	2,289,800 (0.7%)	667,400 (2.2%)	760,000 (1.1%)	9,497,100 (1.3%)
2005	2,766,500 (2.5%)	2,348,600 (2.5%)	692,200 (3.7%)	782,000 (2.9%)	9,740,500 (2.6%)
2006	2,860,800 (3.4%)	2,446,000 (4.2%)	720,000 (4.0%)	811,300 (3.7%)	10,053,300 (3.2%)
2007	2,990,800 (4.5%)	2,568,500 (5.0%)	763,300 (6.0%)	840,100 (3.6%)	10,451,700 (4.0%)
Change 04-07	292,600	278,700	95,900	80,100	954,600

Source: Texas Workforce Commission

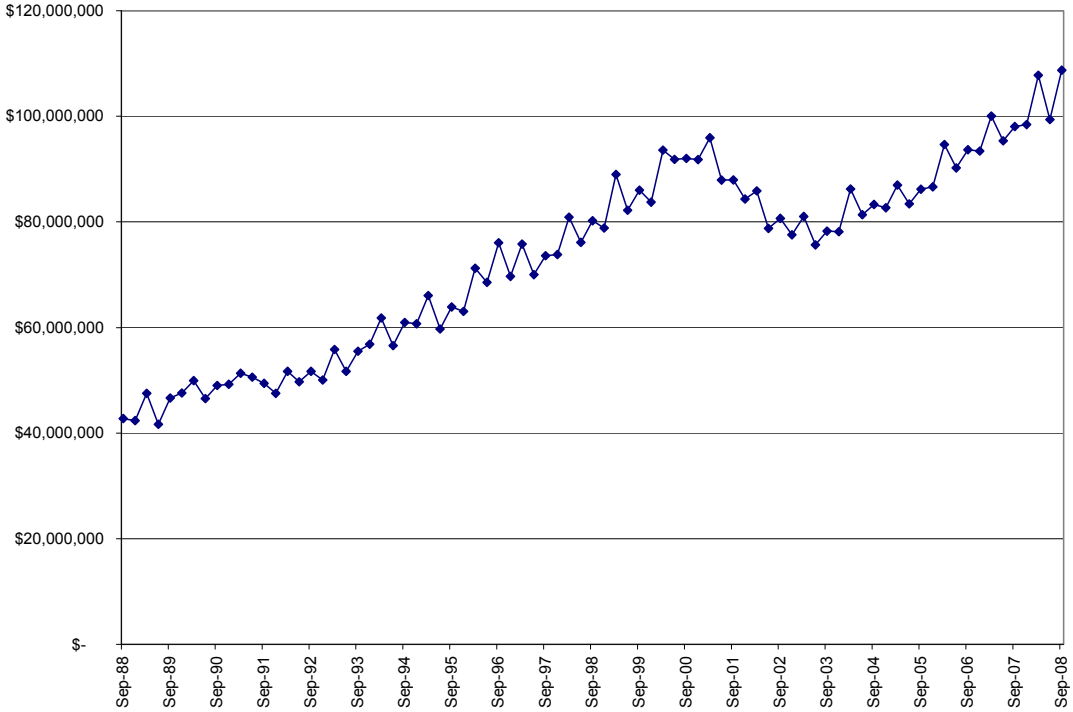
There has been much made in recent weeks about the disappearing consumer. Auto sales are dismal, noted retailers are liquidating, and holiday spending was well below expectations. Media reports have laid the blame for retailers' woes on increasing unemployment, tighter credit standards, and plummeting consumer confidence. We've seen this before. In a recent review of historical sales and use tax allocations paid to Dallas Area Rapid Transit participant cities, we found that the tech-wreck and national recession of 2001-2002 did have a substantial negative impact. As shown in Figure 3, total sales and use tax allocations did not recover for a period of about 4 years. (DART allocations are examined because DART cities serve as a reasonable geographic proxy for NTTA's service area.) However, overall employment and population growth recovered much more quickly, as discussed earlier. The point here is that even though sales and use tax allocations, which are dominated by taxable retail trade activities, are down, that does not mean that all sectors of the economy are going in the tank.

Still, the long-term prospects for the Metroplex remain extremely bright. If past is prologue, the region will once again witness a surge of in-migration and business relocations once the national and global economies start to recover.

The most recent projections from the Texas State Data Center show the region with a population of more than 10 million by 2040 (see Figure 4). For Dallas and Tarrant Counties—the two principal counties served by NTTA projects—their combined population is projected to grow from about 4.1 million today to 6.3 million in 2040 (see Figures 5 and 6).

Figure 3

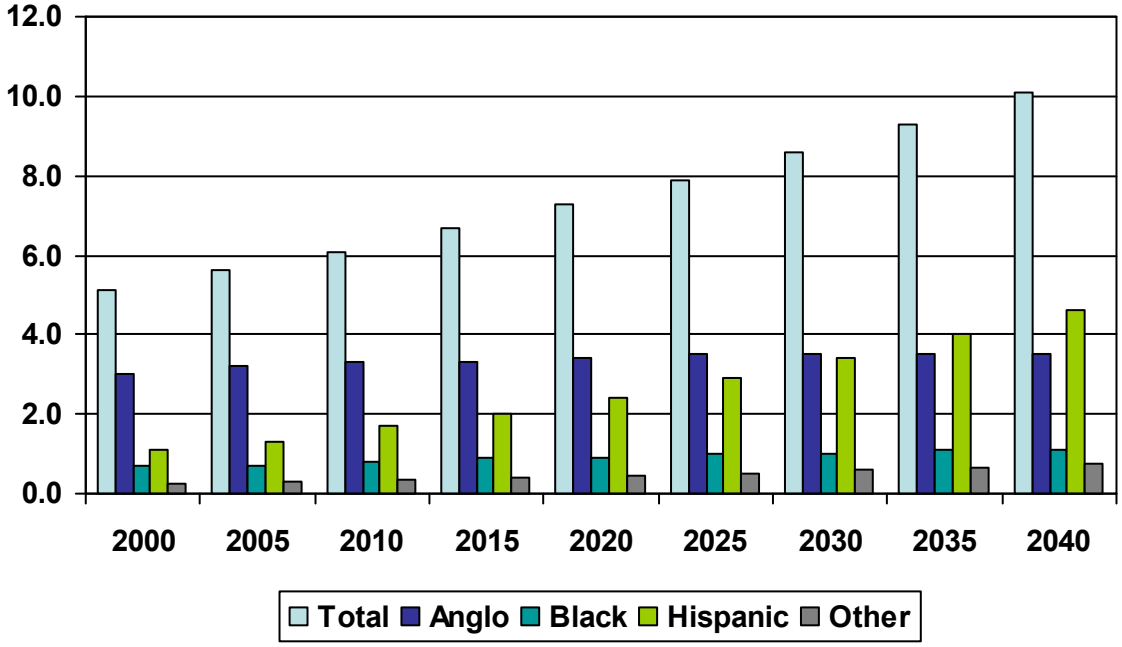
Quarterly Sales and Use Tax Allocations
Dallas Area Rapid Transit, 4Q88 through 4Q08



Source: Texas Comptroller

Figure 4

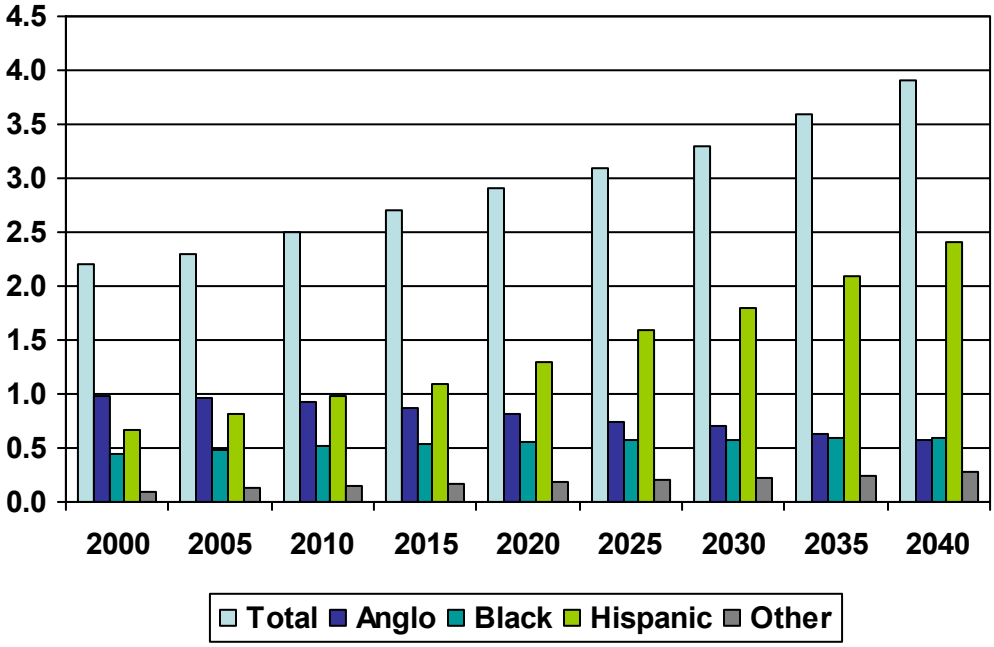
DFW Projected Population 2005-2040*



* Assumes 0.5% migration. Source: Texas State Data Center, 2006

Figure 5

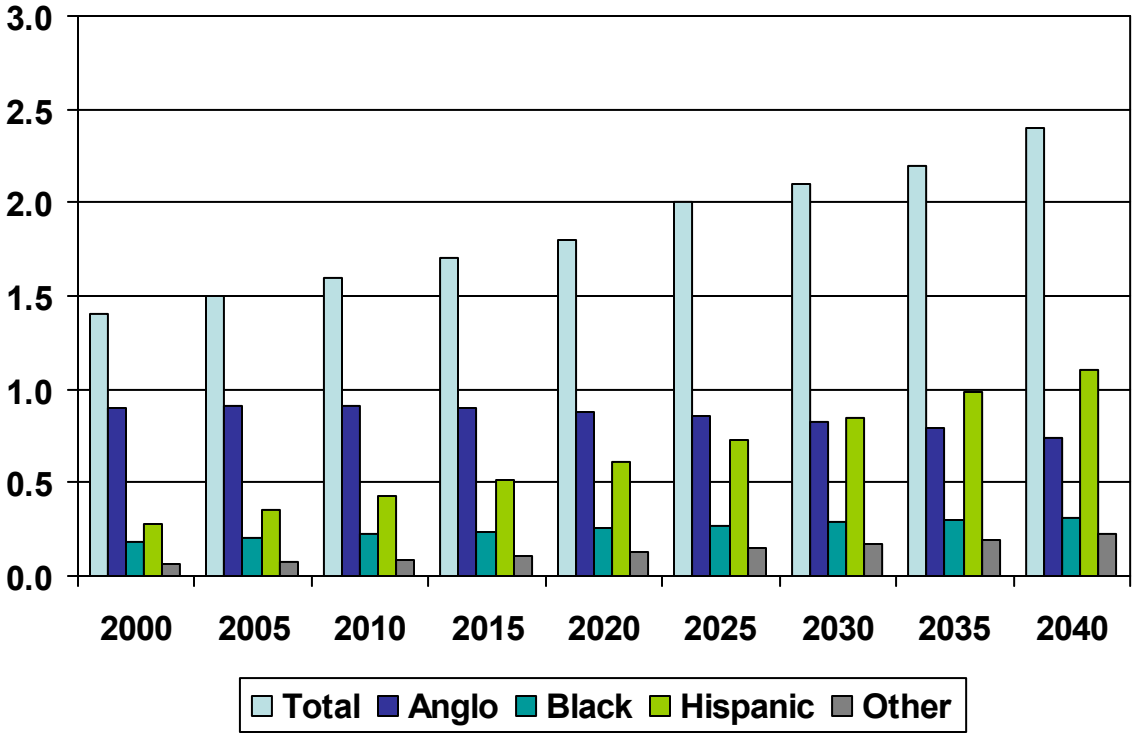
Dallas County Projected Population 2005-2040*



*Assumes 0.5% migration. Source: Texas State Data Center, 2006

Figure 6

Tarrant County Projected Population 2005-2040*



*Assumes 0.5% migration. Source: Texas State Data Center, 2006

While retail trade and other economic activities subject to sales and use tax are not perfect indicators of population and employment growth, they do offer insights into important local economic characteristics. Based on our forecast, we see retail sales in the DART area as declining for 2009 with recovery depending on a set of endogenous and exogenous factors. Endogenous factors include the degree to which national corporate layoff hit DFW area residents, the price of natural gas, which influences payments to local gas royalty holders and regional drilling activity, and local measures of consumer confidence. Exogenous factors include the nature and effectiveness of federal economic stimulus packages, the degree to which federal monies flow into north Texas, and the impact of credit terms, such as credit card interest

rates and the ability of consumers and small businesses to get loans, on local consumption spending.

As shown in Figure 7, our "most likely" scenario shows recovery beginning in late 2009 with total taxable sales regaining recent levels by late 2011. In the pessimistic scenario, the recovery period extends into 2013. Our choice of the most likely scenario parameters is based on a set of assumptions. We recently examined these assumptions in a socio-economic review for the Trinity Parkway (see Table 5). Those set of criteria still apply.

Figure 7

Projections of DART Sales and Use Tax Allocations
Three Scenarios: Pessimistic, Most Likely, and Optimistic
4Q06-3Q13

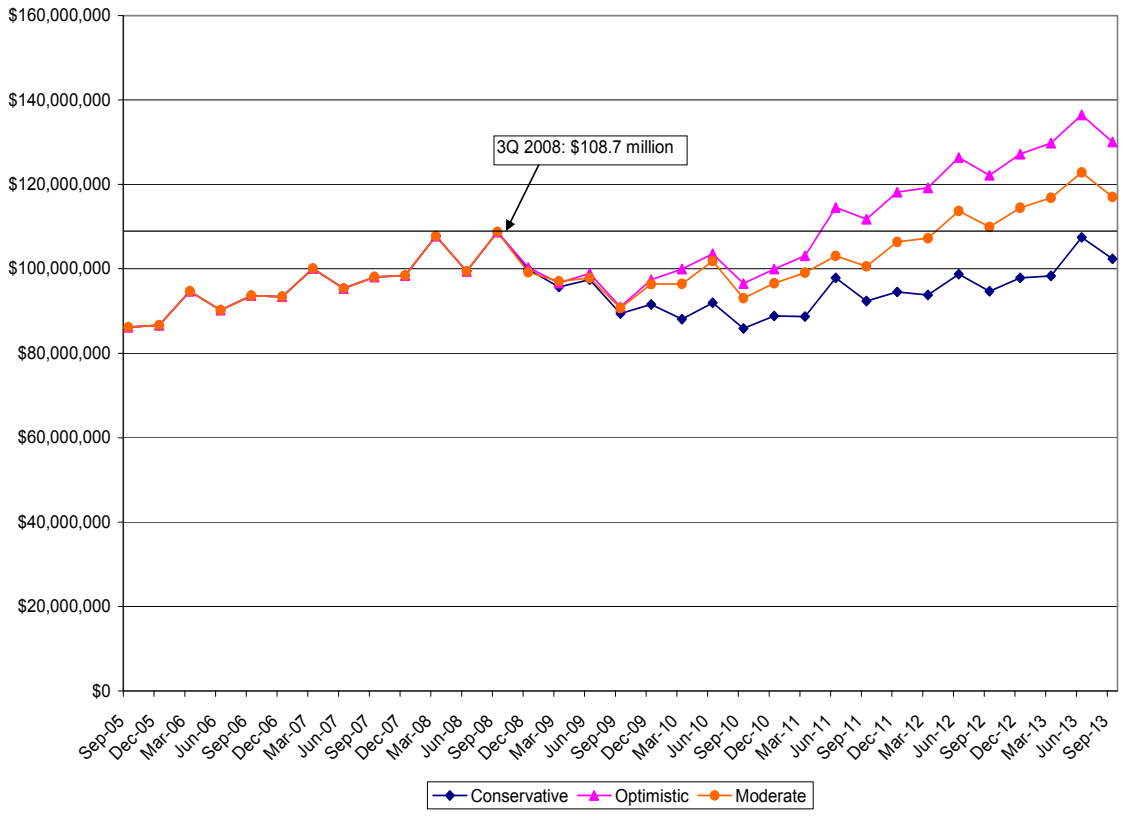


Table 5

Factors Potentially Influencing Population, Employment Change, and NTTA System Utilization (Timing of Impact)

Factor	Conservative	Most-likely	Optimistic
Fuel Prices (short to moderate term impacts)	Oil prices return to $100/bbl resulting in permanent change in commuting behavior (mass transit, carpooling)	Oil prices stay comparatively stable between $70-$100 bbl, some change in commuting patterns, but demand for toll roads remains high.	Gasoline prices stay below $60/bbl and commuters resumes driving behaviors of early 2000s.
Transit Oriented Development (moderate term)	High levels of transit oriented development draw traffic from toll roads.	Some transit oriented development, but capacity of transit system does not allow a meaningful impact on population or employment.	No expansion of transit service plans results in population and employment in catchment area being higher.
Immigration policy (short, moderate, and long term impacts)	Illegal immigration largely stopped with stringent limits on legal migration from south of the border. Result is lower population growth, lower demand for goods and services, higher building costs, and higher cost of living impacting business attraction.	Immigration enforcement no more effective than current efforts. Flow of low cost labor intact. Economy continues to grow at current levels.	Immigration enforcement somehow favors Texas allowing for expansion of regional market.
Immigration Policy/ Growth in Hispanic Households Impact Population Age (moderate to long term impacts)	Fewer Hispanic households, rising median age leading to lower workforce participation due to retirement lower employment growth rates.	Relatively young Hispanic households slow the "aging" of the population, but still a slight decline in workforce participation due to retirement rate.	Young Hispanic households combined with delayed retirement balances workforce participation and rise in population median age.
Global /Regional Competition (long term impacts)	Dallas/Fort Worth area lags other regions of the US in growth.	Remains competitive with other US regions and is a regional hub of global enterprise.	Becomes a major hub of international commerce on par with New York, London.

Table 5 continued Factor	Conservative	Most-likely	Optimistic
Water Availability (some moderate terms impact, mostly long term impact)	Delayed reservoir development and extended drought cause moratoriums on development	Rainfall patterns return to "norm" for past 50 years, water conservation measures decrease average consumption, new reservoirs are developed, no impact on development.	Substantial rainfall combined with reservoir development and conservation measures provide sufficient water resources while other areas of the southwest lose water dependent industries to Texas.

In sum, we feel that the DFW economy is likely to resume recent growth trends in population, employment, and other measures of socio-economic activity by 2011, maybe earlier depending on the success of federal government economic stimulus programs. This suggests that, overall, it may be prudent to assume that previously estimated population and employment projections may be delayed by two or three years. However, some of the projections show sufficiently conservative approaches to their original estimations that these adjustments may not be necessary. In the following, we review each of the aforementioned studies and offer guidance on the need to adjust their findings for current economic conditions.

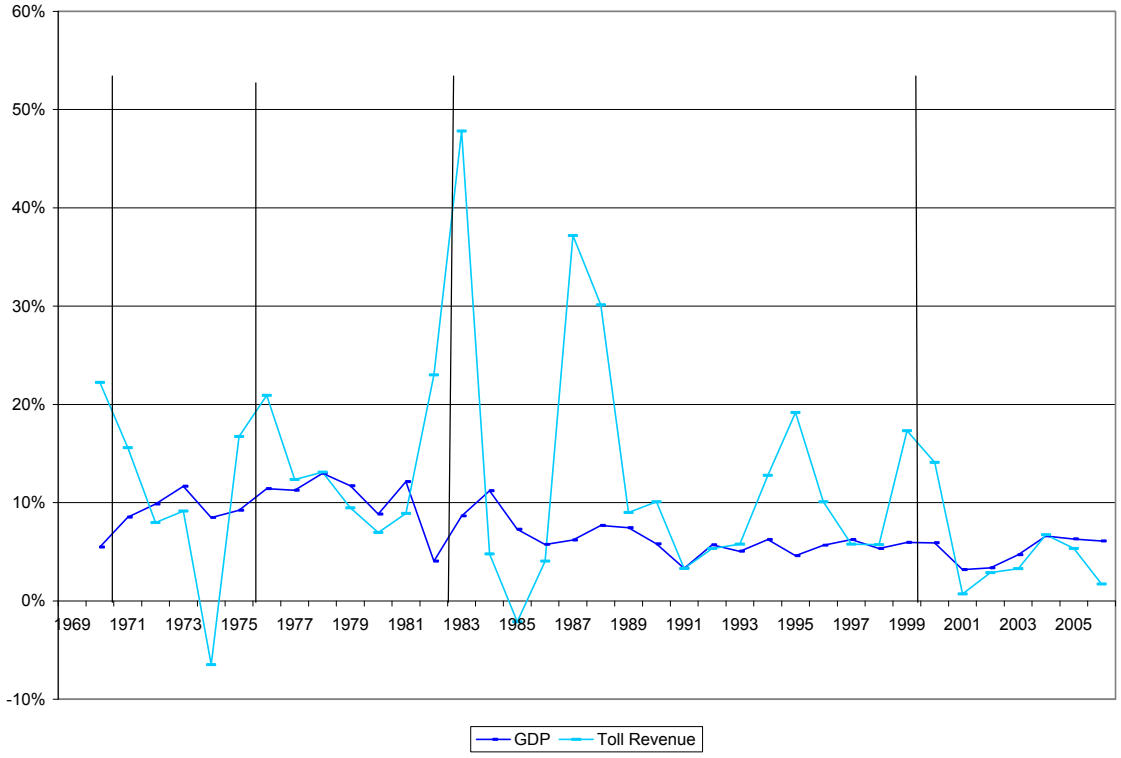
Analysis of Historical Toll Revenues

To consider the influence of national economic trends on NTTA toll revenues, we looked at year over year percentage changes in US GDP and local toll revenues from 1968 through 2006 capturing national recessions in the early 1970s, 1992, and 2001. Keep in mind that a recession is roughly defined as two or more consecutive quarters of negative economic growth. During the period examined, the national recessions did not result in an instance of negative annual economic growth. Figure 8 shows year over year change in GDP and NTTA toll revenues. The

vertical lines indicate years in which toll rates were increased. Visually, it appears that toll revenues do respond to national economic trends. However, using simple correlation analysis, we find that the annual change in GDP does not have a meaningful relationship with local toll revenues explaining a statistically insignificant 1% of total variation in toll revenues.

Figure 8

Year-to-Year Percentage Change
US Gross Domestic Product and NTTA Toll Revenues
1969-2006



To test this further, we conducted a relatively simple multivariate regression procedure in which we tested for a statistical relationship between toll revenues and US GDP controlling for total employment in the NTTA core counties (Dallas, Denton, Collin, and Tarrant), number of miles in the NTTA system, number of transactions, and toll rate increases. Since the data are annual, we created dichotomous variables indicating the year that a toll rate increase went into

effect and a separate variable identifying the year after the rate increase. All continuous variables are transformed to Logs in the equation to better fit model assumptions.

As shown in Table 6, neither US GDP nor core counties employment had a statistically significant impact on system revenues for the period 1970 through 2006. Overall, the model explained 59% of the variance in toll revenues. However, it is possible that there are other explanatory variables that could be added to the model that would alter the coefficients of the modeled variables. Still, the results clearly call into question any assumption that toll revenues are measurably influenced by short term changes in local employment or national economic performance. This is not to say that toll revenues are immune to local or national economic conditions. It simply tells us that over the past quarter century, NTTA toll revenues have been resilient to economic downturns. This supports our previous assertion that the current economic recession will have at most a temporary impact on system revenues.

Table 6

Regression Analysis Output
Dependent Variable: NTTA Toll Revenues

Variable	Regression Coefficient	Standard Error	T-Value	Probability Level (α)	Significant
Intercept	0.1350	0.3211	0.4200	0.6782	No
Employment	0.0305	0.1540	0.1980	0.8447	No
US GDP	0.0020	0.4180	0.0050	0.9963	No
System Miles	-0.3739	0.2088	-1.7910	0.0864	Marginal
Transactions	0.6872	0.1408	4.8800	0.0001	Yes
Rate increase (0/1)	0.9404	0.2041	4.6070	0.0001	Yes
Rate inc. (0/1) Lag 1 year	0.5770	0.1784	3.2340	0.0037	Yes
Adjusted R2: 0.59					

Review of: ***SH 161 Corridor Traffic and Toll Revenue Investment Grade Study Independent Economic Overview and Development Updates***

We have carefully reviewed the March 2008 report entitled *SH 161 Corridor Traffic and Toll Revenue Investment Grade Study* ***Independent Economic Overview and Development Updates*** prepared by Insight Research for Wilbur Smith Associates. This is a well-researched and documented study that still has validity, even though the current national recession may result in a somewhat slower population and job growth over the next 2-3 year than projected by the North Central Texas Council of Governments and modified by Insight Research.

The authors have allowed for variation from the COG data by developing a "band" of growth scenarios, from low to high. They used data from the COG for their baseline projections, but they employed other methodologies to validate and modify these data. Interviews were conducted with a wide range of developers and public officials. In addition, the authors "drove" the SH 161 Corridor and listed every current and planned residential and non-residential parcel in the relevant TAP zones. The population and employment impacts of each project were estimated, and these data were used to supplement the COG projections.

Insight's analysis results in employment variances of between 4 and 9.2 percent vs. COG for different five-year periods through 2030. Insight also projects a 2030 population along the corridor that is 8.2 percent higher than the COG projections. This higher population figure is based on un-platted future developments, platted developments, and projects currently underway.

As the Insight report was prepared in March of 2008, before the severity of the national recession was fully visible, we believe the actual variations between the COG and the Insight projections will be somewhat smaller as planned developments are delayed or canceled.

Still, we find no reason to criticize either the COG projections or the Insight projections. Though the assumptions underlying long-term projections are extremely complex, the approaches taken by both the COG and Insight seem reasonable in view of the uncertainties implicit in such calculations. If relevant agencies wanted to take a cautious approach, it would not be unreasonable to push out the projected demographic growth by two to three years.

Review of: *SH121 Corridor Traffic and Toll Revenue Investment Grade Study, Denton and Collin Counties Independent Economic Overview and Development Updates*

Weinstein, Clower & Associates has reviewed the August 2007 report entitled *SH121 Corridor Traffic and Toll Revenue Investment Grade Study, Denton and Collin Counties* ***Independent Economic Overview and Development Updates*** that was prepared by Insight Research Corp. for Wilbur Smith and Associates in August 2007. This report reviews population and employment projections being used by the North Central Texas Council of Governments for communities and traffic survey zones (TSZs) along the SH121 corridor in Collin and Denton Counties that is currently being expanded and improved into a toll road.

Insight employs a variety of methodologies in their analysis, both quantitative and qualitative. Importantly, Insight documents newly active and announced commercial and residential projects along the corridor and ascertains whether they will contribute to either a gain or loss from the NCTCOG baseline forecasts. Insight also makes assumption about changes in business conditions that could have differential economic impacts on the survey area. Combining these data assumptions with the results of personal interviews with developers, Insight prepares both high and low forecast alternatives.

In terms of population, Insight estimates a population along the corridor of 1,730,077 by 2030, a figure 18.7 percent higher than the NCTCOG forecast using Insight's mid-range projection. Their higher number is based on unplatted future developments, platted developments and projects now underway. Insight's employment forecast to the year 2030 is 28.1 percent higher than the COGs.

Though we have no dispute with the methodologies used by Insight Research, we believe their projections of population and employment is slightly high. We base our assessment on two major factors. The first is the severe national recession that began in December 2007 and may

well last into 2010. Though the Dallas area has not been hit as hard as many other parts of the country, many residential and commercial real estate developments have been put on hold; and it may well take 4 or more years or more to absorb the current excess inventory of housing, office and industrial space. Second, we expect to see slower employment growth than Insight's projections due to national and international economic conditions. Also, with more restrictive immigration enforcement, and tighter border security, immigration from abroad is now falling and could continue to do so, though it appears the current presidential administration has little taste for strengthening border enforcement. However, the relative resilience of the DFW economic to the current economic downturn may result in a wave on job-seeking migrants on the order of what the state and region saw in the 1970s during the Rustbelt-Sunbelt phenomenon.

For the 121 corridor study for Denton and Collin Counties, we believe that the presented forecasts for 2030 population and employment are slightly high. This could be corrected by slightly reducing the estimates on order of one to two percent, or increase the suggested lag period to two years.

Review of: ***SH121 Southwest Parkway Traffic and Toll Revenue Investment Grade Study Independent Economic Overview and Development Updates.***

Weinstein, Clower & Associates has reviewed the March 2006 report entitled *SH121 Southwest Parkway Traffic and Toll Revenue Investment Grade Study* ***Independent Economic Overview and Development Updates*** prepared by Insight Research Corp. for Wilbur Smith and Associates. Southwest Parkway, to be located in southwest Tarrant County, is currently in the design phase with construction slated to begin sometime in 2009. The facility is scheduled to open in 2012.

Insight Research has evaluated population and employment projections from the North Central Texas Council of Governments for southwest Tarrant County through the year 2030. Specifically, Insight looked at COG data for 807 traffic survey zones (TSZs) in Tarrant and Johnson Counties.

In preparing its own projections, Insight Research documents newly active and announced commercial and residential projects within the specified TSZs. They also conducted interviews with developers, city planners, and economic development officials.

Insight prepared its own probable, low and high employment and population forecasts and the compares their results with the COG forecasts. In terms of employment, Insight's variances from COG range from 1.2 percent (low) to 8.5 percent (probable) to 15.7 percent (high). We believe the "probable" forecast from Insight is the most reasonable through the year 2030 and that their projections may be closer to the mark than COG's. The Council of Governments has historically underestimated growth rates in Tarrant County. What's more, with northeast Tarrant County approaching build-out, we expect to see more residential, commercial and industrial development in southwest Tarrant County over the next two decades. We do not see much need for altering demographic outlooks for this road segment; however, a prudent

approach allowing for the uncertainty of current financial markets and the efficacy of federal economic intervention strategies could include assuming a one to two year delay to this report's current timeline such that projections reported for 2030 may be realized in 2031 or 2032.

Review of: *Dallas North Tollway System Investment Grade Traffic and Toll Revenue Study Independent Economic Overview and Development Updates*

Weinstein, Clower & Associates has reviewed the April 2004 report entitled *Dallas North Tollway System Investment Grade Traffic and Toll Revenue Study Independent Economic Overview and Development Updates* prepared by Insight Research Corp. for Wilbur Smith and Associates. Insight estimates population and employment projections as variants from the North Central Texas Council of Governments (COG) projections to the year 2030 for the two major NTTA corridors (Dallas North Tollway and President George Bush Turnpike) plus the Mountain Creek Toll Bridge. Though this report is nearly five years old, we find the authors' assumptions and conclusions basically sound.

To make adjustments to the COG projections, Insight first identified new and announced commercial and residential developments in the relevant traffic survey zones (TSZs). In addition, interviews were conducted with public officials and developers. Using a proprietary methodology, Insight calculated low, high and mid-range population and employment variances from the COG projections.

We believe the Insight adjustments are reasonable, especially if we take the mid-range estimates. In the year 2030, Insight projects a population about 154,000 greater than the COG forecast. Though the report does not include total population in the TSZs, this adjustment is only 1.7 percent higher than the COG regional projection for that year. Since Dallas-Fort Worth has been the second fastest-growing major metropolitan region in the nation since 1990, the Insight adjustment may actually prove to be an understatement of actual population growth.

In terms of employment, Insight's "probable" or "mid-range" projection is 5.4 percent higher than the COG's in the year 2030. Again, we find this adjustment reasonable, particularly in view of the fact that between 2004 and 2008 the Metroplex added about 340,000 jobs.

Though the current national recession will likely retard local job growth for the next few years, when the economy rebounds DFW should once again capture a disproportionate share of nation's employment gains. We feel these projections remain reasonable.

Review of: *Lewisville Lake Toll Bridge Traffic and Toll Revenue Investment Grade Study Independent Economic Overview and Development Updates*

Weinstein, Clower and Associates (WCA) reviewed the November 2005 *Lewisville Lake Toll Bridge Traffic and Toll Revenue Investment Grade Study Independent Economic Overview and Development Updates* prepared by Insight Research Corporation (IRC). Our conclusions find that over-aggressive mortgage lending, financial market turmoil, and subsequent recession have created circumstances slowing growth in the Lewisville Lake Toll Bridge catchment area. Based on our comparison of the most recent NCTCOG population estimates, we feel that the 2005 report may overstate near term (2009) population estimates by about three percent. Significant commercial and residential developments along Highway 380 (University Drive) in Denton are not included in the 2005 analysis and these developments, when completed, could impact traffic flows across the Lewisville Lake Bridge. While we do not specifically compare employment projections, it is likely that they are also overstated in the near term by three to four percent.

Therefore, we recommend that consideration be given to lowering the baseline population estimate by about three percent starting in 2009, and that the average annual population growth rate assumed in the IRC 2005 report for the 2010-2015 period (probable scenario) be lowered from 3.2% to 2.3%. For subsequent periods, we keep with the growth rates IRC used in the 2005 analysis averaging just over 2% per year. Making these changes results in the following revised population estimates for the study area:

Given the limited time frame, it may not be possible to model all trip generation impacts from the recommended modifications to the demographic projections provided in the 2005 analysis. However, demographic change and trip generation show relatively stable statistical

relationships over time. Therefore, lagging the trip tables associated with the Lewisville Lake Toll Bridge by approximately one year should reasonably reflect the proposed demographic change.

The analysis presented in this briefing is not meant as a substitute for a detailed re-examination of population and employment growth estimates in the Lewisville Lake Toll Bridge study area. We have highlighted some overall changes to market conditions that were not as apparent in 2005. For example, the current economic downturn is substantially deeper and will likely last longer than IRC projected in 2005. It is strongly recommended that a full update of the 2005 study be undertaken taking into account some of the key factors noted above.

Review of: *Trinity Parkway Corridor Traffic and Toll Revenue Investment Grade Study: Independent Socioeconomic Analysis.*

Weinstein, Clower & Associates has reviewed the November 2008 report entitled *Trinity Parkway Corridor Traffic and Toll Revenue Investment Grade Study: Independent Socioeconomic Analysis* prepared by Research and Demographic Solutions (RDS) for Wilbur Smith and Associates. We participated in this research study serving as independent economic analysts. Given our role in the preparation of this study, and the recency of this analysis, we limited out review to a re-examination of key assumptions used by RDS, which was covered in the first section of this report. We feel that the "most likely" scenario is still valid, especially in the later years of the analysis. Any adjustments would be relatively minor, such as maybe delaying the achievement of key population and economic characteristics by about one year.

There are, however, other factors affecting the timing of the Trinity Parkway. The US Army Corp of Engineers (USACE) has repeatedly delayed this project due to concerns regarding the placement of road infrastructure inside of the flood control levee system. Recently, soil testing has been allowed to resume, but there are no guarantees the USACE will approve roadway construction designs. The project has also been delayed by sometimes acrimonious debate on the Dallas City Council. Though city level political hurdles appear to have been cleared for now, there remain political questions about the Trinity Parkway project.

County Level Population Projection Review

In the following, we examine county level population and employment projections including those offered by the NCTCOG and analyses conducted previously for NTTA. In addition, we considered population projections prepared by the Texas State Data Center. Tables 7a through 7e show the population projections for Dallas, Denton, Collin, Tarrant, and Rockwall counties. Included in this review is consideration of the population projections released by the TSDC in February 2009.

Dallas County

The current projection for Dallas County's 2030 population from NCTCOG appears to be closely in line with TSDC estimates under the 0.0 Migration (no net migration) scenario. Dallas has been the slowest growing county, in percentage terms, in north central Texas for several decades. The northern half of Dallas County is largely built out and development in the southern sector remains problematic. During the 1990s, net migration to Dallas was close to zero with domestic out-migration offsetting the influx on international migrants to the county. We expect that this pattern will largely hold true for the first decade of the 21st century. However, there are some factors that will likely cause in-migration, domestic and international, to continue with a relative slowing of domestic out-migration resulting in a slightly positive trend in net migration.

One of the factors slowing domestic out-migration is the degree to which southern Collin County and Denton County are becoming built out. Those wishing to leave Dallas County are having to go farther north in Collin County to find housing, in many cases taking these persons farther from employment centers. Secondly, there is much hope that the Dallas Logistics Hub, located in the far southern portion of Dallas County, may be a spark for people not only choosing to stay in Dallas County, but will attract to domestic and international migration to

these potentially large, new regional employment center. Therefore, we feel that a net migration growth rate of about 0.25 (0.25% per year average net in-migration) is an appropriate adjustment to baseline population projections for Dallas County. This would result in a 2030 population in Dallas County of about 3.1 million using the TSDC data set, which is very similar to existing NTTA projections of 3.09 million.

Table 7
Dallas County Population Projections

Year	NCTCOG	NTTAS Revised	TSDC Migration 0.0	TSDC Migration 0.5	TSDC Migration 1.0
2005	-	-	2,345,016	2,387,018	2,434,045
2007	2,445,991	2,483,280	-	-	-
2008	-	-	-	-	-
2009	2,484,677	2,555,526	-	-	-
2010	-	-	2,451,542	2,563,125	2,699,760
2015	2,574,960	2,706,420	2,539,905	2,746,567	3,022,274
2020	-	-	2,616,406	2,941,394	3,407,537
2025	2,758,816	2,976,227	2,688,652	3,158,164	3,869,525
2030	2,829,580	3,089,170	2,751,175	3,396,109	4,422,781

NCTCOG: North Central Texas Council of Governments. NTTAS: North Texas Tollway Authority.
TSDC: Texas State Data Center (Migration assumption % per year).

Denton County

Denton County is poised to see continuing growth both along the IH 35E and Highway 380 corridors. Not withstanding the increasing cost of commuting from northern Denton County into the Dallas Central Business District and other Dallas County employment centers, folks continue to move into Denton County. With new local employment centers, such as the under-construction Razor Ranch project, a rapidly growing retail sector in the city of Denton serving far northern Denton County, and new transportation infrastructure better connecting the north central part of the county with western Dallas and Tarrant counties (Lakes Cities to Little Elm Lake Lewisville bridge), Denton County will continue to grow. There is little difference

between the NCTCOG and NTTA revised projections for total population in 2030, with both fitting closely with the 0.5 migration scenario for the TSDC. We see no reason to dispute the NTTA revised projections.

Table 8
Denton County Population Projections

Year	NCTCOG	NTTAS Revised	TSDC Migration 0.0	TSDC Migration 0.5	TSDC Migration 1.0
2005	-	-	466,521	517,177	572,375
2007	602,100	639,012	-	-	-
2008	-	-	-	-	-
2009	641,148	711,855	-	-	-
2010	-	-	493,549	606,715	743,700
2015	777,001	856,811	515,518	702,196	953,210
2020	-	-	530,498	800,028	1,201,728
2025	1,006,128	1,100,993	542,297	903,374	1,496,771
2030	1,102,151	1,197,018	549,268	1,011,101	1,845,677

NCTCOG: North Central Texas Council of Governments. NTTAS: North Texas Tollway Authority.
TSDC: Texas State Data Center (Migration assumption % per year).

Rockwall County

Rockwall County has seen huge growth in recent years, in percentage terms. However, even with this growth, total current population estimates suggest that only about 77,000 individuals live in Rockwall County. The TSDCs population projection at about 1.0 percent average annual net in-migration seems reasonable, which coincides with NCTCOG projections.

Table 9
Rockwall County Population Projections

Year	NCTCOG	NTTAS Revised	TSDC Migration 0.0	TSDC Migration 0.5	TSDC Migration 1.0
2005	-	-	44,629	49,307	54,635
2007	68,791	68,791	-	-	-
2008	-	-	-	-	-
2009	77,611	77,505	-	-	-
2010	-	-	46,212	55,873	67,993
2015	104,007	104,007	48,023	63,085	83,780
2020	-	-	49,784	71,210	102,866
2025	134,710	134,710	51,073	80,065	126,069
2030	147,151	147,151	51,683	89,384	154,168

NCTCOG: North Central Texas Council of Governments. NTTAS: North Texas Tollway Authority.
TSDC: Texas State Data Center (Migration assumption % per year).

Collin County

Previous data reviews have suggested that existing NCTCOG population estimates for Collin County substantially under-represent actual demographic trends. Collin County has seen tremendous growth over the past three decades, and while the pace of growth has slowed, due to a largely built out southern sector and national economic trends, the county will continue to see growth, especially net domestic migration once the local economy starts to recover from the current economic downturn. (We expect that Texas and the DFW Metroplex will be among the first areas to experience economic recovery.) The NTTA revised scenarios, which would fall within the TSDC projections with about 0.65% average annual net migration, seem to be the most likely outcome.

Table 10
Collin County Population Projections

Year	NCTCOG	NTTAS Revised	TSDC Migration 0.0	TSDC Migration 0.5	TSDC Migration 1.0
2005	-	-	520,385	579,470	643,300
2007	708,185	764,989	-	-	-
2008	-	-	-	-	-
2009	746,932	859,723	-	-	-
2010	-	-	540,407	669,064	822,204
2015	861,000	1,043,294	556,113	761,633	1,031,115
2020	-	-	571,231	862,960	1,283,242
2025	1,067,880	1,270,561	584,847	975,815	1,593,842
2030	1,187,606	1,390,286	592,718	1,096,857	1,971,640

NCTCOG: North Central Texas Council of Governments. NTTAS: North Texas Tollway Authority.
TSDC: Texas State Data Center (Migration assumption % per year).

Tarrant County

Tarrant County has grown at a faster clip than Dallas County for several decades. Unlike Dallas County, Tarrant County is growing rapidly both to the north and the south, with northwest Tarrant County one of the fastest-growing submarkets in North Texas. With a fairly large existing population base and limited land opportunities for future development, growth will be at least somewhat constrained. Still, we think that using a TSDC estimate assuming net migration in excess of 0.5% per annum is appropriate. Given that both the NCTCOG and NTTA revised projections meet this assumption, we suggest that there is little meaningful difference between these two projections.

Table 11
Tarrant County Population Projections

Year	NCTCOG	NTTAS Revised	TSDC Migration 0.0	TSDC Migration 0.5	TSDC Migration 1.0
2005	-	-	1,522,473	1,553,665	1,586,217
2007	1,692,833	1,716,558	-	-	-
2008	-	-	-	-	-
2009	1,743,019	1,784,198	-	-	-
2010	-	-	1,585,981	1,662,880	1,748,764
2015	1,933,641	2,026,016	1,640,528	1,777,494	1,944,948
2020	-	-	1,685,848	1,896,328	2,176,530
2025	2,203,585	2,320,116	1,724,270	2,021,308	2,454,636
2030	2,310,439	2,426,970	1,752,247	2,153,223	2,788,106

NCTCOG: North Central Texas Council of Governments. NTTAS: North Texas Tollway Authority.
TSDC: Texas State Data Center (Migration assumption % per year).

County Level Employment Projection Review

There is variance between NCTCOG estimates of total employment and those offered in the NTTAS revisions, especially in the pace of growth in the 2020-2025 and 2025-2030 periods (see Table 12). Overall, we are very comfortable with revised projections of total employment growth for the NTTA service area. Notwithstanding current conditions, this region is well poised for future job growth. County level employment projections from NCTCOG were also substantially revised. Notably, employment projections for Dallas County are lowered by about 5%, while Collin County's revised baseline projections are shown at 23% higher than NCTCOG estimates. Smaller increases were applied to Denton, Tarrant, and Rockwall county estimates. We agree with these revisions. While we note a few instances of potentially over-optimism in the forecasts offered in the reports reviewed earlier in this analysis, overall the trends and projections for 2030 are generally reasonable.

We note that the revised projections for Dallas County show a substantial increase in growth rate between 2015 and 2025. While local economic conditions could warrant such

growth, we feel that many of the seemingly intractable problems for historically-underutilized portions of southern Dallas County will remain challenging from an economic development perspective. In our opinion, it is more likely that much of this growth will be seen in Denton County. So while we do not see the need to change the revised long range projections of total employment significantly, the specific location of that growth could shift to some extent. We reiterate here that our recommendation remains that based on current economic conditions, it is prudent to assume that employment growth could be delayed for one to two years with attendant impacts on the level of total employment in any given forecast year.

Table 12
Employment Projections by County

	Total	Dallas	Denton	Collin	Tarrant	Rockwall
NCTCOG						
Nov,2007	3,544,071	2,000,008	213,529	273,171	1,035,603	21,760
Nov,2009	3,666,984	2,052,703	227,394	291,456	1,072,516	22,915
Nov,2015	4,082,139	2,223,891	287,287	361,559	1,182,745	26,657
Nov,2025	4,697,602	2,478,453	367,072	467,244	1,345,444	39,389
Nov,2030	4,935,071	2,540,076	423,293	527,853	1,393,459	50,390
NTTAS Revised						
Nov,2007	3,527,577	1,890,797	230,911	336,127	1,047,982	21,760
Nov,2009	3,799,886	1,995,058	259,259	414,161	1,108,482	22,926
Nov,2015	4,376,954	2,189,296	328,117	568,725	1,264,160	26,657
Nov,2025	5,039,169	2,458,958	407,452	698,957	1,434,413	39,389
Nov,2030	5,299,382	2,543,346	463,590	759,665	1,482,391	50,390

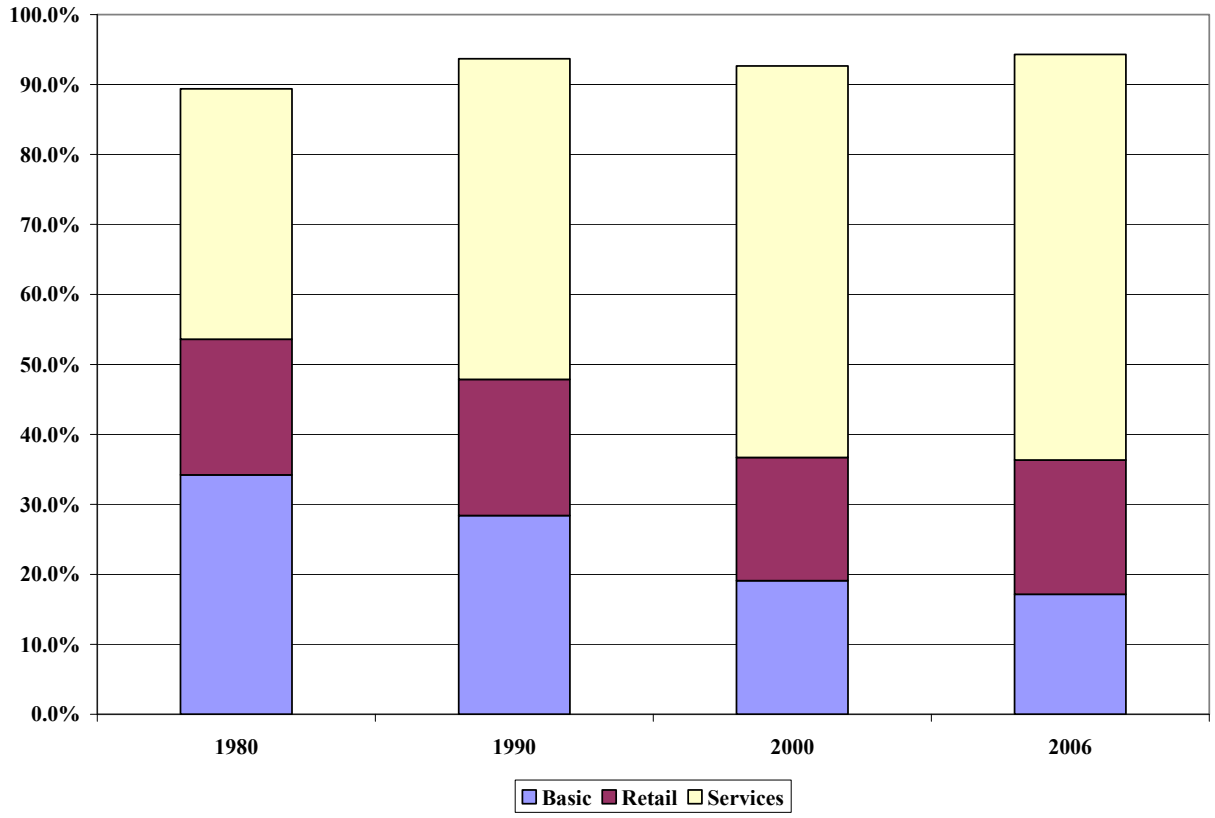
Projections are also offered on the breakdown of employment in the targeted counties by industry group including basic employment, retail trade, and services. Table 13 shows the relative distribution of employment in the revised projections. These data indicate that the regional industrial structure will remain stable over the next 20-plus years. We do not agree with that assessment.

Table 13
Percentage Employment by Industry
Revised Projections

	Basic	Retail	Services
Nov,2007	29.2%	22.3%	48.5%
Nov,2009	28.8%	22.7%	48.6%
Nov,2015	28.0%	23.2%	48.8%
Nov,2025	27.1%	23.7%	49.2%
Nov,2030	26.8%	23.8%	49.5%

Figure 9 shows historical distribution of employment for Dallas, Denton, Collin, and Tarrant Counties. (Rockwall County is not included due to data masking.) These data are sources from County Business Patterns (CBP) published by the US Department of Commerce and are not directly comparable to the NCTCOG and NTTAS Revised estimates. Data from the CBP do not adequately cover self-employed workers and generally do not count government employment. However, they are illustrative regarding changes in regional industrial structures. What is clearly shown is that while the proportion of employment in retail trade remained fairly consistent during the 1980-2006 period, there was a dramatic shift in basic to services employment. We do not expect another seismic shift in the make up of the regional economy over the next 20 years, but we do think that basic sector employment will continue to decline as a proportion of total employment as our economic becomes more service focused. What is unclear is how this shift will impact toll road traffic counts or toll revenues. Data presented earlier show that tolls rose throughout this period of economic restructuring, so we have no historical evidence that would suggest economic change will negatively impact future toll revenues.

Figure 9
Employment by Sector as a Percent of Total Employment
Dallas, Denton, Collin and Tarrant Counties



Source: County Business Patterns, US Department of Commerce

Conclusions

Taking several approaches and examining the data at varying levels of disaggregation, the revised population and employment projections offered in previous analyses require very modest to no adjustment. The depth and duration of the current economic recession remain unknown, though we anticipate recovery late in 2009 through mid-year 2010. There are mounting questions regarding the potential efficacy of federal economic stimulus plans and how those plans will affect the NTTA service area. However, the North Central Texas region has proven that it can recover, sometimes in dramatic fashion, from periods of economic upheaval.

Therefore, we stick to our previously stated opinion that current national economic conditions will do no more than slow regional economic and population growth and that, at most, the long range projections for population and employment for most of the forecast areas will be delayed by one to two years.