1.0 INTRODUCTION

The North Central Texas Council of Governments initiated the formal study of a Regional Outer Loop concept in the summer of 2007. The purpose of the Regional Outer Loop Corridor Feasibility Study was to evaluate the need and feasibility for an outer loop around the Dallas-Fort Worth region, as well as identify a potential corridor(s). The Regional Outer Loop was envisioned as a potential series of independent transportation facilities that could form a 240-mile transportation corridor around the Dallas-Fort Worth region. The concept was first identified in Mobility 2030: The Metropolitan Transportation Plan for the Dallas-Fort Worth Area (Mobility 2030). Mobility 2030 included the Regional Outer Loop as part of a long-term multimodal vision for the region to serve automobile and truck traffic bypassing the region and to accommodate future growth. Mobility 2045: The Metropolitan Transportation Plan for North Central Texas (Mobility 2045), was adopted in June 2018 by the Regional Transportation Council. The Collin County Outer Loop from Dallas North Tollway to IH 35 is included in Mobility 2045. The Denton Greenbelt Corridor will also incorporate sustainability, environmental stewardship, and best practices as recommended by the Federal Highway Administration sustainability tool, INVEST (Infrastructure Voluntary Evaluation Sustainability Tool). The Federal Highway Administration INVEST criteria include the following:

- CS-01 Economic Development and Land Use
- CS-02 Natural Environment
- CS-03 Scenic, Natural or Recreational Qualities
- CS-04 Historical, Archaeological, and Cultural Preservation
- CS-05 Light Pollution
- CS-06 Social Considerations
- CS-07 Context Sensitive Solutions
- CS-08 Access and Affordability
- CS-09 Safety
- CS-10 Multimodal Transportation and Health
- CS-11 Transit Facilities
- CS-12 Freight and Goods Access and Mobility
- CS-13 Travel Demand Management
- CS-14 Air Quality and Emissions
- CS-15 Optimizing Assets
- CS-16 Operational Efficiency
- CS-17 Infrastructure Resiliency
- CS-18 Earthwork Balance

This chapter discusses the project development process and how this feasibility study fits into the process. The remaining sections in this chapter describe the project background and related previous and on-going studies.

1.1 THE PLANNING PROCESS

Figure 1-1 outlines the typical process that is followed to identify, develop, and implement transportation projects. Public and agency involvement is included in every step of the process. The need for new transportation facilities is based on current population and projected growth within the region, while balancing transportation need with land use changes and available funding (Step 1). The long-range planning process involves local, state, regional, and federal transportation officials, and provides opportunities for people throughout the region to give input and feedback. Major projects that are warranted and can be funded are added to the Metropolitan Transportation Plan (MTP). Step 2 recommends the mode (i.e., roadway, transit)
for a particular transportation improvement. The inclusion of a project in the fiscally constrained MTP (Step 2) allows planning to proceed into the feasibility, preliminary design, and environmental phase (Step 3).

Step 3 can involve several studies, depending on the scope and length of the corridor (see Figure 1-2). For large corridors and/or those on a new location, the first level of a planning study is typically a feasibility study. The purpose of this study is to help narrow the study area and determine the transportation issues, problems to be solved, and potential solutions. This involves data collection; establishing the transportation needs and issues that need to be addressed; and developing and evaluating potential corridors based on travel demand modeling, socio-economic, and environmental data. This information is used to determine if a transportation project is feasible. If feasible, the study concludes with the identification of a study area or preferred corridor for additional study. For long corridors, the study may also recommend an implementation schedule and break the corridor into shorter sections, which may have independent utility. Independent utility means a project would be able to function on its own without further construction of an adjoining section.

These recommendations are then forwarded into the preliminary engineering and environmental studies phase. Alignment alternatives are developed within the preferred corridor. These alignments are developed at a higher level of detail for further study. More detailed examination of the social, economic, and natural environments; travel demand; and costs are some of the information developed to help assess the potential effects on the community and environment. This step also includes the development of specific mitigation strategies for potential negative effects and funding mechanisms. The analyses are documented and reviewed by federal and state agencies, decision makers, and the public to ensure the effects of the alternatives are accurately assessed and to help make an informed choice by assessing the effects of the No Build and Build alternatives. For large projects, it may take 5 to 10 years of alternative development and evaluation, public and agency involvement, and environmental study to select a preferred alignment.

Once an alignment is environmentally approved, the next step of the project is to develop detailed construction plans. During this step, the implementing agency, funding sources, staging, and construction schedule are determined. Any needed right-of-way would be acquired before construction begins. Most large projects are constructed and opened to traffic in stages because of funding availability and the need to minimize traffic impacts during construction.

The Regional Outer Loop Corridor Feasibility Study was part of Step 3 (see Figures 1-1 and 1-2). The purpose of this corridor feasibility study was to evaluate the need and feasibility for an outer loop, as well as identify a potential corridor for future study; it did not include the development of alignments within a corridor. In the context of the Regional Outer Loop Feasibility Study, a corridor was a defined width of approximately one mile. In comparison, the typical right-of-way width needed for a major roadway is approximately 450 to 600 feet. A corridor width of one mile merely helped to define the future study area and allows for flexibility in the development of alignment alternatives to minimize negative social, economic, and environmental effects. Future preliminary engineering and environmental studies would establish the specific alignment and right-of-way needs.
Figure 1-1. Typical Project Development Process

- **Step 1:** Identify Regional Needs
- **Step 2:** Inclusion in the Metropolitan Transportation Plan
- **Step 3:** Conduct Planning, Preliminary Design & Environmental Studies
- **Step 4:** Develop Detailed Construction Plans
- **Step 5:** Acquired Right-of-Way
- **Step 6:** Construction
- **Step 7:** Open to Traffic

- **Step 1:** Based on current and forecast demographics
- **Step 2:** Develop MTP and recommend mode based on regional needs
- **Step 3:** Develop and evaluate corridors and alignment alternatives
  - Complete environmental and preliminary engineering
  - Obtain environmental approval(s)
- **Step 4:** Develop construction and operation plans
  - Determine implementing agency and funding sources
  - Determine project staging plan
- **Step 5:** Acquired and/or preserve right-of-way to expedite future construction efforts
- **Step 6:** Construction
  - Staged construction – may take up to 10 to 20 years to construct the complete facility
  - Section priority based on travel demand
- **Step 7:** Open for Operation

Figure 1-2. Step 3 of the Planning Process

- Collect Data
- Identify Needs & Issues
- Develop & Evaluate Corridors
  - Identify a Recommended Corridor & Potential Logical Terminal
  - Develop & Evaluate Alignments within the Recommended Corridor
    - Recommended Alignment(s) for Further Environmental Study
    - Refine Alignments
    - Prepare an Environmental Analysis/Study
    - Gain Approval of a Preferred Alignment
1.2 REGIONAL PLANNING CONTEXT

The North Central Texas Council of Governments serves as the Metropolitan Planning Organization (MPO) for a 12-county metropolitan planning area centered on Dallas and Fort Worth. The metropolitan planning area includes Collin, Dallas, Denton, Ellis, Hood, Hunt, Johnson, Kaufman, Parker, Rockwall, Tarrant, and Wise counties. Since the early 1970s, MPOs have had the responsibility of developing and maintaining a MTP. The MTP is federally mandated, which must be updated to maintain a 20-year planning horizon. It identifies transportation needs; guides federal, state, and local transportation expenditures; and is the basis for project-specific studies.

A series of federal transportation acts have specifically addressed and modified the role of the MPO. The Intermodal Surface Transportation Efficiency Act of 1991 strengthened the role of the MTP by making it the central mechanism for the decision-making process regarding transportation investments. The passage of the Transportation Equity Act for the 21st Century in 1998 continued this emphasis. The Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) was signed into law on August 10, 2005. SAFETEA-LU addresses the challenges facing our transportation system such as improving safety, reducing traffic congestion, improving efficiency in freight movement, increasing intermodal connectivity, and protecting the environment. The SAFETEA-LU metropolitan planning regulations require transportation plans to be fiscally constrained by being based on reasonable assumptions that the funding is available to build what is contained in the multi-year plan. Both the federal transportation acts and the Clean Air Act Amendments of 1990 impose conformity requirements on the long-range transportation plan for urbanized areas.

The development of the current MTP, Mobility 2045: The Metropolitan Transportation Plan for North Central Texas (Mobility 2045), was guided by nine goals related to mobility, quality of life, system sustainability, and implementation (see Table 1.1). The goals adopted as part of Mobility 2045 represent the Dallas-Fort Worth regional commitment to a comprehensive, cooperative, and continuous transportation planning process for a balanced transportation system by recognizing the evolving transportation and air quality needs of the region.

<table>
<thead>
<tr>
<th>Mobility</th>
<th>Quality of Life</th>
<th>System Sustainability</th>
<th>Implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Improving the availability of transportation options for people and goods.</td>
<td>• Preserving and enhancing the natural environment, improving air quality, and promoting active lifestyles.</td>
<td>• Ensuring adequate maintenance and enhancing the safety and reliability of the existing transportation system.</td>
<td>• Providing for timely project planning and implementation.</td>
</tr>
<tr>
<td>• Supporting travel efficiency measures and system enhancements targeted at congestion reduction and management.</td>
<td>• Encouraging livable communities which support sustainability and economic vitality.</td>
<td>• Pursuing long-term sustainable revenue sources to address regional transportation system needs.</td>
<td>• Developing cost-effective projects and programs aimed at reducing the costs associated with constructing, operating, and maintaining the regional transportation system.</td>
</tr>
<tr>
<td>• Assuring all communities are provided access to the regional transportation system and the planning process.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 1.1. Mobility 2045 Goals

Source: Mobility 2045, June 2018
The Dallas-Fort Worth region is designated as a nonattainment area for eight-hour ozone by the Environmental Protection Agency. The Clean Air Act Amendments of 1990 require transportation plans for all nonattainment areas to be in conformity with the State Implementation Plan for air quality to demonstrate that projects in the MTP meet air quality goals. In accordance with the metropolitan planning regulations, the MTP must include a congestion management process to address congestion systematically. The congestion management process is a systematic approach, collaboratively developed and implemented throughout a metropolitan region, which provides for the safe and effective management and operation of new and existing transportation facilities through the use of demand reduction and operational management strategies.

*Mobility 2045* was developed amidst growing concerns for increasing congestion, reduced air quality in the Dallas-Fort Worth region, and the lack of financial resources to fund many desired transportation projects and programs. To maximize available funds, a prioritization process was followed to maximize the existing transportation system, then invest strategically in infrastructure improvements. To maximize available funds, a prioritization process was followed to maximize the existing transportation system, then invest strategically in infrastructure improvements (see Figure 1-3). This is done by first investing in the maintenance of the existing infrastructure and improving the management and operations of existing facilities; removing trips from the system; and improving land use/transportation connections. Investments are then made in strategic infrastructure to induce a switch to transit and increase auto occupancy. Only after maximizing the operational capacity of the existing transportation system are additional capacity and/or new location projects such as tax-supported highways or tolled facilities considered.

Transportation system performance information was based on the Dallas-Fort Worth Regional Travel Model. This information helped guide the development of system alternatives and indicated the impact of various improvements. The improvements recommended in *Mobility 2045* include regional congestion management strategies, bicycle and pedestrian facilities, managed/high-occupancy vehicle lanes, light/commuter rail and bus transit improvements, intelligent transportation system technology, freeways and toll roads, and improvements to the regional arterial and local thoroughfare system such as intersection improvements and signal timing.
The estimated cost of the projects in Mobility 2045 is $135.4 billion (see Table 1.2). The primary funding sources for the plan include federal and state motor fuel tax, local roadway monies, local transit taxes, and innovative financing. However, the needs of the region have outpaced the projected funding sources. Mobility 2045 estimates that the North Central Texas region would need approximately $390 billion to eliminate the worst levels of congestion. Mobility 2045 identifies approximately $135.4 billion in resources to fund transportation improvements in the region through the year 2045.

### Table 1.2. Identified Funding Needs for the Dallas-Fort Worth Region

<table>
<thead>
<tr>
<th>Metropolitan Transportation System Components</th>
<th>Mobility 2030, 2009 Amendment (Billions)</th>
<th>Mobility 2035 (Billions)</th>
<th>Mobility 2040 (Billions)</th>
<th>Mobility 2045 (Billions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infrastructure Maintenance</td>
<td>$36.2</td>
<td>$27.3</td>
<td>$37.4</td>
<td>$38.7</td>
</tr>
<tr>
<td>Management and Operations</td>
<td>$3.1</td>
<td>$4.8</td>
<td>$7.2</td>
<td>$9.6</td>
</tr>
<tr>
<td>Growth, Development, and Land Use Strategies</td>
<td>$2.1</td>
<td>$3.9</td>
<td>$3.6</td>
<td>$3.2</td>
</tr>
<tr>
<td>Public Transportation</td>
<td>$24.3</td>
<td>$18.9</td>
<td>$27.2</td>
<td>$33.4</td>
</tr>
<tr>
<td>Roadway System</td>
<td>$79.8</td>
<td>$46.2</td>
<td>$43.4</td>
<td>$50.6</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$145.5</strong></td>
<td><strong>$101.1</strong></td>
<td><strong>$118.9</strong></td>
<td><strong>$135.4</strong></td>
</tr>
</tbody>
</table>

Source: NCTCOG, July 2018
1.3 STUDY CONTEXT AND PREVIOUS STUDIES
The Regional Outer Loop Corridor Feasibility Study (November 2011) identified an east-west corridor in Denton County for ongoing studies. Denton County adjoins Dallas, Tarrant, Wise, Cooke, Grayson, and Collin counties. The study limits for the Denton County Greenbelt are from IH 35 in the city of Denton to the Dallas North Tollway (DNT) in Aubrey.

Denton County’s north-south mobility includes IH 35E, IH 35W, and DNT. IH 35E south of Denton is under construction to provide a six-lane freeway plus managed lanes. The DNT has a planned expansion northward into Grayson County, generally along the western edge of Collin County/eastern edge of Denton County.

The east-west mobility in Denton County is provided by the Sam Rayburn Tollway (SH 121) and US 380. US Highway 380 extends across IH 35, DNT, and US 75. There are significant constraints to east-west mobility due to the location of Lake Lewisville and Lake Ray Roberts.

The Collin County Regional Loop from DNT to US 75 is currently funded and in the development phase. The Denton County Greenbelt Corridor is a critically important access point with DNT and other established roadway corridors.

Figure 1-4. Mobility 2045: The Metropolitan Transportation Plan Freeway Recommendations Map
1.4 DENTON COUNTY
The Denton County Thoroughfare Plan is the official transportation planning document adopted by the Denton County Commissioners Court in April 2017 (Figure 1-5). The purpose of the document is to provide a guideline for present and future transportation needs for the county and a tool for implementation. It does not contain a recommendation for a Regional Outer Loop or any new limited-access freeway or toll road facility. Recognizing that the current document had become greatly outdated because of rapid growth, the Denton County Commissioners Court authorized the development of an update to the plan.

Numerous individual facility and system-wide alternatives were developed, modeled, and analyzed between 2004 and 2007. To date, no formal recommendation resulting from this evaluation has been identified or adopted by the Denton County Commissioners Court. However, within the final draft prepared in 2007, the county requested the inclusion of a high-speed, east-west oriented six-lane arterial between the Collin County line near Celina and FM 156 north of Krum. The facility was generally aligned along the existing FM 428 corridor with a northern bypass around the city of Aubrey. West of the Trinity River Greenbelt, the facility was generally routed along the FM 3163 corridor, travelling across IH 35 and connecting to FM 156 just south of the Kansas City Southern Railroad connection to the BNSF Railway line. The new roadway was touted as the last remaining opportunity for a major high-capacity east-west facility in Denton County between US 380 and Lake Ray Roberts because FM 455 to the north travels across the Ray Roberts Dam and cannot be feasibly widened beyond its current two-lane capacity. In addition, Denton County officials were aware in 2007 of the planning activities underway to the east for the Collin County Outer Loop and this roadway was identified as a potential connecting facility or possible extension of that corridor.
Figure 1-5. Denton County Thoroughfare Plan (2017)
1.5 COLLIN COUNTY OUTER LOOP STUDY
The Collin County Mobility Plan is the officially adopted document by the Collin County Commissioners Court, which identifies the present and future transportation needs for Collin County. The Collin County Mobility Plan-2002 Update was the first plan to include the Collin County Outer Loop. This plan, as well as the subsequent 2004 update, identified the Collin County Outer Loop as a “Multimodal Transportation Corridor Preservation.” Figure 1-6 illustrates the 2014 Update of the Collin County Thoroughfare Plan, stretching from the Denton County line between the cities of Celina and Prosper, traveling north of the city of Melissa, then turning south along the east side of Lake Lavon down toward the Rockwall County line.

In January 2009, the Collin County Commissioner Court created the Collin County Toll Road Authority. Responding to continued strong demographic growth, as well as the lack of sufficient state or federal funds, the county saw an opportunity through the Collin County Toll Road Authority and recent state legislation (Texas Senate Bill 792) to construct segments of the Collin County Loop. In addition, an inter-local agreement was reached in March 2011 by the Collin County Toll Road Authority and the North Texas Tollway Authority allowing the collaborative advancement of planning for the Collin County Outer Loop. As part of the agreement, the Collin County Toll Road Authority and the North Texas Tollway Authority will form and maintain an advisory group consisting of the Texas Department of Transportation, the North Central Texas Council of Governments, and other appropriate parties.

The approved Collin County Outer Loop locally preferred alignment was formally incorporated into the Collin County Mobility Study-2007 Update thoroughfare plan recommendations and the document was officially adopted by the Collin County Commissioners Court in December 2007. The Collin County Outer Loop locally preferred alignment was classified in the thoroughfare plan recommendations as a tollway with the recognition that local revenues alone would be insufficient to complete final engineering, obtain environmental approval, acquire right-of-way, and construct the ultimate facility prior to the year 2030. The Collin County Mobility Study-2007 Update also stated that the design concept and scope of its Outer Loop recommendation was consistent with the North Central Texas Council of Governments’ proposal for a Regional Outer Loop outlined in Mobility 2030.

As of December 2017, design is ongoing for the construction of a two-lane service road from DNT to just east of SH 289. Design is also in progress for Segment 3 from the Denton/Collin County line to US 75 (Figure 1-7).
Figure 1-6. Collin County Mobility Study – Thoroughfare Plan (May 2016)
1.6 SUMMARY
The need for a circumferential roadway around the Dallas metropolitan area was first identified in the 1957 Thoroughfare Report of the Dallas Area Master Plan Committee. The Regional Outer Loop is an outgrowth of substantial and long-standing components of the regional long-range transportation plan. Portions of the Regional Outer Loop have been included in each of the 12 regional transportation plans developed since 1974. The inclusion of the Denton Greenbelt Corridor and the Collin County Regional Outer Loop in Mobility 2045 showed increased regional commitment to the project. Various municipalities and agencies such as the North Central Texas Council of Governments and the Texas Department of Transportation have demonstrated support for the project by including outer loop sections in their local and regional thoroughfare plans, or by referring to the outer loop during their planning efforts.
2.0 NEED AND INTENT

This chapter discusses the potential transportation needs and intent of the Denton Greenbelt Corridor. This chapter also describes the study area and subareas established for the project.

2.1 NEED FOR THE DENTON GREENBELT CORRIDOR

This section discusses potential regional transportation needs based on population and employment growth, regional transportation demand, and system linkages in the study area and the Dallas-Fort Worth region.

2.1.1 Growth

Historically, Texas has been one of the 10 fastest growing states in the nation. According to the US Census Bureau, Texas added 4.3 million persons between 2000 and 2010, a 20.6 percent increase in population. By comparison, the US population grew by 27.3 million persons between 2000 and 2010, an increase of 9.7 percent. As a result of these high growth rates, the demand for efficient transportation in the Dallas-Fort Worth metropolitan area continues to increase. A favorable business climate, attractive tax policies, and an abundance of available land also contribute to the population and employment growth of the region. Based on 2010 US Census population estimates, the Dallas-Fort Worth metropolitan area is the fourth most populous in the nation.

2.1.2 Future Growth based on Historical Trends

In 2010, the Dallas-Fort Worth urban area grew to 6,417,700 persons, a 23.8 percent increase in population since the 2000 Census. Table 2.1 indicates the North Central Texas Council of Governments (NCTCOG) regional projections for population and employment from 2010 through 2045 for the Dallas-Fort Worth metropolitan planning area (MPA). The MPA includes 12 counties: Collin, Dallas, Denton, Ellis, Hood, Hunt, Johnson, Kaufman, Parker, Rockwall, Tarrant, and Wise. Based on the 2010 US Census, the Dallas-Fort Worth MPA increased in population by 1.2 million people from 2000 to 2010. This accounted for over 28 percent of population growth for the entire state of Texas.

<table>
<thead>
<tr>
<th>Year</th>
<th>Population</th>
<th>% Change</th>
<th>Employment</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990 Census¹</td>
<td>4,013,418</td>
<td></td>
<td>2,534,340</td>
<td></td>
</tr>
<tr>
<td>2000 Census¹</td>
<td>5,197,317</td>
<td>29%</td>
<td>3,191,576</td>
<td>26%</td>
</tr>
<tr>
<td>2010 Census¹</td>
<td>6,417,724</td>
<td>23%</td>
<td>4,045,726</td>
<td>27%</td>
</tr>
<tr>
<td>2018²</td>
<td>7,429,723</td>
<td>16%</td>
<td>4,793,363</td>
<td>18%</td>
</tr>
<tr>
<td>2028²</td>
<td>8,722,529</td>
<td>17%</td>
<td>5,455,956</td>
<td>14%</td>
</tr>
<tr>
<td>2037²</td>
<td>10,188,220</td>
<td>17%</td>
<td>6,382,301</td>
<td>17%</td>
</tr>
<tr>
<td>2045²</td>
<td>11,246,531</td>
<td>10%</td>
<td>7,024,227</td>
<td>10%</td>
</tr>
</tbody>
</table>

Source: ¹US Census Bureau, ²NCTCOG Demographic Forecast Information, September 2018

Substantial growth is occurring in the study area and across Denton County. Denton County, with a current population of 662,614 from the 2010 Census is expected to grow by 103 percent to 1,346,316 by 2045. Additionally, Denton County will have a population density of 1,405 per square mile in 2045, which is greater than the MPA at 1,191 in 2045.

The project crosses through three cities: Celina, Aubrey, and Denton. Table 2.2 indicates the growth for these cities in the project area. This shows the substantial growth in these cities which compare to the entire MPA average of 1.6 percent growth per year.
Table 2.2. Population Growth

<table>
<thead>
<tr>
<th>City</th>
<th>2000(^1)</th>
<th>2010(^1)</th>
<th>Estimated 2018 Population(^2)</th>
<th>% Change per year</th>
<th>Projected 2040 Population(^3)</th>
<th>% Change per year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Celina</td>
<td>1,861</td>
<td>6,028</td>
<td>13,090</td>
<td>14.6</td>
<td>89,000</td>
<td>26.4</td>
</tr>
<tr>
<td>Aubrey</td>
<td>1,500</td>
<td>2,595</td>
<td>4,040</td>
<td>7.0</td>
<td>7,349</td>
<td>3.7</td>
</tr>
<tr>
<td>Denton</td>
<td>80,537</td>
<td>113,383</td>
<td>130,990</td>
<td>2.0</td>
<td>268,780</td>
<td>4.8</td>
</tr>
</tbody>
</table>

Source: \(^1\)US Census Bureau, \(^2\)NCTCOG Population Estimates, \(^3\)Texas Water Development Board, September 2018

As population increases, employment levels are expected to increase accordingly. In the MPA, the employment for the region is expected to grow by 53 percent from 2010 (US Census) to 2045 (NCTCOG demographic forecast). Denton County, in comparison, is expected to grow twice as fast with 118 percent in the same time period. NCTCOG’s demographic forecast continues to show expanded growth on the outside of the region from the counties surrounding Dallas and Tarrant. The current forecast estimates the growth will be greater in the northern portion of the MPA.

NCTCOG used Federal Highway Administration’s INVEST (Infrastructure Voluntary Evaluation Sustainability Tool) to identify sustainability-related content to include in corridor-scale studies. INVEST criteria CS-1.1 and CS-1.2 discuss identifying how transportation needs meet economic development and land use and engaging those agencies responsible. The cities of Celina and Aubrey, along with Denton County, all have future land use and economic plans. These plans detail expanded grown within the proposed project area with multiple developments with commercial, residential, and transportation. The plans for each city and county include and assume the construction of the Denton Greenbelt Corridor. NCTCOG has met with each of these stakeholders to provide input into this project. Public and stakeholder coordination is discussed in detail in Chapter 5.

As Denton County continues to attract new industry and businesses, and established businesses relocate further from the urban core, the associated increases in population and employment will create a strain on existing transportation systems. Trends derived through analysis of previous demographic growth include increased automobile ownership, more single-occupant travel, increased suburbanization, and increased vehicle miles of travel in the region (regional travel). Given the availability of undeveloped land and the absence of an east-west roadway network in the project area, the existing suburbanization is anticipated to create severe mobility implications and the need for additional transportation linkages.

2.1.3 Travel Demand

Traditionally, mobility improvements for the metropolitan area have focused on improving travel time and reducing traffic congestion along the major freeway corridors. The majority of industrial and commercial developments have historically been located around the major freeway facilities. Most of the peak-hour travel demand was observed to originate from commuters in suburban communities located outside these major freeway corridors traveling to and from their respective places of employment. Industrial and commercial developments have now expanded beyond the major freeways into the suburban communities, causing a dramatic change in travel patterns for these areas. Increasing development of the industrial and commercial facilities has positively affected the growth of the economy for these communities, as well as generated rapidly increasing population growth.

Not only have population and travel increased, but the nature of travel has changed in ways that contribute to greater traffic congestion. The changes in land use associated with
suburbanization have an effect on the characteristics of travel. Rather than the suburb-to-
central city commute of the past, current commuting patterns are more widely diffused, as inter-
and intra-suburban travel has increased. Due to the rapid pace at which growth has occurred,
and is projected to continue, limited funding seriously constrains the ability to solve ground
transportation issues in the region.

Section 1.2 discusses the process and development of the Metropolitan Transportation Plan. 
*Mobility 2045: The Metropolitan Transportation Plan for North Central Texas (Mobility 2045)* is 
the current fiscally constrained Metropolitan Transportation Plan for the Dallas-Fort Worth area. 
It presents a system of transportation improvements needed to maintain mobility in the Dallas-
Fort Worth metropolitan area over the next 25 plus years and serves as a guide for the 
expenditure of state and federal funds for the region. Its development was coordinated among 
the public, local governments, transit authorities, the Texas Department of Transportation, 
Federal Highway Administration, and Federal Transit Administration. Regional transportation 
projects selected through the process of forecasting future travel demand, evaluating system 
alternatives, and selecting those options which best meet the mobility needs of the region are 
included in the plan. It also serves as a guide for the phased implementation of multimodal 
transportation improvements, policies, and programs through the year 2045.

A major emphasis of *Mobility 2045* is management of the regional transportation system. 
*Mobility 2045* focuses on cost-effective improvements, identifying additional and/or alternative 
funding sources for needed transportation improvements, and a more aggressive strategy (or 
strategies) to manage the regional transportation system. The potential transportation projects 
considered for inclusion in *Mobility 2045* were evaluated against a standard or warrant. Various 
improvements/modes including the congestion management process, bicycle and pedestrian 
facilities, rail facilities, and managed lane facilities were investigated prior to determining the 
need for additional roadway capacity improvements. The warrants were based on minimum 
and maximum traffic volumes as a function of facility type, number of lanes, and area type (e.g., 
urban, suburban, rural).

As shown in Table 2.3, *Mobility 2045* estimates that even with the implementation of planned 
transportation improvements, vehicle hours spent in delay would increase by 124 percent 
compared to 2018 mobility levels in the Dallas-Fort Worth MPA. The planned improvements 
would increase hourly capacity by 21 percent. Levels for vehicle hours spent in delay would 
increase 296 percent under the No-Build scenario.

<table>
<thead>
<tr>
<th>Regional Performance Measure</th>
<th>2018</th>
<th>2045</th>
<th>No Build</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td>7,429,723</td>
<td>11,246,531</td>
<td>11,246,531</td>
</tr>
<tr>
<td>Employment</td>
<td>4,793,363</td>
<td>7,024,227</td>
<td>7,024,227</td>
</tr>
<tr>
<td>Vehicle Miles of Travel</td>
<td>212,248,504</td>
<td>331,319,572</td>
<td>332,376,920</td>
</tr>
<tr>
<td>Hourly Capacity (Miles)</td>
<td>44,779,653</td>
<td>54,331,489</td>
<td>44,284,576</td>
</tr>
<tr>
<td>Vehicle Hours Spent in Delay (Daily)</td>
<td>1,682,269</td>
<td>3,773,455</td>
<td>6,658,531</td>
</tr>
<tr>
<td>Increase in Travel Time Due to Congestion</td>
<td>40.98%</td>
<td>59.12%</td>
<td>101.77%</td>
</tr>
<tr>
<td>Annual Cost of Congestion (Billions)</td>
<td>$12.1</td>
<td>$27.2</td>
<td>$47.9</td>
</tr>
</tbody>
</table>

Source: *Mobility 2045*, Exhibit 8.16, May 2018

Figure 2-1 illustrates the congestion levels during the peak hour under 2018 conditions. Figure 
2-2 illustrates the congestion levels during the peak hour under 2045 conditions. The congestion 
level for 2045 with the *Mobility 2045*-recommended improvements includes the Denton 
Greenbelt Corridor. Figure 2-3 shows the congestion levels during peak hour in the Dallas-Fort
Worth MPA under the No-Build scenario where no transportation improvements are built beyond the programmed commitments in the 2019-2022 Transportation Improvement Program.

Figure 2-1. 2018 Peak-Period Congestion Levels
Figure 2-2. 2045 Peak-Period Level of Congestion (Build)

Cost of Congestion/Delay: $27.2 billion
Congestion index is based on a percent increase in travel time.
The congestion levels continue to increase from the existing condition. Under the No-Build option for Mobility 2045, the proposed project would be in light and moderate congestion. The full build for Mobility 2045, including this proposed project, would reduce the area to light congestion near the city of Denton and no congestion for the remainder of the project area.

**System Linkages**

Denton County has, and continues, to experience substantial growth. As the growth continues in the northern portion of the MPA, demand for roadways and linkages increase. The current system of roadways in the project area consist of small rural county roads and Farm-to-Market roads maintained by the Texas Department of Transportation. These roadway systems were not designed to handle the expected traffic growth that will continue to occur in the project area. Additionally, the only major east-west infrastructure in Denton County is US 380, which is currently experiencing increased travel times and congestion and is located five miles south of the proposed project. It is estimated that the US 380 corridor will have severe congestion in 2045 under Mobility 2045’s No-Build scenario.

The proposed project connects to potential five major facilities as shown in Table 2.4.
The Denton Greenbelt Corridor would provide a crucial east-west facility to connect these major facilities.

2.2 INTENT OF DENTON GREENBELT CORRIDOR

Mobility 2045 included the Denton Greenbelt Corridor as part of a long-term multimodal vision for the region to serve east-west automobile and truck traffic in northern Denton County to accommodate future growth. The Denton Greenbelt Corridor was envisioned as a potential series phased construction, adding additional lanes as traffic warranted. The intent of the Denton Greenbelt Corridor is to:

- Improve capacity, mobility, and accessibility for outlying communities and developing areas in northern Denton County by providing direct links to existing major radial highways.
- Serve northern Denton County that currently lacks major east-west facilities for inter-suburban travel
- Help manage long-term regional congestion from rapid population and employment growth and development.
- Provide the basic transportation infrastructure necessary to allow for expansion that accommodates varied travel demands or modes as warranted.
- Provide a system that integrates with current and proposed land use and promotes development outlined by the cities and Denton County.

### Table 2.4. System Linkages

<table>
<thead>
<tr>
<th>Roadway</th>
<th>Existing Facility</th>
<th>Future 2045 Facility</th>
<th>Major Direction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dallas Parkway/ Dallas North Tollway</td>
<td>2-lane rural</td>
<td>6-lane tolled with 6-lane frontage road</td>
<td>North-South</td>
</tr>
<tr>
<td>Collin County Outer Loop (DNT to US 75)</td>
<td>Nothing (under engineering design)</td>
<td>6-lane freeway with 6-lane frontage road</td>
<td>East-West</td>
</tr>
<tr>
<td>US 377</td>
<td>2-lane rural roadway</td>
<td>6-lane roadway</td>
<td>North-South</td>
</tr>
<tr>
<td>IH 35</td>
<td>4-lane freeway with 4-lane frontage road</td>
<td>6-lane freeway with 4/6-lane frontage road</td>
<td>North-South</td>
</tr>
<tr>
<td>Loop 288</td>
<td>4-lane arterial</td>
<td>4-lane arterial</td>
<td>East-West</td>
</tr>
</tbody>
</table>