Regional Choices for North Texas
Regional Choices for North Texas

November 2008

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## Contents

**Executive Summary** .................................................. 1

**Overview** ............................................................... 9

**North Texas Now** ...................................................... 13
  Geographic Areas .................................................... 13
  The People of North Texas ........................................... 13
  The North Texas Development Pattern .......................... 24
  North Texas Investments and Infrastructure .................. 45

**North Texas to 2030: Extending the Trends** ................. 75
  The People of North Texas ........................................... 75
  The North Texas Development Pattern .......................... 78
  North Texas Investments and Infrastructure .................. 81

**North Texas: Alternative Visions of the Future** .......... 91
  New Directions .......................................................... 91
  Changing Stakeholder Preferences ............................... 99
  Alternative Scenarios ............................................... 112

**Regional Summit 2008 Discussion Topics** ................. 125

**Appendices** .......................................................... 129
  Appendix 1: Vision North Texas Advisors .................... 129
  Appendix 2: Vision North Texas Sponsors .................... 130
  Appendix 3: North Texas Cities, By Community Form Type .. 131
  Appendix 4: Exhibit Listing .......................................... 132
  Appendix 5: Bibliography ............................................ 135
By the year 2030, the sixteen county North Texas region may be home to almost 9.5 million people. Where these individual residents choose to live and work will have a major effect on the quality of life for all North Texans in the coming decades — from environmental impacts such as air and water quality to economic vitality, availability of parks, traffic congestion and desirable community character. Decisions made today about regional development patterns, and the public and private investments that result from these choices, will determine the region’s ability to be successful and sustainable in the long term.

What is Vision North Texas?

Vision North Texas is a partnership of private, public, and academic organizations working to increase awareness about the growth expected in North Texas and to involve people and organizations in initiatives that accommodate that growth successfully and sustainably. The partnerships’ three Charter Sponsors are the Urban Land Institute’s North Texas District Council (ULI), the North Central Texas Council of Governments (NCTCOG) and the University of Texas at Arlington (UTA); many other organizations participate as partners and sponsors. Vision North Texas brings together people from diverse backgrounds and perspectives to discuss common interests, understand differences, and find solutions. It educates people about the change and growth our region is facing, and about the options we have to successfully accommodate this growth. It is the region’s forum to debate and agree on a shared vision for our region and a practical action program to create that future. It provides North Texas decision-makers with the tools they need to make better choices that will make this vision a reality.

In September 2007, the Vision North Texas leadership began an ambitious effort to create North Texas 2050, a document that will be a ‘gamebook’ designed to help the region grow more successfully and sustainably. North Texas 2050 will include a Regional Vision Statement describing the region of the future that current residents would like to achieve. It will also contain an Action Package of tools and techniques that can be used by many different private and public decision-makers to help achieve that regional vision.
This report, *Regional Choices for North Texas*, is the first product of this ambitious effort. It compiles research and information about critical issues that will shape the future of North Texas. It provides a complete picture of our region as it exists today. It describes the future that is expected if North Texas continues “business as usual” and follows current trends and plans. Then, it proposes a set of alternatives to this future that are based on the results of the subregional workshops and the ideas of the region’s stakeholders.

**What defines North Texas today?**

North Texas is one of the major metropolitan areas of the 21st century United States. It is a unique result of its natural surroundings, the post World War II-era when it experienced most of its growth, and the choices its individual residents and businesses have made as they have invested in North Texas communities.

North Texas is big. The geographic area of North Texas is larger than the state of Massachusetts. This is the fourth-largest metropolitan area in the nation in numbers of people and jobs (behind only New York, Los Angeles and Chicago) and the fifth-largest in terms of gross domestic product.

North Texans are diverse. About 57% of the region’s residents are white. Exhibit 1.2 shows there are significant numbers of black, Hispanic and Asian residents as well. More than half (55%) of the region’s residents are native Texans. Of the 19% who were born abroad, most came from Latin America or Asia.

The region’s households are also varied. Only 37% of the households in North Texas are families with children. Fully a quarter of North Texas households are single person households. Seniors living alone are 6% of the region’s households and non-family households are just over 5% of the households in the region. Housing is generally affordable here compared to other metropolitan areas, but people in important segments of the workforce (such as police officers) do not earn enough to afford median priced homes.

North Texas’ economic strength comes from many sectors including manufacturing, professional services, finance, retail and government. It has a higher concentration of high technology jobs than the national average. It is the home of 24 Fortune 500 companies.

With over 150 incorporated cities, North Texas offers a wide range of choice for residents and businesses. Unlike most metropolitan areas, there are many large cities here – Dallas, Fort Worth and nine other cities have more than 100,000 residents.

Though the region is less densely populated than older metropolitan areas like Chicago and Boston, it is more densely populated than the Houston and Atlanta regions and significantly more densely populated than the Seattle, Portland, Denver and Phoenix metropolitan areas.

On the other hand, there are many parts of North Texas that have relatively low intensities of development. Nearly 70% of the region’s housing stock is single family detached homes. This report’s analysis of development patterns uses a national sprawl index where the national average of all counties in all metropolitan areas is given a score of 100 and more compact counties score higher (for instance,
San Francisco County CA scored 209.27). Dallas, Tarrant and Collin counties are less sprawling than the national average. The region’s outlying counties – Ellis, Johnson, Kaufman and Parker – score below 90 on this index.

There is still a very large amount of North Texas yet to be shaped by decisions about development patterns and investments in the region’s natural areas and built infrastructure. Within the region’s 12 central counties, there were over 6,600 square miles of vacant and agricultural land in 2005. Combined with the four outlying counties, there are almost 10,000 square miles of land that are not yet part of the North Texas urban fabric. This is more land than the entire New York metropolitan area and almost three times the size of Yellowstone National Park.

The natural assets of North Texas do not include dramatic peaks or sweeping ocean shorelines. But they do include the nation’s largest urban hardwood forest (the Great Trinity Forest in Dallas), watersheds of four major Texas rivers (the Brazos, Sabine and Sulphur as well as the Trinity), native prairies and habitat for endangered or threatened species of plants and animals.

The pattern of regional development that accommodates today’s people and businesses is supported by an extensive infrastructure network. It requires substantial resources to function. The region used approximately 1.4 million acre feet of water in the year 2000 and an estimated 73.6 billion kilowatt hours of electricity in 2008. In 2007, the region’s urbanized center had over 151 million vehicle miles of travel on its 4,500 lane miles of major roadways. Public transportation and high occupancy vehicle systems carried approximately 100 million passenger trips that year, and there were 34 miles of completed off-system Veloweb (bicycle) trails available in the region.

This regional pattern offers choice, but it also creates challenges. The air quality in most counties does not meet national standards, creating health concerns for residents with respiratory problems. The region’s rivers and streams have segments where water quality is impaired. The carbon footprint of North Texas (the amount of carbon dioxide or equivalent released into the atmosphere) is as large as the footprint for the entire state of New Mexico. People lost over one million hours a day in 2007 stuck in traffic congestion. And recent research indicates that people living in lower density communities (such as
the region’s outlying counties) are more likely to be obese or have hypertension. Throughout the region, aging infrastructure (such as bridges and dams) represents both a safety concern and a future cost – 14.6% of the region’s bridges are ‘structurally deficient’ or ‘functionally obsolete’ and 15.4% of its dams are considered ‘high hazard’.

**Where is North Texas headed?**

All projections indicate that North Texas will continue to grow significantly. By 2030, the 16 counties in North Texas could have almost 9.5 million people and by 2050 the region could have 12 million residents. The decisions and investments made now by North Texas residents, companies, local governments and other organizations will determine the future of North Texas. They will shape the quality of life experienced by future residents, the economic success of businesses and the overall sustainability of the region.

Current projections and approved plans paint a picture of what North Texas’ future could be like. They describe the ‘business as usual’ future for the region, which includes:

- **In 2030, the median age of North Texas residents will be similar to the median age today. But the composition of the population will be different, with a smaller share of the population likely to be in the labor force. Children (19 and under) will also be a smaller share of the region’s population. Seniors (65 and older) will be a larger share of the population. A larger percentage of North Texas residents will be Hispanic.**

- **People are expected to want different types of housing. For example, the number of households in the market for transit-oriented housing (within one-half mile of transit stations) is expected to grow from about 46,000 in 2007 to over 270,000 in 2030.**

- **The development pattern for the region is expected to continue growing outward at relatively low intensities. This pattern will likely mean a reduction in the amount of land in natural areas and in agricultural use. It will increase the region’s impervious surface coverage.**

- **The region’s “Mobility 2030” plan includes $70.9 billion in improvements to bike, pedestrian, rail, highway and other transportation systems by 2030. Yet the hours lost to traffic congestion increase by almost 37%.**

- **Energy demand by 2050 will be 21% higher than the currently available capacity.**

- **By 2050, water demand will more than double from year 2000 levels, exceeding the supplies currently expected to be available.**

- **All of the investments in buildings and ‘grey’ infrastructure that exist today will be much older. Some will have exceeded their useful life and will need replacement. Others will need maintenance or rehabilitation.**
Other aspects of the region—such as its natural or ‘green’ infrastructure—are not addressed in currently developed regional plans. So decisions about these assets often focus on individual sites, with little guidance about a site’s role in larger regional systems.

Many individual facilities that provide health care, education and cultural assets to communities in North Texas have studied their own anticipated demands. But these plans for facility expansions, replacements or other investments are not typically coordinated with the plans for the region’s overall development or for other facilities and infrastructure systems. So there may be other areas where ‘business as usual’ creates additional challenges for the region.

How could the future be different?

An extension of past trends is not the only possible future for North Texas. Vision North Texas has examined and highlighted some global and national issues that are likely to affect the region, as well as changes that are underway or under discussion in the region. Some of the possibilities reflected by these new directions are:

- Global efforts to reduce climate change are focusing on the role urban areas play in reducing greenhouse gas emissions. Alternative development patterns for North Texas have already been shown to reduce vehicle miles traveled, a key factor in reducing the area’s carbon footprint. Over 60% of North Texans live in cities whose Mayors have signed the U.S. Mayors’ Climate Protection Agreement.

- The future may be shaped by even larger urban regions. Several national initiatives consider the ‘Texas Triangle’ to be one of ten megaregions nationwide. The Texas Triangle connects the North Texas, Houston and San Antonio regions.

- Natural systems (the ‘green infrastructure’) can retain the open spaces and natural features of the region while addressing issues such as stormwater management. They reduce the needs for the traditional ‘grey infrastructure’ of pipes and pavement. By reducing the region’s impervious surfaces, they can help address the urban heat island effect and other concerns.

- The urban forest is becoming a recognized asset that can contribute to reduced energy use, a smaller carbon footprint, and a more livable region. It may become an economic asset if carbon trading systems are part of a national climate change strategy.

- A study by the American Council for an Energy-Efficient Economy has calculated that the DFW region could meet all its increased needs for electricity for the next 15 years through a suite of nine conservation policies.
‘Architecture 2030’ advocates reducing greenhouse gas emissions (and lowering energy consumption) by applying higher energy standards to new and renovated buildings. For North Texas, 45-50% of the housing units that will exist in 2030 have not been built yet. So these higher standards could make a difference to this region and its future.

New design that reflects ‘development excellence’ has been recognized in North Texas since 2003. Thirty five projects have received CLIDE awards in categories including new development, redevelopment, public planning and policy, raising public awareness and special development.

What do North Texans think?

North Texas stakeholders have participated in Vision North Texas workshops throughout the region, beginning with a regionwide event in 2005 and continuing with subregional workshops in 2007 and 2008. Workshop participants met in small, diverse groups. Each group agreed on a shared vision of the future they hope to see for North Texas and a development pattern that accommodates expected growth and achieves this vision. Stakeholders at all workshops consistently describe preferred visions for the future that are not ‘business as usual’.

Vision North Texas participants – from diverse backgrounds and different communities – expressed frequent support for protection of natural resources and preservation of community character.
They were interested in patterns of growth that create mixed-use centers at various scales and locations. They created development patterns or scenarios that gave people more choice in how they travel, with rail, bicycle routes and pedestrian connections between homes, jobs and other destinations. Throughout their discussions, there was support for regional collaboration and coordination. Exhibit 1.3, “Live Life Linked”, reflects the vision and distribution of growth created by one stakeholder group at the Northwestern Subregional Workshop. On this map, orange Legos represent new housing expected from 2000 to 2030 and blue Legos represent jobs added during that time.

Stakeholders at Vision North Texas workshops have consistently supported regional efforts that change ‘business as usual’. Participant support for regional investment based on a preferred regional scenario ranges from 83% to 96% at Vision North Texas events held in the past three years.

**What alternatives might we consider?**

Vision North Texas has identified five scenarios that provide a range of possibilities for the region’s future. All scenarios assume that the 16 county region will have 9.49 million people and 5.58 million jobs in 2030. These scenarios are summarized in Exhibit 1.4. Chapter 5 of this report includes a description of the development and investment choices they reflect. Exhibit 1.5 uses a digital version of one workshop group concept to illustrate the southeastern part of the Connected Centers Scenario.

### Exhibit 1.4: North Texas 2050 Scenario Summary

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Key Concept</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business As Usual</td>
<td>Continuation of current trends and adopted plans</td>
</tr>
<tr>
<td>Connected Centers</td>
<td>Give people more choice about how they connect to the places where they live, work and play</td>
</tr>
<tr>
<td>Return on Investment</td>
<td>Maximize the benefit received from the extensive investment taxpayers and property owners have made in the region’s existing infrastructure &amp; development pattern</td>
</tr>
<tr>
<td>Diverse, Distinct Communities</td>
<td>Create a region with different sorts of communities and centers, built on the traditional character of regional communities but designed to meet the needs of the region’s future markets</td>
</tr>
<tr>
<td>Green Region</td>
<td>Emphasize green development or natural assets as the foundation for future regional growth</td>
</tr>
</tbody>
</table>

### Exhibit 1.5: Connected Centers Scenario
The entire set of scenarios will be analyzed in terms of its development pattern, benefits and impacts on the region by 2030. A more general assessment will extend the effects of these scenarios to the year 2050.

Stakeholders should not select one scenario to support at this time. Instead, they should consider whether the set of scenarios proposed here are the ones that should be studied.

What can you do?

Participants at subregional update sessions will share their opinions at these sessions. Regional Summit 2008 will bring together additional leaders to focus on the set of possible alternative scenarios and the action tools that are most important to achieve the region’s desired vision. Ideas, comments and other input will also be received online at www.visionnorthtexas.org. By signing up for the email list on this site, interested individuals and organizations can be sure they receive information as Vision North Texas continues.

The next set of public sessions for Vision North Texas will occur in June 2009 when the results of the alternative scenario study are released. During the summer and early fall, the region’s stakeholders will participate in a dialogue about the implications of these scenarios. This debate should set the direction for North Texas 2050, the vision for the region’s future and the action package of tools and techniques all decision-makers can use. North Texas 2050 should be completed in late 2009.
Overview

By the year 2030, the sixteen county North Texas region may be home to 9.49 million people. Where these people choose to live and work will have a major effect on the quality of life for all North Texans in the coming decades — from environmental impacts such as air and water quality to economic vitality, availability of parks, mobility options and desirable community character. Decisions made today about regional development patterns and the public and private investments that result from these choices will determine the region’s ability to be successful and sustainable in the long term.

What is Vision North Texas?

Vision North Texas is a partnership of private, public, and academic organizations working to increase awareness about the growth expected in North Texas. It involves people and organizations in initiatives that accommodate that growth successfully and sustainably. The partnerships’ three Charter Sponsors are the Urban Land Institute’s North Texas District Council (ULI), the North Central Texas Council of Governments (NCTCOG) and the University of Texas at Arlington (UTA); many other organizations participate as partners and sponsors. Vision North Texas’ activities are directed by a small Management Committee representing the Charter Sponsors and other leaders in the private, public and academic sectors, and are guided by more than 70 Advisors representing key private and public sector entities.

Vision North Texas involves the people of North Texas in deciding what a desirable and sustainable future will look like for our region.

It brings together people from diverse backgrounds and interests to discuss common interests, understand differences, and find solutions. It educates people about the change and growth our region is facing, and about the options we have to successfully accommodate this growth. It is the region’s forum to debate and agree on a shared vision for our region and a practical action program to create that future. It provides North Texas decision-makers with the tools they need to make better choices that, together, will make this vision a reality.
Vision North Texas Activities and Accomplishments

The Vision North Texas partnership began its work by hosting a regional visioning workshop, held in April 2005 at the University of Texas at Arlington. This workshop brought together a diverse group of nearly 200 stakeholders from across the region to discuss alternatives to the pattern of urban growth currently projected for the area. During the visioning workshop, participants defined 15 alternative development scenarios that could provide increased quality of life, sustainability and economic vitality for the people who will live and work here in the future. Evaluation of these scenarios showed they could provide North Texas with significant economic and environmental benefits—more than $15 billion in transportation cost savings, in one case.

Following the 2005 workshop, leaders from across the region urged Vision North Texas to continue this important work. Vision North Texas has now completed more than 100 workshops and presentations and conducted research on issues such as creation of a regional greenprint and support for development best practices. A Leadership Summit in 2006 engaged the elected and appointed leaders of the regions’ cities and counties. In 2007 and 2008, four subregional workshops involved diverse stakeholders throughout the region in a more detailed discussion of the best ways to accommodate anticipated growth.

Since 2005, Vision North Texas has involved and heard from hundreds of stakeholders who share a vision for a sustainable North Texas and who overwhelmingly urged our region to take action.

Creating a Regional ‘Gamebook’

In September 2007, the Vision North Texas leadership began an ambitious effort to create North Texas 2050, a document that will be a ‘gamebook’ designed to help the region grow more successfully and sustainably. North Texas 2050 will include a Regional Vision Statement describing the region of the future that current residents would like to achieve. It will also contain an Action Package of tools and techniques that can be used by many different private and public decision-makers to help achieve that regional vision.
Examining Regional Choices

This report, *Regional Choices for North Texas*, is the first product of this ambitious effort. It compiles research and information about critical issues that will shape the future of North Texas. It provides a complete picture of our region as it exists today. It describes the future that is expected if North Texas continues “business as usual” and follows current trends and plans. Then, it proposes a set of alternatives to this future that are based on the results of the subregional workshops and the ideas of the region’s stakeholders.

*Regional Choices for North Texas* lays the groundwork for substantive policy discussion that will begin with subregional update sessions in November 2008 and a major Regional Summit on December 9, 2008. These discussions will shape a set of alternative scenarios for the region’s future that will be analyzed in 2009. A second report, *Alternative Futures for North Texas*, will present the results of this analysis and the implications of these alternatives on the region’s livability, economic vitality and sustainability. Major assemblies in June 2009 will begin regional debate about these alternatives. Feedback from stakeholders and interested individuals will set priorities and shape the recommendations in the *North Texas 2050* draft. This regional dialogue will conclude in late 2009 with the completion of *North Texas 2050*. Vision North Texas Charter Sponsors, cities and counties, civic and development organizations and others will be asked to adopt or approve *North Texas 2050* and use it to help guide their own decisions and investments.
Exhibit 3.1: Geographies of the North Central Texas Region
North Texas Now

Understanding the choices North Texas faces for the future begins with understanding the conditions of the North Texas region today. This chapter reviews the characteristics of North Texas as it exists now – the people who live here and the natural assets, economy and infrastructure that shape their daily lives.

Geographic Areas

Vision North Texas focuses on a 16-county area in North Texas. This area coincides with the North Central Texas Council of Governments’ planning region. Whenever possible, this 16-county area will be referenced throughout this report. It will often be indicated by the word “region”. At almost 12,800 square miles, this region is larger than nine states, including Hawaii and Massachusetts.

In some parts of the report, different geographic areas are used because information is not available for all sixteen regional counties. Other relevant geographies include the Metropolitan Planning Area (MPA) and the Metropolitan Statistical Area. The Metropolitan Planning Area, which covers all of five counties and portions of an additional four counties; is the area used for transportation facility planning and funding. The 12-county Metropolitan Statistical Area (MSA) is used by the U.S. Census Bureau for all their data collection and analysis purposes. It is commonly referred to as the Dallas-Fort Worth-Arlington MSA or simply the MSA. The terms “DFW” and “metro area” also indicate the MSA. Additional geographies will be used throughout this report. Descriptions or maps will be provided for each of these other geographies as these references occur.

The People of North Texas

People live in North Texas for many reasons – some were born here, others moved here because of education or job opportunities, or for some other reason. Within the region, people choose among many different neighborhoods, cities and counties. In this section of the report, the characteristics of North Texas residents are described and then compared to people in other regions and in other parts of this region.

North Central Texas Council of Governments Region

Regional Population

The sixteen-county region that is the focus of Vision North Texas had slightly more than a half million people when the 20th century began. By the beginning of the 21st century, the region’s population had increased nearly ten-fold, to 5.3 million. Most of that growth occurred after World War II, as this region saw the dramatic expansion of jobs and growth of suburban neighborhoods that characterized much of the Sunbelt.

Today, the sixteen-county North Central Texas region is home to over 6.5 million people. It is more populous than many countries including Jordan, Denmark, Finland, Norway, and New Zealand; this region had more people in 2007 than the entire state of Arizona. Nearly eighty-six percent of the region’s population in concentrated in four core counties: Collin, Dallas, Denton and Tarrant.

Ethnicity and Age of Residents

Approximately fifty-four percent of North Central Texans are white, twenty-seven percent are Hispanic, fourteen percent are black, and
the remaining five percent are Asian or of another race. Overall, there are just slightly more males than females but women outnumber men in every racial group except Hispanic. The average number of people in each household is 2.65.

The median age for all people in the area is about 33.5 years. In all age categories below fifty years, males outnumber females. The reverse is true in each of the fifty-year-plus age groups, where women outnumber men.

**Dallas - Fort Worth - Arlington MSA**

**Population**

With over 6.1 million people, the twelve-county Dallas-Fort Worth-Arlington MSA is the fourth most populous metropolitan area in the nation.

The MSA’s population is nearly evenly split in terms of gender. Men outnumber women by only 0.4 percent. The median age for all people in the area is thirty-three years. Sixty-nine percent of the people in the DFW metro area are white, fourteen percent are black, five percent are Asian, and the remaining twelve percent are of another race or of mixed race. Twenty seven percent of the people across all races are Hispanic.

**Population Density, U.S. and North Texas**

The nation’s largest metropolitan area, New York, is also the most densely populated. The U.S. Census Bureau calculated the 2005 population density for this metro area at 4.36 persons per square mile. The Los Angeles metropolitan area’s density is almost as high. The Dallas-Fort Worth-Arlington metropolitan area is less densely populated than these regions, at 1.01 persons per acre. However, it is more dense than either the Houston or Atlanta regions and significantly more dense than the Seattle, Portland, Denver and Phoenix metropolitan areas.

**Families and Households**

Seventy percent of Dallas-Fort Worth area residents live in families. Twenty-five percent live alone and five percent live in households with at least one other, non-related person. The household composition is very similar to that of two other Texas metros—San Antonio and Houston—but less like other large national metros, which tend to have fewer family households.

**Household Income**

In 2007, half of area households had an income of at least $54,730, which is higher than both the state median of $47,548, and the national median of $50,740. The estimated median income for the DFW area is just below the figure for the Austin MSA. However,

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1 A family is a group of two or more people who reside together and who are related by birth, marriage, or adoption. A household includes all the people who occupy a housing unit as their usual place of residence.
the Austin metro area has less than one-third as many households as does the DFW metro. DFW’s median income is higher than the median incomes of the Houston and San Antonio MSA’s.

**Income and Wealth**

Woods & Poole Economics, a Washington DC-based firm that provides long-range economic and demographic forecasts, has devised a measure that attempts to gauge an area’s relative wealth. This measure looks at all sources of income and views income from sources such as dividends, interests, and rent positively while income from transfer payments is viewed negatively. Each area’s figure is compared to a national figure to compute the index.

In 2008, three of the region’s counties were above the national average for wealth — Collin, Dallas and Rockwall. The county with the highest wealth, Collin, measured 138.14 on this index, while the lowest wealth county, Kaufman, measured 71.17.

### Exhibit 3.5: The Ten Most Populous Metropolitan Statistical Areas

<table>
<thead>
<tr>
<th>Metropolitan Statistical Area</th>
<th>2007 Estimated Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>New York-Northern New Jersey-Long Island, NY-NJ-PA</td>
<td>18,815,988</td>
</tr>
<tr>
<td>Los Angeles-Long Beach-Santa Ana, CA</td>
<td>12,875,587</td>
</tr>
<tr>
<td>Chicago-Naperville-Joliet, IL-IN-WI</td>
<td>9,524,673</td>
</tr>
<tr>
<td>Dallas-Fort Worth-Arlington, TX</td>
<td>6,145,037</td>
</tr>
<tr>
<td>Philadelphia-Camden-Wilmington, PA-NJ-DE-MD</td>
<td>5,827,962</td>
</tr>
<tr>
<td>Houston-Sugar Land-Baytown, TX</td>
<td>5,628,101</td>
</tr>
<tr>
<td>Miami-Fort Lauderdale-Pompano Beach, FL</td>
<td>5,413,212</td>
</tr>
<tr>
<td>Atlanta-Sandy Springs-Marietta, GA</td>
<td>5,278,904</td>
</tr>
<tr>
<td>Boston-Cambridge-Quincy, MA-NH</td>
<td>4,482,857</td>
</tr>
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</table>
### Exhibit 3.6: Population Density for Selected Metropolitan Areas, 2005

<table>
<thead>
<tr>
<th>Metropolitan Statistical Area</th>
<th>Persons Per Acre, 2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atlanta-Sandy Springs-Marietta, GA</td>
<td>0.92</td>
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<tr>
<td>Boston-Cambridge-Quincy, MA-NH</td>
<td>1.97</td>
</tr>
<tr>
<td>Chicago-Naperville-Joliet, IL-IN-WI</td>
<td>2.05</td>
</tr>
<tr>
<td>Dallas-Fort Worth-Arlington, TX</td>
<td>1.01</td>
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<tr>
<td>Denver-Aurora, CO</td>
<td>0.44</td>
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<tr>
<td>Houston-Sugar Land-Baytown, TX</td>
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</tr>
<tr>
<td>Los Angeles-Long Beach-Santa Ana, CA</td>
<td>4.16</td>
</tr>
<tr>
<td>Miami-Fort Lauderdale-Pompano Beach, FL</td>
<td>1.65</td>
</tr>
<tr>
<td>Phoenix-Mesa-Scottsdale, AZ</td>
<td>0.41</td>
</tr>
<tr>
<td>Portland-Vancouver-Beaverton, OR-WA</td>
<td>0.49</td>
</tr>
<tr>
<td>Seattle-Tacoma-Bellevue, WA</td>
<td>0.85</td>
</tr>
</tbody>
</table>

### Exhibit 3.8: Households and Income for Selected Texas MSAs

<table>
<thead>
<tr>
<th>Texas Metropolitan Area</th>
<th>Number of Households</th>
<th>Median Income</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austin-Round Rock</td>
<td>583,598</td>
<td>$56,746</td>
</tr>
<tr>
<td>Dallas-Fort Worth-Arlington</td>
<td>2,128,648</td>
<td>$54,730</td>
</tr>
<tr>
<td>Houston-Sugar Land-Baytown</td>
<td>1,896,441</td>
<td>$52,988</td>
</tr>
<tr>
<td>San Antonio</td>
<td>679,614</td>
<td>$46,321</td>
</tr>
</tbody>
</table>

### Exhibit 3.7: Characteristics of Households for Selected MSAs, 2007

<table>
<thead>
<tr>
<th>Metropolitan Area</th>
<th>Number of households</th>
<th>Families</th>
<th>Living alone</th>
<th>Non-family, not living alone</th>
</tr>
</thead>
<tbody>
<tr>
<td>New York-Northern New Jersey-Long Island, NY-NJ-PA</td>
<td>6,721,841</td>
<td>66%</td>
<td>28%</td>
<td>5%</td>
</tr>
<tr>
<td>Los Angeles-Long Beach-Santa Ana, CA</td>
<td>4,158,616</td>
<td>68%</td>
<td>25%</td>
<td>7%</td>
</tr>
<tr>
<td>Chicago-Naperville-Joliet, IL-IN-WI</td>
<td>3,412,058</td>
<td>67%</td>
<td>28%</td>
<td>5%</td>
</tr>
<tr>
<td>Philadelphia-Camden-Wilmington, PA-NJ-DE-MD</td>
<td>2,188,173</td>
<td>65%</td>
<td>29%</td>
<td>6%</td>
</tr>
<tr>
<td>Dallas-Fort Worth-Arlington, TX</td>
<td>2,128,648</td>
<td>70%</td>
<td>25%</td>
<td>5%</td>
</tr>
<tr>
<td>Miami-Fort Lauderdale-Pompano Beach, FL</td>
<td>2,002,081</td>
<td>65%</td>
<td>29%</td>
<td>7%</td>
</tr>
<tr>
<td>Washington-Arlington-Alexandria, DC-VA-MD-WV</td>
<td>1,958,104</td>
<td>65%</td>
<td>29%</td>
<td>6%</td>
</tr>
<tr>
<td>Houston-Sugar Land-Baytown, TX</td>
<td>1,896,441</td>
<td>71%</td>
<td>24%</td>
<td>5%</td>
</tr>
<tr>
<td>Atlanta-Sandy Springs-Marietta, GA</td>
<td>1,867,083</td>
<td>68%</td>
<td>26%</td>
<td>6%</td>
</tr>
<tr>
<td>Boston-Cambridge-Quincy, MA-NH</td>
<td>1,684,749</td>
<td>63%</td>
<td>29%</td>
<td>7%</td>
</tr>
<tr>
<td>San Antonio, TX</td>
<td>679,614</td>
<td>70%</td>
<td>25%</td>
<td>5%</td>
</tr>
<tr>
<td>Austin-Round Rock, TX</td>
<td>583,598</td>
<td>62%</td>
<td>29%</td>
<td>9%</td>
</tr>
</tbody>
</table>
Educational Achievement

Three out of every ten North Central Texas residents have at least a bachelor’s degree. An additional twenty-eight percent have some college-level training. Of the largest metro areas, only Washington DC and Boston, MA have substantially more college attendees or graduates as a percentage of their adult population. On the other end of the scale, only two of the largest metro areas—Los Angeles and Houston—have higher percentages of people without a high school diploma when compared to DFW’s share.

Counties Within North Texas

Population Density

The 6.5 million people living in North Texas are not evenly distributed across the 16-county region. The core counties—Collin, Dallas, Denton, and Tarrant—are home to almost eighty-six percent of the area’s residents. The most densely populated county is Dallas with more than four people for each acre of land. The most sparsely populated county is Palo Pinto. Located on the western edge of the region, Palo Pinto has twenty-one acres of land for every person living in the county. Over the last eight years, all of the core counties and many of the outer counties experienced an increase in population density. Rockwall and Collin counties showed the greatest percentage change in density. For some counties, the change was insignificant. No county experienced a decline in density.

Share of Regional Population

Uneven population growth in the region leads to shifting shares of the regional population. In 2000, Dallas County had forty-two percent of the region’s population. By the beginning of 2008, the figure had dropped to thirty-seven percent. The largest share gain was in Collin County, which increased its share from nine to eleven percent. The share in Tarrant County remained unchanged at twenty-seven percent.
Diversity

Dallas County is by far the largest and most racially and ethnically diverse county in the North Central Texas region. The dominant group in Dallas County is the Hispanic population, which is larger both in terms of absolute number and percentages than in any other North Central Texas county. Collin County has a relatively large share of the region’s Asian population. This is reflected in their greater than ten percent showing in the “other” category. With the exception of Navarro, the rural counties tend to be much less diverse than their urban neighbors.


<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Collin</td>
<td>491,675</td>
<td>748,050</td>
<td>566,851</td>
<td>0.9</td>
<td>1.3</td>
<td>0.5</td>
</tr>
<tr>
<td>Dallas</td>
<td>2,218,899</td>
<td>2,451,800</td>
<td>581,279</td>
<td>3.8</td>
<td>4.2</td>
<td>0.4</td>
</tr>
<tr>
<td>Denton</td>
<td>432,976</td>
<td>614,650</td>
<td>610,108</td>
<td>0.7</td>
<td>1.0</td>
<td>0.3</td>
</tr>
<tr>
<td>Ellis</td>
<td>111,360</td>
<td>147,850</td>
<td>608,915</td>
<td>0.2</td>
<td>0.2</td>
<td>0.1</td>
</tr>
<tr>
<td>Erath</td>
<td>33,001</td>
<td>38,550</td>
<td>697,446</td>
<td>0.0</td>
<td>0.1</td>
<td>0.0</td>
</tr>
<tr>
<td>Hood</td>
<td>41,100</td>
<td>54,900</td>
<td>279,519</td>
<td>0.1</td>
<td>0.2</td>
<td>0.0</td>
</tr>
<tr>
<td>Hunt</td>
<td>76,596</td>
<td>91,600</td>
<td>564,381</td>
<td>0.1</td>
<td>0.2</td>
<td>0.0</td>
</tr>
<tr>
<td>Johnson</td>
<td>126,811</td>
<td>159,750</td>
<td>469,982</td>
<td>0.3</td>
<td>0.3</td>
<td>0.1</td>
</tr>
<tr>
<td>Kaufman</td>
<td>71,313</td>
<td>102,550</td>
<td>516,425</td>
<td>0.1</td>
<td>0.2</td>
<td>0.1</td>
</tr>
<tr>
<td>Navarro</td>
<td>45,124</td>
<td>49,500</td>
<td>695,131</td>
<td>0.1</td>
<td>0.1</td>
<td>0.0</td>
</tr>
<tr>
<td>Palo Pinto</td>
<td>27,026</td>
<td>29,600</td>
<td>630,583</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Parker</td>
<td>88,495</td>
<td>120,300</td>
<td>582,327</td>
<td>0.2</td>
<td>0.2</td>
<td>0.1</td>
</tr>
<tr>
<td>Rockwall</td>
<td>43,080</td>
<td>76,000</td>
<td>95,211</td>
<td>0.5</td>
<td>0.8</td>
<td>0.3</td>
</tr>
<tr>
<td>Somervell</td>
<td>6,809</td>
<td>9,100</td>
<td>122,805</td>
<td>0.1</td>
<td>0.1</td>
<td>0.0</td>
</tr>
<tr>
<td>Tarrant</td>
<td>1,446,219</td>
<td>1,780,150</td>
<td>577,162</td>
<td>2.5</td>
<td>3.1</td>
<td>0.6</td>
</tr>
<tr>
<td>Wise</td>
<td>48,793</td>
<td>64,500</td>
<td>590,386</td>
<td>0.1</td>
<td>0.1</td>
<td>0.0</td>
</tr>
<tr>
<td>Region</td>
<td>5,309,277</td>
<td>6,538,850</td>
<td>8,188,511</td>
<td>0.6</td>
<td>0.8</td>
<td>0.2</td>
</tr>
</tbody>
</table>

Households

Ten North Central Texas counties have a population of at least 65,000. Of these top ten counties, Kaufman has the highest average number of persons per household (3.36); Tarrant has the lowest (2.77). In most of the counties, forty to forty-five percent of the households have children. The exception is Hunt, which has a somewhat lower showing of thirty-five percent. Not surprisingly, Hunt County has the highest percentage of household with at least one person over the age of sixty. More than one in three Hunt County households fit into this category. Denton County has the lowest.
share of households with seniors, with people over sixty in less than one out of every five households.

Fifty-six percent of all housing units in Dallas County are occupied by the unit’s owner. This figure is twelve percentage points lower than any other county except for Tarrant, where there is a seven point difference. At nearly eighty-four percent, Rockwall has the highest percentage of owner-occupied housing units.

**Education**

One out of every four Dallas County residents over the age of twenty-five does not have a high school diploma. This is in contrast to Collin County where the rate is less than one in ten. Nearly half of those living in Collin County have earned a bachelor’s degree. At less than fifteen percent, Kaufman County has the lowest share of adult residents with a college degree.

**Income**

The income data for the ten counties is somewhat reflective of the educational attainment levels. Collin County has the highest median income while Hunt has the lowest with a $36,000 spread between the two. Hunt has the highest percentage of families with children who are living below the poverty level. Rockwall County has the lowest share of families, with or without children, living in poverty. Dallas County has the highest percentage of all families living in poverty and the second highest for families with children. Despite the high percentages of poverty in Dallas County, the county’s median income is equal to Denton County’s, which has poverty shares nearly identical to Collin County’s.
Communities Within North Texas

While some issues have a similar effect on all communities within the region, other issues affect communities in different ways. Five primary ‘community form types’ have been defined for Vision North Texas. This classification is based on four major factors that describe the cities’ roles in the region and in the region’s historic development pattern:

- Extent of urbanization;
- Primary development period, reflected by the age of the housing stock;
- Whether the city is largely land-locked or is able to grow by annexing adjacent land; and
- The city’s proximity to the region’s two center cities of Dallas and Fort Worth.

**Core Areas** include the oldest central parts of the region’s two center cities of Dallas and Fort Worth. Much of the Core Area was developed before 1950.

**Inner Tier Communities** include cities like Irving, Richardson and Haltom City that are adjacent to Dallas and Fort Worth and were largely developed by the 1990’s. Those parts of Fort Worth and Dallas developed since World War II are also considered Inner Tier Communities. For the most part, these communities no longer have the ability to grow through annexation, so their future economic and fiscal vitality depends on retaining the vitality of neighborhood and business areas already inside the existing city limits.

**Outer Tier Communities** are further from the region’s two central cities but are part of the region’s urbanized area. Most of their development has occurred since 1980. They are largely urbanized. Since they are not land-locked, they can still expand through annexation. Grapevine, Coppell, Frisco and McKinney are examples of Outer Tier Communities.

Cities like Waxahachie are defined as **Separate Communities** because they are physically separate from the region’s main urban area. They include central areas that were largely developed before 1990; they typically can still grow outward. Smaller Towns are similar to Separate Communities though they are less urban; they include places like Anna. The **Rural/Unincorporated Areas** category includes unincorporated areas.

More than 2 million of the region’s inhabitants live in the core cities, which include the two central cities of Dallas and Forth Worth. Over the last eight years, the share of the region’s population living in the core cities has declined slightly as much of the growth has been in the outer tier cities and rural areas, which together increased by over 600,000 residents.

Women slightly outnumber men in the inner tier, outer tier, and separate cities. The number of men and women is essentially

---

**Exhibit 3.14: Selected Household Characteristics of North Central Counties, 2007**

<table>
<thead>
<tr>
<th>County</th>
<th>Number of Households</th>
<th>Average Household Size</th>
<th>Households with children</th>
<th>Households with seniors (60+)</th>
<th>Housing units which are owner occupied</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collin</td>
<td>256,954</td>
<td>2.82</td>
<td>42.6%</td>
<td>20.0%</td>
<td>72.5%</td>
</tr>
<tr>
<td>Dallas</td>
<td>829,143</td>
<td>2.82</td>
<td>39.3%</td>
<td>24.2%</td>
<td>56.3%</td>
</tr>
<tr>
<td>Denton</td>
<td>201,202</td>
<td>2.98</td>
<td>41.9%</td>
<td>17.7%</td>
<td>67.8%</td>
</tr>
<tr>
<td>Ellis</td>
<td>45,924</td>
<td>3.08</td>
<td>45.2%</td>
<td>26.6%</td>
<td>75.6%</td>
</tr>
<tr>
<td>Hunt</td>
<td>28,925</td>
<td>2.79</td>
<td>34.5%</td>
<td>35.9%</td>
<td>69.3%</td>
</tr>
<tr>
<td>Johnson</td>
<td>47,546</td>
<td>3.10</td>
<td>40.5%</td>
<td>29.2%</td>
<td>74.7%</td>
</tr>
<tr>
<td>Kaufman</td>
<td>28,442</td>
<td>3.36</td>
<td>42.5%</td>
<td>27.5%</td>
<td>77.0%</td>
</tr>
<tr>
<td>Parker</td>
<td>35,895</td>
<td>2.95</td>
<td>42.7%</td>
<td>28.9%</td>
<td>81.5%</td>
</tr>
<tr>
<td>Rockwall</td>
<td>23,905</td>
<td>3.04</td>
<td>45.6%</td>
<td>23.6%</td>
<td>83.5%</td>
</tr>
<tr>
<td>Tarrant</td>
<td>610,185</td>
<td>2.77</td>
<td>40.3%</td>
<td>23.7%</td>
<td>63.4%</td>
</tr>
</tbody>
</table>
equal in the core communities. The towns are the only area where there are more male residents than female ones, collectively.

Outer tier communities have the highest share of children. These cities also have a corresponding high share of people in the 35 – 54 age bracket, presumably the people parenting all these children. The separate cities and towns reflect higher percentages of older residents.

The core communities are by far the most racially diverse of the various community types. This is to be expected since these communities include the urban center cities of Dallas and Fort Worth, which dominate the category. The inner tier cities have the highest percentages of white and Asian residents. In the outer tier, separate cities, and towns, about eighty percent their populations are white.

There are only 7 percent fewer households in the inner tier communities than in the core cities. However, the composition of households in these communities is less similar. The core areas have more singles and more seniors than the inner tier communities.

More than seventy percent of inner tier households are comprised of related persons and more than forty percent have children living at home.

Of all the community types, the outer tier communities have the lowest share of their population living in single-person households. Overall, these communities tend to be the youngest and most family-oriented.

The household composition of towns is similar to that of the outer tier communities except that the cities which comprise the town category have more households with elder family members.

<table>
<thead>
<tr>
<th>County</th>
<th>2007 Median Income</th>
<th>Families below poverty level</th>
<th>Families with children below poverty level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collin</td>
<td>$79,657</td>
<td>4.0%</td>
<td>6.0%</td>
</tr>
<tr>
<td>Dallas</td>
<td>$46,372</td>
<td>14.5%</td>
<td>20.9%</td>
</tr>
<tr>
<td>Denton</td>
<td>$46,372</td>
<td>4.3%</td>
<td>6.0%</td>
</tr>
<tr>
<td>Ellis</td>
<td>$54,330</td>
<td>9.3%</td>
<td>14.3%</td>
</tr>
<tr>
<td>Hunt</td>
<td>$43,163</td>
<td>12.6%</td>
<td>24.5%</td>
</tr>
<tr>
<td>Johnson</td>
<td>$53,289</td>
<td>10.2%</td>
<td>17.0%</td>
</tr>
<tr>
<td>Kaufman</td>
<td>$54,125</td>
<td>8.8%</td>
<td>14.4%</td>
</tr>
<tr>
<td>Parker</td>
<td>$61,433</td>
<td>5.8%</td>
<td>5.9%</td>
</tr>
<tr>
<td>Rockwall</td>
<td>$77,861</td>
<td>3.3%</td>
<td>5.1%</td>
</tr>
<tr>
<td>Tarrant</td>
<td>$53,459</td>
<td>9.8%</td>
<td>14.3%</td>
</tr>
</tbody>
</table>
Exhibit 3.17: North Texas Communities, by Community Type

Cities by Category:
- Core Communities
- Inner Tier Communities
- Outer Tier Communities
- Separate Communities

Vision North Texas
Regional Choices for North Texas
### Exhibit 3.18: Population and Population Change for North Central Texas Community Types

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Core Communities</td>
<td>1,799,980</td>
<td>2,080,808</td>
<td>280,828</td>
<td>16%</td>
<td>34%</td>
<td>32%</td>
<td>-2%</td>
</tr>
<tr>
<td>Inner Tier Communities</td>
<td>1,698,077</td>
<td>1,899,350</td>
<td>201,273</td>
<td>12%</td>
<td>32%</td>
<td>29%</td>
<td>-3%</td>
</tr>
<tr>
<td>Outer Tier Communities</td>
<td>901,575</td>
<td>1,344,250</td>
<td>442,675</td>
<td>49%</td>
<td>17%</td>
<td>21%</td>
<td>4%</td>
</tr>
<tr>
<td>Separate Communities</td>
<td>346,664</td>
<td>450,900</td>
<td>104,236</td>
<td>30%</td>
<td>7%</td>
<td>7%</td>
<td>0%</td>
</tr>
<tr>
<td>Towns</td>
<td>65,410</td>
<td>94,550</td>
<td>29,140</td>
<td>45%</td>
<td>1%</td>
<td>1%</td>
<td>0%</td>
</tr>
<tr>
<td>Rural Areas</td>
<td>497,571</td>
<td>668,992</td>
<td>171,421</td>
<td>34%</td>
<td>9%</td>
<td>10%</td>
<td>1%</td>
</tr>
<tr>
<td>NCTCOG Region</td>
<td>5,309,277</td>
<td>6,538,850</td>
<td>1,229,573</td>
<td>23%</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Exhibit 3.20: Population by Age by Community Type, 2000

<table>
<thead>
<tr>
<th>Community Type</th>
<th>19 and Under</th>
<th>20 - 34</th>
<th>35 - 54</th>
<th>55 - 64</th>
<th>65 and over</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core</td>
<td>30%</td>
<td>27%</td>
<td>27%</td>
<td>7%</td>
<td>9%</td>
</tr>
<tr>
<td>Inner Tier</td>
<td>31%</td>
<td>24%</td>
<td>31%</td>
<td>7%</td>
<td>7%</td>
</tr>
<tr>
<td>Outer Tier</td>
<td>33%</td>
<td>21%</td>
<td>34%</td>
<td>7%</td>
<td>6%</td>
</tr>
<tr>
<td>Separate</td>
<td>30%</td>
<td>25%</td>
<td>25%</td>
<td>7%</td>
<td>12%</td>
</tr>
<tr>
<td>Town</td>
<td>31%</td>
<td>19%</td>
<td>30%</td>
<td>9%</td>
<td>11%</td>
</tr>
</tbody>
</table>
The North Texas Development Pattern

The location of homes, businesses, parks and other destinations creates the physical setting in which North Texas residents live their lives. The pattern of this development plays an important role in the region’s livability, desirability and sustainability. In this section of the report, the region’s growth over time is considered because it shapes the existing region’s character. The current pattern of physical development is described, including issues related to the regional land use pattern; residential development patterns and market demands; location of employment centers; and characteristics of mixed-use areas. Lastly, this section provides information on the proximity of jobs and housing.

Regional Land Use Pattern

Age of Urbanization

The late 1880s marked the first major period of growth for the cities of Dallas and Fort Worth – together they had 17,000 residents in 1880 and over 61,000 in 1890. Significant growth in adjacent cities did not come until half a century later. Each decade since the 1960s has seen multiple cities reach a population level of at least 25,000 people.

Developed Lands

Growing population is reflected in an increase in development and a corresponding change in the way land is used. By 2001, more than half of the land in Dallas and Tarrant counties was developed for urban uses. Counties adjacent to these two have greater percentages of developed land when compared to non-adjacent counties. One example

Exhibit 3.22: Household Composition by Community Type, 2000

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>Family</th>
<th>Living Alone</th>
<th>With individuals under 18 years</th>
<th>With individuals 65 years and over</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core</td>
<td>673,715</td>
<td>61%</td>
<td>31%</td>
<td>36%</td>
<td>17%</td>
</tr>
<tr>
<td>Inner Tier</td>
<td>623,778</td>
<td>71%</td>
<td>23%</td>
<td>41%</td>
<td>13%</td>
</tr>
<tr>
<td>Outer Tier</td>
<td>316,538</td>
<td>78%</td>
<td>18%</td>
<td>47%</td>
<td>12%</td>
</tr>
<tr>
<td>Separate</td>
<td>124,877</td>
<td>66%</td>
<td>27%</td>
<td>37%</td>
<td>22%</td>
</tr>
<tr>
<td>Town</td>
<td>22,390</td>
<td>76%</td>
<td>20%</td>
<td>43%</td>
<td>22%</td>
</tr>
</tbody>
</table>
Exhibit 3.22: Household Composition by Community Type, 2000

<table>
<thead>
<tr>
<th>Community Type</th>
<th>Total Family</th>
<th>Total Living Alone</th>
<th>Total With Individuals under 18 years</th>
<th>Total With Individuals 65 years and over</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core</td>
<td>673,715</td>
<td>61%</td>
<td>31%</td>
<td>36%</td>
</tr>
<tr>
<td>Inner Tier</td>
<td>623,778</td>
<td>71%</td>
<td>23%</td>
<td>41%</td>
</tr>
<tr>
<td>Outer Tier</td>
<td>316,538</td>
<td>78%</td>
<td>18%</td>
<td>47%</td>
</tr>
<tr>
<td>Separate</td>
<td>124,877</td>
<td>66%</td>
<td>27%</td>
<td>37%</td>
</tr>
<tr>
<td>Town</td>
<td>22,390</td>
<td>76%</td>
<td>20%</td>
<td>43%</td>
</tr>
</tbody>
</table>

Exhibit 3.23: Community Growth Over Time

Time period when population reached 25,000:
- 1880-1890
- 1890-1900
- 1895-1960
- 1950-1960
- 1960-1970
- 1980-1990
- 1990-2000
- 2000-2008
is Dallas’ neighbor to the east. Rockwall, the smallest county in the region, was 17 percent developed by 2001. Overall, only 15.5% of the land in the 16 county region was developed for urban uses in 2001.

Clearly, the extent of development varies from one city to another within the region. Exhibit 3.26 shows that some North Texas cities were more than 80% developed in 2001 while many others were less than 40% developed. Cities that have begun to develop more recently typically have a smaller share of developed land. However, older cities that have annexed territory may also have substantial areas that are not yet developed. Fort Worth is a good example of this situation – even though it reached 25,000 population in the 1890’s, continuing annexation has given the city new areas for development. For the cities that are largely developed, issues of concern are often maintenance of existing neighborhoods and the redevelopment or revitalization of declining areas. For cities that are largely undeveloped, and those with opportunities for additional annexation, concerns often include the extension of urban services and facilities to new areas as well as maintenance of existing developed areas.

A more detailed assessment of the use of land is available for the 12 counties in the central part of the North Texas region. In 2005, 13 percent of the land in this 12-county area was engaged in residential uses of various types and at all development densities. Three percent was in commercial (or non-residential) use. Two percent was set aside for parks and recreation. Four percent was water – rivers, lakes and streams. Eight percent was in other uses including transportation and utilities. Seventy percent of the land in these counties remained vacant or was being used for agriculture.¹

¹ Vacant/agriculture includes all undeveloped land as well as land used for cropland, pasture, orchards, vineyards, groves, nurseries, ornamental horticultural areas, confined feeding operations or other agricultural uses.

---

### Exhibit 3.24: Developed Area By County, 2001

<table>
<thead>
<tr>
<th>County</th>
<th>Square Miles</th>
<th>% Developed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collin</td>
<td>885.7</td>
<td>23.2</td>
</tr>
<tr>
<td>Dallas</td>
<td>908.2</td>
<td>60.3</td>
</tr>
<tr>
<td>Denton</td>
<td>953.2</td>
<td>17.8</td>
</tr>
<tr>
<td>Ellis</td>
<td>951.4</td>
<td>8.2</td>
</tr>
<tr>
<td>Erath</td>
<td>1,089.7</td>
<td>2.2</td>
</tr>
<tr>
<td>Hood</td>
<td>436.7</td>
<td>7.7</td>
</tr>
<tr>
<td>Hunt</td>
<td>881.8</td>
<td>8.1</td>
</tr>
<tr>
<td>Johnson</td>
<td>734.3</td>
<td>8.6</td>
</tr>
<tr>
<td>Kaufman</td>
<td>806.9</td>
<td>7.2</td>
</tr>
<tr>
<td>Navarro</td>
<td>1,086.1</td>
<td>6.4</td>
</tr>
<tr>
<td>Palo Pinto</td>
<td>985.2</td>
<td>3.0</td>
</tr>
<tr>
<td>Parker</td>
<td>909.8</td>
<td>6.0</td>
</tr>
<tr>
<td>Rockwall</td>
<td>148.7</td>
<td>17.0</td>
</tr>
<tr>
<td>Somervell</td>
<td>191.8</td>
<td>3.3</td>
</tr>
<tr>
<td>Tarrant</td>
<td>901.8</td>
<td>52.0</td>
</tr>
<tr>
<td>Wise</td>
<td>922.4</td>
<td>8.4</td>
</tr>
<tr>
<td>Region</td>
<td>12,793.7</td>
<td>15.5</td>
</tr>
</tbody>
</table>
Exhibit 3.27: Land Use by County, 2005 (thousands of acres)

<table>
<thead>
<tr>
<th></th>
<th>Collin</th>
<th>Dallas</th>
<th>Denton</th>
<th>Ellis</th>
<th>Hood</th>
<th>Hunt</th>
<th>Johnson</th>
<th>Kaufman</th>
<th>Parker</th>
<th>Rockwall</th>
<th>Tarrant</th>
<th>Wise</th>
<th>12-County Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential</td>
<td>87</td>
<td>155</td>
<td>82</td>
<td>36</td>
<td>13</td>
<td>38</td>
<td>68</td>
<td>42</td>
<td>47</td>
<td>16</td>
<td>147</td>
<td>27</td>
<td>759</td>
</tr>
<tr>
<td>Commercial</td>
<td>20</td>
<td>79</td>
<td>18</td>
<td>8</td>
<td>3</td>
<td>4</td>
<td>7</td>
<td>4</td>
<td>5</td>
<td>2</td>
<td>57</td>
<td>3</td>
<td>210</td>
</tr>
<tr>
<td>Parks/Recreation</td>
<td>13</td>
<td>36</td>
<td>16</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>4</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>27</td>
<td>20</td>
<td>127</td>
</tr>
<tr>
<td>Water</td>
<td>26</td>
<td>26</td>
<td>50</td>
<td>11</td>
<td>12</td>
<td>29</td>
<td>6</td>
<td>19</td>
<td>8</td>
<td>14</td>
<td>26</td>
<td>17</td>
<td>243</td>
</tr>
<tr>
<td>Other</td>
<td>48</td>
<td>121</td>
<td>41</td>
<td>23</td>
<td>9</td>
<td>21</td>
<td>16</td>
<td>22</td>
<td>32</td>
<td>6</td>
<td>107</td>
<td>18</td>
<td>463</td>
</tr>
<tr>
<td>Vacant/Agriculture</td>
<td>373</td>
<td>165</td>
<td>402</td>
<td>528</td>
<td>242</td>
<td>472</td>
<td>370</td>
<td>427</td>
<td>488</td>
<td>57</td>
<td>212</td>
<td>505</td>
<td>4,240</td>
</tr>
</tbody>
</table>

At the county level, Ellis has the greatest share of vacant/agricultural land while Dallas has the least. The four outlying counties of the North Texas region (Erath, Navarro, Palo Pinto and Somervell) also are largely agricultural.

Land in residential or commercial use is also likely to be located in urban areas where public facilities and services (such as water and sewage treatment, police and others) are available. Some of these developed lands may be underutilized or otherwise suitable for reinvestment in the future; vacant land within the urban fabric may also be available for new development. Other vacant or agricultural lands are not yet served by urban levels of public services. These lands could remain in their current agricultural use in the future, continuing this aspect of the region’s economy. They could also be candidates for inclusion in open space or natural area systems, or they could be candidates for new urban-scale development.

The total amount of land that was in agricultural use or was vacant in 2005 clearly demonstrates the magnitude of the impact future development patterns could have on the region. The 12 counties listed in Exhibit 3.29 have over 6,600 square miles of land in vacant or agricultural uses; the four outlying counties contain over 3,300 square miles of territory, most of which is in agricultural use. Together, these areas cover almost 9,980 square miles of land – more than the entire New York metropolitan area and almost three times the size of Yellowstone National Park. Decisions about investments in these areas will have a significant effect on the overall region’s character in the future.
Exhibit 3.28: General Land Use Pattern, 2005

Land Use:
- Residential
- Commercial/Industrial
- Parks/Recreation
- Vacant/Agriculture
- Airport/Other
- Water

Vision North Texas
Regional Choices for North Texas
Impervious Areas

One result of urban development is an increase in the amount of land covered by impervious surfaces which do not allow water to penetrate into the underlying soil. Impervious surfaces include roads, parking lots, sidewalks, rooftops, and other impermeable areas in the region. The percentage of an individual watershed or region that is impervious is a very useful indicator for measuring the impacts of land development on aquatic systems and water quality. A variety of research projects – conducted in many geographic areas, concentrating on many different variables, and employing widely different methods – have yielded a surprisingly consistent conclusion that stream degradation occurs at relatively low levels of imperviousness (approximately 10%).

Most importantly, imperviousness is one of the few variables that can be explicitly quantified, managed and controlled at each stage of land development. For example, the total runoff volume for a one-acre parking lot \( (R_v = 0.95) \) is about 16 times that produced by an acre of undeveloped meadow \( (R_v = 0.06) \). Studies by the Center for Watershed Protection show that water quality in streams declines significantly in areas with over 25% impervious cover. Even 10% imperviousness causes stream quality to be impacted. This is the level of imperviousness resulting from developments with two-acre residential lots.

Impervious surfaces affect aquatic systems and water quality because they increase the amount of rainfall that runs off an area instead of being absorbed in the soil on the site. Higher runoff may increase stormwater flows or change their timing; it also reduces groundwater recharge. Since this runoff may be carrying pollutants (such as oil from cars in a parking lot) it can increase pollutant levels in streams and rivers. Additionally, many impervious areas contribute to the ‘urban heat island’ because their higher reflective values (compared to vegetation) cause the temperature in the surrounding area to rise. For this reason, higher levels of imperviousness may contribute to higher energy costs (for air conditioning of adjacent buildings) and health concerns (for heat-related illnesses).

Exhibit 3.29: Vacant & Agricultural Uses as a Percentage of County Land Area, 2005

<table>
<thead>
<tr>
<th>County</th>
<th>Vacant/Agriculture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collin</td>
<td>66%</td>
</tr>
<tr>
<td>Dallas</td>
<td>28%</td>
</tr>
<tr>
<td>Denton</td>
<td>66%</td>
</tr>
<tr>
<td>Ellis</td>
<td>87%</td>
</tr>
<tr>
<td>Hood</td>
<td>86%</td>
</tr>
<tr>
<td>Hunt</td>
<td>84%</td>
</tr>
<tr>
<td>Johnson</td>
<td>79%</td>
</tr>
<tr>
<td>Kaufman</td>
<td>83%</td>
</tr>
<tr>
<td>Parker</td>
<td>84%</td>
</tr>
<tr>
<td>Rockwall</td>
<td>60%</td>
</tr>
<tr>
<td>Tarrant</td>
<td>37%</td>
</tr>
<tr>
<td>Wise</td>
<td>86%</td>
</tr>
</tbody>
</table>

Sprawl Index

Recent national studies have created an index that shows whether an area’s development is considered sprawl – the low density, automobile-based development pattern of the past 50 years. This index, developed by researchers at Rutgers and Cornell Universities for Smart Growth America, uses a set of variables to represent different factors that characterize this development pattern. The ‘sprawl index’ value of 100 represents the national average; areas with higher scores are less sprawling and those with lower scores are more sprawling.
Exhibit 3.30: North Texas Impervious Areas
A metropolitan area sprawl index was developed in 2002. The Dallas PMSA measured 78.3 on this index, while the Fort Worth-Arlington PMSA measured 77.2. At the regional level, North Texas is more sprawling than other major metropolitan areas such as New York (at 177.8, the least sprawling of the nation’s 83 large metropolitan areas), Chicago (121.2) and Los Angeles (101.8). Only 9 of the 83 large metro areas (including Atlanta at 57.7) were less sprawling than Fort Worth-Arlington.

Later research applied a modified sprawl index to individual counties within metropolitan areas. Again, a score of 100 represented the national average. This calculation clearly shows the differences within North Texas. The central counties of this region – Dallas and Tarrant – are comparable to other urban counties including Travis County TX (Austin) at 106.79, Maricopa County AZ (Phoenix) at 111.51, Harris County TX (Houston) at 113.25 and King County WA (Seattle) at 118.01. Outlying counties show a higher degree of sprawl.

One reason for concern about this ‘sprawl’ development pattern is that the research project compared health data to this index and found “a direct relationship between sprawl and chronic disease”. The report showed that a person’s likelihood of being obese, and of having hypertension, increased in the more sprawling areas. Exhibit 3.31 shows these results for North Texas. For example, residents of Dallas County are 3.04% less likely than the national average to be obese, while residents of Parker County are 4.12% more likely to be obese.

### Exhibit 3.31: Sprawl Index and Obesity, North Texas Counties, 2002

<table>
<thead>
<tr>
<th>Sprawl Index Score</th>
<th>% Difference in Odds of Obesity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collin County</td>
<td>101.00</td>
</tr>
<tr>
<td>Dallas County</td>
<td>114.55</td>
</tr>
<tr>
<td>Denton County</td>
<td>98.68</td>
</tr>
<tr>
<td>Ellis County</td>
<td>88.64</td>
</tr>
<tr>
<td>Johnson County</td>
<td>89.94</td>
</tr>
<tr>
<td>Kaufman County</td>
<td>88.42</td>
</tr>
<tr>
<td>Parker County</td>
<td>80.94</td>
</tr>
<tr>
<td>Rockwall County</td>
<td>90.98</td>
</tr>
<tr>
<td>Tarrant County</td>
<td>110.62</td>
</tr>
</tbody>
</table>

Residential Development

### Housing Type and Age

In January of 2008, there were over 2.4 million dwellings in the 16-county North Central Texas region, nearly seventy percent of which were single-family homes. This inventory of housing units represents a net increase of 353,000 since the 2000 Census. Multi-family units as a percentage of all housing units decreased slightly over this same period.

There are currently approximately 2.36 million single-family, multi-family or other housing units in the Dallas-Fort Worth-Arlington MSA, half of which have been built since 1984.

The boom years for apartment building were in the 1980s while single-family home construction has continued to be strong in the decades since. Exhibit 3.34 illustrates these patterns.

---

2 The PMSA is a geographic area used by the U.S. Census Bureau in 2000 and earlier. The Dallas PMSA included Collin, Dallas, Denton, Ellis, Henderson, Hunt, Kaufman and Rockwall counties; the Fort Worth-Arlington PMSA included Hood, Johnson, Parker and Tarrant counties.
3 “Measuring the Health Effects of Sprawl”, Smart Growth America, September 2003
Exhibit 3.35, on the next page, shows that the median value of the homes built since 1990 is much higher than the median for homes built any time before, including the decade just prior. Part of this can be attributed to the newness of the structures but another part of this is a reflection of the fact that the newer units are truly more expensive ones. They are larger and have more features than their predecessors and easy financing has made these homes more available, albeit not necessarily more affordable.

**Home Size**

Single family homes in the U.S. have grown larger over time. In 1973, the median size of a new single family home in the Southern U.S. was 1,555 square feet. By 1994, the median size of these homes was 2,000 square feet, and by 2007 the median size was 2,325 square feet, an increase of almost 50% since 1973. The median size of all occupied homes in growing regions like North Texas has also increased as new, larger homes are added to the housing stock. In 1994, the median size of owner-occupied homes was 1,687 square feet in Fort Worth and 1,854 square feet in Dallas. In 2002, that median size had increased to 1,799 square feet in Fort Worth and 1,994 square feet in Dallas, an increase of about 7% in eight years. At the same time, the median lot size decreased from 0.24 acres to 0.23 acres per unit in Dallas and from 0.26 to 0.25 in Fort Worth. Household sizes held relatively steady during this time so the number of square feet per person increased.
Housing Condition

The vast share of the housing stock in North Texas is in good physical condition. In 2002, 93 percent of the units in the Dallas area and 92 percent in the Fort Worth-Arlington area were without physical problems. However, in the period between 1994 and 2002, the number of units with severe problems increased in both parts of the region.

Exhibit 3.37: Housing Condition, 1994 and 2002

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>92.1%</td>
<td>92.5%</td>
<td>91.0%</td>
<td>91.4%</td>
</tr>
<tr>
<td>Moderate</td>
<td>6.6%</td>
<td>5.6%</td>
<td>8.5%</td>
<td>7.2%</td>
</tr>
<tr>
<td>Severe</td>
<td>1.3%</td>
<td>1.9%</td>
<td>0.5%</td>
<td>1.4%</td>
</tr>
</tbody>
</table>
Housing Affordability

Housing affordability measures the relationship between incomes and housing prices or rents. The Real Estate Center at Texas A&M University has developed a housing affordability index which measures the ratio of median family income to the cost of a median-priced existing home. In the third quarter of 2007, the index for the nation as a whole stood at 1.07, meaning that a family making the median income had slightly more income than needed to purchase the median-priced home. For Dallas, the index stood at 1.51 and for Fort Worth at 1.99, demonstrating that both parts of this region rank above the national average in affordability.

North Texas is also significantly more affordable than many other metropolitan regions of the nation. The median home price for the Dallas area was $183,000 in late 2007; the median home price for the Fort Worth area was $153,000. These prices rank Dallas and Fort Worth 107th and 131st respectively among 210 metropolitan areas (where the ranking of 1 is the most costly and the ranking of 210 is the most affordable). These median prices are far below the level of the most expensive metropolitan area, San Francisco, which had a median home price of $770,000. North Texas is also more affordable than the three larger metropolitan areas – New York, Los Angeles and Chicago.

While housing is more affordable here, wages are not keeping pace with increasing home prices. In 2003, the average salary for a Fort Worth area police officer was about 108% of the salary needed to afford the area’s median-priced one-bedroom rental unit.

Overall, North Texas is an affordable place to live. But there are important issues to address in terms of housing for particular segments of the population and for many people in the region’s workforce.

Housing Availability

One issue affecting affordability is the availability of housing supply to meet the demands of the market. When the inventory of homes available for sale is low, the prices tend to rise. When the inventory is high, prices tend to decline and the average time it takes to sell a home is longer. This housing inventory is a ratio of the number of homes available for sale in a given month divided by the number of homes sold in the same month. It indicates how many months of available homes remain on the market at the current absorption rate. An inventory of six to seven months’ worth of supply generally indicates a balanced market between home sellers and home buyers.

Overall, housing suppliers in North Central Texas have done a good job of keeping up with demand, which in turn has helped keep housing relatively affordable. At the same time, this market has not had a surplus of available homes, and this relative stability (compared to other regions) has helped homes retain their value. For most north Texas markets, inventories of single-family homes (including townhouses and condos) are at lower levels than one year ago. Presently, only the Dallas, Fort Worth, and Irving markets have over six months of inventory. However, none of the North Texas markets have less than five months of inventory. This balance is one of the reasons that the DFW area has managed to maintain
relatively stable home values while other parts of the country have been more severely affected by the crises in the national real estate market.

**Market for Selected Housing Types**
The market for housing in any region is determined by the needs and desires of the people who live in that region. Household characteristics play an important role in determining what sort of housing will be most appropriate to meet the needs of any particular household. For example, larger households and households with children may prefer single-family, detached housing units, while single-person households may choose units such as townhomes near shopping or entertainment destinations. Households with seniors or disabled persons may also have special needs that affect housing types and features. Neighborhood character, mobility, housing price, choices about rental or ownership and other issues also play a role in the selection of housing.

**Exhibit 3.39: Household and Market Characteristics, 2007**

<table>
<thead>
<tr>
<th></th>
<th>Dallas - Fort Worth - Arlington</th>
<th>US</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family Households</td>
<td>69.6%</td>
<td>66.8%</td>
</tr>
<tr>
<td>Family Households with Children</td>
<td>37.0%</td>
<td>31.1%</td>
</tr>
<tr>
<td>Other Family Households</td>
<td>32.7%</td>
<td>35.7%</td>
</tr>
<tr>
<td>Single Person Households</td>
<td>25.1%</td>
<td>27.3%</td>
</tr>
<tr>
<td>Single Person Households w/ Seniors</td>
<td>5.8%</td>
<td>9.1%</td>
</tr>
<tr>
<td>Other Single Person Households</td>
<td>19.3%</td>
<td>18.1%</td>
</tr>
<tr>
<td>Other Non-Family Households</td>
<td>5.3%</td>
<td>5.9%</td>
</tr>
</tbody>
</table>

Exhibit 3.39 shows that North Texas has a larger proportion of households with children than does the U.S. as a whole. Some notable characteristics of these families are:

- Of the region’s families with children, sixty-five percent have school-aged kids, between the ages of six and seventeen. About seventeen percent have very young children (aged three years and under). For these families, the quality of schools is often an important determinant in housing selection. These are the households that typify the ‘traditional’ composition of a household in the region and the nation.

- More than eighty percent of North Central Texas families live in detached, single-family structures. Of all families, three percent live in a mobile home, trailer, RV or some other place.

- Only twelve percent of North Central Texas families currently live in apartment buildings.

- Approximately twenty-five percent of families with seven or more members live in apartments or other multi-unit buildings.
Even though households with children are a larger share of households in North Texas than in the U.S., they still account for only 37% of the region’s households.

Fully a quarter of all households in North Texas today include only one person. Some notable characteristics of these households are:

- More of these households live in apartments than in single-family homes. Approximately the same proportions of these households live in single family detached homes as in large apartment buildings (those with 5 or more units in the structure). 7% live in apartments in buildings with 2 to 4 units and 4% live in single family detached units, such as townhomes.
- Of the region’s single householders, about 23 percent are young, between the ages of 15 and 34.
- Seniors between the ages of 65 and 74 account for 2.6% of these households. These households may fit the image of ‘empty nesters’ or retirees interested in living close to cultural activities and less interested in maintaining a large house and yard.
- Seniors older than 74 account for 3.2% of these households. These households may have special concerns about accessibility and proximity to medical care and other services. They may be particularly disadvantaged if their neighborhoods lack public transportation and they can no longer drive a car themselves.

Households with two or more non-related people comprise more than 5% of North Texas households. They may be interested in the space afforded by a single family detached home, but may also be interested in proximity to services and amenities; they are less likely to be concerned about school quality when selecting a home.

At least 450,000 households in the nine counties (Collin, Dallas, Denton, Ellis, Johnson, Kaufman, Parker, Rockwall, and Tarrant) include at least one person with a disability. In as many as 10 percent of these households, all the members are disabled. For these households, mobility and access to medical services and facilities may be an important aspect of the housing decision.

Housing choice is a complex matter and is influenced by many factors, not the least of which are location and affordability. Without detailed surveys it is difficult to ascertain housing preferences and it is even more difficult to determine if these preferences can be applied broadly to household types, such as families with small children.

These statistics describe the housing types in which different types of households in North Central Texas live today, but they do not indicate why households live in a particular type of unit. Perhaps some of the many smaller households living in single family detached homes would prefer high-rise apartments but none exist near the neighborhood they desire. It is just as possible that some of those families of eight or nine people would prefer single-family homes to their current multi-family ones but cannot afford them. As a result, this description reflects the choices made by North Texas households among the housing options available to them currently, not their optimal preferences.
Other Development

Employment Centers
Within North Central Texas there are fifty-six distinct market areas, most of which are situated along existing or future rail corridors. Definitions for these locales are based on employment concentrations and connections. More than half of the region’s employment is located within these areas. The Dallas CBD is by far the densest area both in terms of development and employment. The largest market area is the Alliance area, which covers over 35,000 acres and is home to more than 50 major employers.4

Mixed-Use Development
In recent years, the North Texas region has seen the development of a number of mixed-use projects. A better understanding of the existence and impact of these mixed-use developments/centers in the DFW region will provide useful information on the region’s ability to remain sustainable, healthy, and economically viable for all. The School of Architecture at University of Texas at Arlington and the North Central Texas Council of Governments (NCTCOG) have partnered to examine these issues. The information in this section of the report is excerpted from a draft report of the study’s preliminary results.

The review of local ordinances and documents from cities and counties in the region shows that the meaning of “mixed-use” varies from city to city and county to county and in some cases from one document to another, and that there is no single overarching definition for “mixed-use” that has been adopted within the sixteen-county region. For purposes of this study, the Urban Land Institute’s (ULI) definition of “mixed-use” is generally followed; essentially, it describes developments that include living, working, and shopping. Components such as hotels, cultural, civic, and entertainment can be considered secondary.

There are currently 194 mixed-use developments/centers (multi-tower structures, mixed-use town centers/urban villages/districts) accounted for within the sixteen county region of North Central Texas. This number excludes single structures, and historic sites, and neighborhood districts since more accurate and complete information is needed for those categories.

The Urban Land Institute’s definition of mixed-use development is characterized by:

◆ Three or more significant revenue-producing uses (such as retail/entertainment, office, residential, hotel, and/or civic/cultural/recreation), which in well-planned projects are mutually supporting

◆ Significant functional and physical integration of project components (and thus a relatively close-knit and intensive use of land), including uninterrupted pedestrian connections; and

◆ Development in conformance with a coherent plan that frequently stipulates the type and scale of uses, permitted densities, and related items.

The physical configuration of mixed-use developments falls into these four broad categories:

◆ Mixed-use tower;

◆ Integrated multitower structures;

◆ Mixed-use town centers/urban villages/districts (Schwanke, 2003); and

◆ Traditional/Historic town centers, Main Street Districts, downtowns, neighborhood districts, and Central Business Districts (CBD’s).

4 An employer who has eighty or more employees in a particular location.
Exhibit 3.41: North Central Texas Market Areas
Exhibit 3.42: Mixed-Use Developments & Centers By City & County

<table>
<thead>
<tr>
<th>City</th>
<th>#</th>
<th>County</th>
<th>#</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dallas</td>
<td>47</td>
<td>Dallas</td>
<td>82</td>
</tr>
<tr>
<td>Fort Worth</td>
<td>29</td>
<td>Tarrant</td>
<td>48</td>
</tr>
<tr>
<td>Irving</td>
<td>13</td>
<td>Collin</td>
<td>33</td>
</tr>
<tr>
<td>Frisco</td>
<td>11</td>
<td>Denton</td>
<td>25</td>
</tr>
<tr>
<td>Plano</td>
<td>9</td>
<td>Other</td>
<td>6</td>
</tr>
<tr>
<td>Denton</td>
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<td>Total, All Counties</td>
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<tr>
<td>Allen</td>
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</tr>
<tr>
<td>Arlington</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Richardson</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flower Mound</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other Cities</td>
<td>59</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Key findings about the location of these mixed-use developments and centers include:

- Of these North Texas mixed-use developments/centers, 35 are located within ½ mile of commuter and light rail stations. This indicates that the other 159 sites are vehicle oriented mixed-use developments/centers.

- Dallas County has by far the largest number of mixed-use sites of the counties within the North Texas region. Tarrant, Collin and Denton counties also have notable numbers of these developments.

- The city of Dallas has significantly more mixed-use centers than any other city in the region. Fort Worth has the second-highest number of centers, with eight other cities reporting four or more mixed-use developments/centers.

- 88 of the 194 mixed-use developments/centers are located within ½ mile of the top 10% employment centers in the region (defined through analysis of NCTCOG traffic survey zone data).

- 85 of the 194 mixed-use developments/centers are located within ½ mile of the top 10% population centers in the region (again based on NCTCOG traffic survey zone data).

- Only 33 of the 194 mixed-use developments/centers are located within ½ mile of traffic survey zones with a density of 16 dwelling units (du) per acre and higher. Therefore, existing and proposed mixed-use development/projects do not seem to target existing higher density areas within the region.

- There are currently 35 mixed-use developments/centers within ½ mile of 60 existing and future light rail stations (DART), and commuter train stations (TRE). Only 27 out of 60 commuter and light rail stations have mixed-use developments/centers within ½ mile. This means that up to 33 additional rail stations have the potential to support new higher density, mixed-use developments/centers.

The development pattern in and around two of these mixed-use centers illustrates the range of existing mixed-use sites in North Texas. Basic analysis of the land use and demographic data of Plano’s Eastside Village and the Southlake Town Square suggest the presence of density among mixed-use development/center projects. Although these areas offer special qualities of interest to users, they may not always promote solutions for increasing density and reducing auto dependency. The data indicate that by 2030, Plano’s Eastside Village mixed-used center and its surrounding area (within a 1/2 mile buffer zone) is expected to house three times the number of people and three times more employment than Southlake’s town square (according to NCTCOG’s population and employment projections for that year).
Exhibit 3.43: Mixed-use Developments/Centers & Employment Centers, 2008
Exhibit 3.45: Mixed-use Center Profiles, 2005

Eastside Village, Plano, Texas

- **Year 2000:**
  - Total Population: 3,257
  - Male: 1,813
  - Female: 1,444
  - Total Housing Units: 1,116
- **Year 2030:**
  - Population: 4,141
  - Households: 1,402
  - Employment: 5,129

**Land-Use Code (2005):**

<table>
<thead>
<tr>
<th>Land-Use Code (2005)</th>
<th>Land-Use %</th>
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</thead>
<tbody>
<tr>
<td>Residential</td>
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<td>Multifamily</td>
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<tr>
<td>Mobile Home</td>
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<td>Commercial</td>
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<td>Public</td>
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<td>Utilities, Railroads</td>
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<tr>
<td>Private Open Space/Park</td>
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</tr>
<tr>
<td>Vacant</td>
<td>10.26</td>
</tr>
</tbody>
</table>

**Southlake Town Square, Southlake, Texas**

- **Year 2000:**
  - Total Population: 917
  - Male: 454
  - Female: 463
  - Total Housing Units: 274
- **Year 2030:**
  - Population: 1,441
  - Households: 422
  - Employment: 1,390

**Land-Use Code:**

<table>
<thead>
<tr>
<th>Land-Use Code</th>
<th>Land-Use %</th>
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</thead>
<tbody>
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</tr>
<tr>
<td>Multifamily</td>
<td>6.14</td>
</tr>
<tr>
<td>Mobile Home</td>
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<tr>
<td>Commercial</td>
<td>10.18</td>
</tr>
<tr>
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</tr>
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<td>Utilities, Railroads</td>
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<td>Private Open Space/Park</td>
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<tr>
<td>Vacant</td>
<td>29.73</td>
</tr>
</tbody>
</table>

**Land-Use Definitions:**

- **Residential**: 28.26%
- **Mobile Home**: 6.14%
- **Commercial**: 10.18%
- **Public**: 5.03%
- **Industrial**: 0.28%
- **Utilities, Railroads**: 0.37%
- **Private Open Space/Park**: 0.41%
- **Vacant**: 29.73%

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Exhibit 3.46: Travel Times from Selected Major North Texas Employment Centers
Proximity of Jobs & Housing

An important ‘quality of life’ factor for many people is the amount of time spent commuting between home and work. If the distances between housing and employment are small, or if the route between the two is uncongested, commute time is seldom a concern. But long distances, traffic congestion, or the combination of the two can dramatically increase the amount of time spent commuting. Increased commute time reduces time for one’s family and other interests. So the proximity of jobs and housing is a useful indicator to use in examining the development pattern of an urban region.

Exhibit 3.46 is the result of calculations for travel time by auto from three of the region’s major employment centers – downtown Fort Worth, downtown Dallas and the area near the intersection of the Dallas North Tollway and Highway 121. A relatively small part of the region is within a 15 minute commute of one of these three centers. However, much of the area shown in the map is within a 30 minute commute to one of the three. Residents of northwestern Denton County, eastern Collin County and the region’s outlying counties would need to commute for more than 30 minutes to reach one of these major employment centers. These are not the region’s only employment centers, of course, and other job locations are within shorter commutes of Denton and Collin counties. As the region develops, the length of commute time to existing and future employment centers will be an important factor in examining residential quality of life and employers’ ability to attract workers.

North Texas Investments and Infrastructure

The natural assets of a place – its climate, land, water and ecology – are the foundation of its human communities. These natural assets affect the choices available as people make investments in the neighborhoods, economies, infrastructure and other components of their communities. For Vision North Texas, they also form the basis of a ‘green infrastructure’ system – one part of the framework of investments that will determine the region’s future success, livability and sustainability.

In this section of the report, natural assets are the first topic. Discussion of these assets is followed by an overview of two systems that both use natural resources and require networks of physical infrastructure – water and energy. The range of public facilities that serve the region is described next. These include several types of ‘grey infrastructure’ – the major transportation facilities that provide mobility to the region; bridges and dams that have safety as well as infrastructure implications; infrastructure for small communities; solid waste treatment and disposal; education; and health care. Investments that have shaped the character of North Texas communities are summarized, followed by the key highlights of the region’s economy. Public and private investment decisions will build on the region’s existing character and economy so these assets combine with the natural assets and infrastructure systems to form the starting point for creation of North Texas’ future.
Natural Assets

Regional Climate
North Texas is located in a region of temperate mean climatological conditions, experiencing occasional extremes of temperature and rainfall of relatively short duration. According to the National Oceanic and Atmospheric Administration Station in Fort Worth, the 30-year mean rainfall amount is 33.7 inches per year with the most recent ten-year (1987-1996) average being 37.88 inches. The mean relative humidity is 65 percent and the average temperature is 65.8°F.

Physiography
The region is located in two of the major ecoregions of Texas – the Blackland Prairies and the Cross Timbers and Prairies. The Cross Timbers and Prairies Ecoregion includes the East Cross Timbers, West Cross Timbers, and the Grand Prairie which is further divided into the Fort Worth Prairie and the Lampasas Cut Plains. The Lampasas Cut Plains sub-region is outside the study area, as is all but a small portion of the West Cross Timbers. These ecoregions differ in their underlying geology, slopes and rainfall, all differences that are reflected in the ecosystems’ plant and animal communities.

Water Resources and Quality
Vast quantities of water percolate underground through geologic formations known as “aquifers”. The occurrence of water within the formations takes different forms. In sedimentary rocks, such as those composed of sand and gravel, water is contained in the spaces between grains. Some of the largest aquifers in Texas, including the Ogallala, Gulf Coast, and Carrizo-Wilcox, hold water in this fashion. Limestone formations, such as the Edwards, contain water in crevices and caverns caused in part by dissolution of the limestone by groundwater. A third occurrence of groundwater is within the cracks, fractures, and joints developed in harder formations such as granite and volcanic rock.

Groundwater aquifers underlie much of North Texas. Protection of the water quality and level of groundwater in these aquifers is an important aspect of managing the region’s natural assets. Groundwater conservation districts help three North Texas counties address these issues. Parker and Wise counties are part of the Upper Trinity Groundwater Conservation District and Tarrant County is covered by the Northern Trinity Groundwater Conservation District.

While most of the North Texas region is in the Trinity River Basin, the region includes parts of three other river basins as well. Parts of Johnson, Hood and Parker counties are in the Brazos River Basin and there are parts of Hunt, Kaufman and Rockwall counties in both the Sabine and the Sulphur River Basins. The water in the lakes and streams that feed these major rivers is important for human use and for the benefit of ecosystems along the rivers. Federal and state agencies are responsible for establishing and enforcing water quality standards and for allocating water rights in these basins. Within the region, each of the major rivers has segments that do not meet these water quality standards. In addition, the Texas Commission on Environmental Quality (TCEQ) identifies many parts of these river basins for which water rights are limited. All counties in North Texas include areas for which TCEQ indicates that unappropriated flows are available for new water rights less than 25% of the time.

Point sources for water discharge have been subject to National Pollution Discharge Elimination Standards (NPDES) permitting for many years. Recent changes in stormwater permitting requirements mean that smaller governments within North Texas (and the rest of the state) must now develop plans to address stormwater pollution from new and redeveloping projects. Since development plans and project designs can significantly reduce stormwater runoff and pollution, ‘best practices’ for stormwater management in the region have been established through the NCTCOG iSWM program. Detailed planning and analysis of water availability, quantity, quality
Exhibit 3.47: North Texas Natural Regions

Natural Regions
- Blackland Prairies
- Oak Woods & Prairies
- Rolling Plains

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and stormwater management will connect these water quality issues to the pattern of development. This work is underway at the subwatershed level with pilot projects in three subwatersheds.

A final way in which these waterways can affect the region’s development is through flooding of areas when storms cause the water levels in the rivers, lakes and streams to increase dramatically. Exhibit 3.48 shows areas within the 100-year floodplain for the region’s central counties. Other counties – Ellis, Erath, Hood, Hunt, Kaufman, Navarro, Palo Pinto, Somervell and Wise – do not participate in federal floodplain mapping programs so their floodplains have not been identified.

**Air Quality**

North Texas is located within the Environmental Protection Agency (EPA)’s Air Quality Control Region (AQCR) 215. In 2004, the EPA designated nine counties in North Central Texas as nonattainment for the 8-hour ozone in accordance with the National Ambient Air Quality Standards (NAAQS) -- Collin, Dallas, Denton, Ellis, Johnson, Kaufman, Parker, Rockwall and Tarrant counties. EPA establishes limits on atmospheric pollutant concentrations through enactment of the NAAQS. Ground-level ozone is monitored and targeted for reductions due to its potential for harmful effects on human health. Four main sources of ozone precursor emissions include On-road Mobile Sources like cars and trucks, Non-road Mobile Sources like bulldozers and backhoes, Point Sources like electric generating utilities and industrial boilers, and Area Sources like solvent use and agriculture.

If the region’s counties fail to meet these air quality standards, the federal government can impose sanctions that include the loss of federal highway funds. Even more important than the threat of sanctions is the public health implication of non-attainment. North Texas residents with respiratory problems are hurt by the levels of air pollution that exceed these standards. Children and the elderly may be most affected, but even healthy adults are warned to avoid active outdoor activities on days when ozone reaches ‘unhealthy’ or ‘very unhealthy’ levels.

**Carbon Footprint**

Though carbon emissions are not currently subject to Clean Air requirements, international scientific research has concluded that increasing levels of carbon in the atmosphere contribute to global climate change. The Intergovernmental Panel on Climate Change reached several important conclusions in its “Climate Change 2007: Synthesis Report”:

- “Warming of the climate system is unequivocal, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice, and rising global average sea level.
- There is very high confidence that the net effect of human activities since 1750 has been one of warming.
- There is high agreement & much evidence that with current … practices, global GHG emissions will continue to grow over the next several decades.”

Increasingly, attention has focused on the activities that release carbon and other greenhouse gases (GHG) into the atmosphere. Calculations of a ‘carbon footprint’ for a family, business, city or nation indicate the level of carbon emissions resulting from their activities. One measurement tool, developed by Purdue University, is the Vulcan data inventory, which estimates the level of carbon dioxide (or equivalent) released in specific geographic areas in 2002. The Vulcan calculations show that in 2002, the 16-county North Texas region was responsible for as much carbon emission into the atmosphere as the entire state of New Mexico.
Exhibit 3.48: Major and Minor Aquifers

Major Aquifers:
- Trinity
- Carrizo

Minor Aquifers:
- Woodbine
- Nacatoch

Legend:
- Floodplain
- Lakes
- Waterways

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Exhibit 3.49: River Basins and Watersheds

Hydrologic Units
- Subbasins (8-digit HUC)
- Watersheds (10-digit HUC)
- Subwatersheds (12-digit HUC)
Exhibit 3.50: Impaired Waterways
Exhibit 3.51: Land Cover and Vegetation
Vegetation

From a land cover viewpoint, most of the region's area is dominated primarily by grasslands. This broad vegetative cover category includes native prairies, manicured grass associated with developments, and disturbed areas including rangeland that has only sparse amounts of woody vegetation. Forests, both upland and bottomland combined, cover about 28 percent of the area while emergent wetlands and open water cover about 2 percent and 3 percent respectively.

The vegetation in the region displays tremendous biological diversity because of numerous factors, including the region's climatic and geologic variations and its location as a transition zone between the eastern deciduous forests and the central North American grasslands.

Urban Forest and Tree Canopy

For many people, trees provide beauty and shade to an urban community. In addition to these benefits, they bring the natural world into the urban area, offering habitat for birds and animals and a connection to nature for people. Recent research has demonstrated the role trees and vegetation play in moderating the micro-climates within urban areas. The buildings, pavement and other hard surfaces in urban areas cause the temperatures in the city to increase, creating an “urban heat island” that can make cities 5 to 9 degrees warmer than surrounding rural areas. Trees provide shade and transpiration (the release of water vapor into the air), both of which help to offset the heat island effect and reduce energy demands related to air conditioning. For example, one simulation found that planting 500,000 trees in the Tucson area would lower the heat island effect by 3 degrees and would lower overall cooling costs by up to 25%.

Urban trees also contribute to air quality improvement because trees produce oxygen and store carbon dioxide. One acre of trees absorbs enough carbon dioxide per year to match that emitted by driving a car 26,000 miles. Based on recent California research, increasing tree canopy cover in urban areas can now be included in state air quality plans as a measure to help meet or sustain clean air standards.

Other benefits provided by the urban forest have additional economic value. A study of the Houston Regional Forest, completed in 2005, found:

- The replacement cost of the region’s 663 million trees is valued at over $205 billion.
- Trees store $721 million worth of carbon.
- Trees generate $456 million of environmental benefits annually.
- Trees save $131 million in residential energy costs and avoided power plant emissions each year.
- Houston’s trees remove over 60,000 tons of air pollution each year.

A general estimate of tree cover in North Texas is based on National Land Cover Data information for 2001. As shown in Exhibit 3.52, approximately 12% of the land in North Texas was covered by tree canopy at that time.

More detailed investigation of the tree canopy and its role in reducing heat in the urban area is underway in Dallas, through the City’s Urban Forestry Advisory Committee, Office of Environmental
Exhibit 3.53: Dallas County: Impervious Surface and Tree Canopy

Exhibit 3.54: Dallas County: Thermal Imaging of Urban Heat Islands
Quality and the U.S. EPA. Initial analysis, highlighted in Exhibits 3.53 and 3.54, show the relationship between the tree canopy and urban heat islands in Dallas County. These maps were developed by the Houston Advanced Research Center (HARC), under an EPA contract to support the Dallas Sustainable Skylines Initiative.5

The Dallas Urban Forest Advisory Committee Strategic Plan proposes to focus future tree planting projects in heat island problem areas. The urban forest also helps address air quality issues; it could help the region reduce its carbon footprint and generate ‘carbon credits’ under some of the climate change strategies currently being considered nationally. Additional research, and expansion of these efforts to include other parts of North Texas, would help to determine the benefits provided by the entire region’s urban forest. A regional forest inventory is needed to establish a baseline for this research and for management of the forest.

**Threatened and Endangered Species**

North Texas is the home of numerous species of plants, birds and animals, some of which are considered at risk. The federal listing of species for the Upper Trinity River, shown in Exhibit 3.55, is representative of the species listed for each of the region’s counties. Exhibit 3.55 indicates species that are Endangered (E) or Threatened (T) at the federal level.

Additionally, the Texas Parks and Wildlife Department (TPWD) lists species as endangered or threatened in each of the region’s sixteen counties. TPWD endangered species in the region include the interior least tern, black-capped vireo and the whooping crane. TPWD threatened species in the region include the bald eagle, white-faced ibis, American swallow-tailed kite, wood stork, Arctic peregrine falcon, Bachman’s sparrow, timber rattlesnake, Texas horned lizard, piping plover, golden-cheeked warbler, and the Brazos water snake.

**Water**

Passage of legislation in 1997 divided the state of Texas into water planning regions. The 16-county North Texas region includes parts of water planning regions C, D and G. In 2000, the North Texas counties had 71% of the population of these three water planning regions, but...
Exhibit 3.56: Water Planning Regions in North Texas

Regional Water Planning Groups
- Region G
- Region C
- Region D

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these counties were responsible for only 53% of the demand for water use in the three regions. The North Texas counties’ water demand in 2000 was estimated to be approximately 1.4 million acre feet.\(^6\)

**Exhibit 3.57: Population and Water Demand, 2000**

<table>
<thead>
<tr>
<th>Year 2000</th>
<th>Population</th>
<th>Water Needs</th>
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<tr>
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<td>Persons</td>
<td>VNT as %</td>
<td>Acre-feet/Year</td>
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<tr>
<td>VNT Region</td>
<td>5,382,554</td>
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<td>1,405,906</td>
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<tr>
<td>Total, Regions C, D &amp; G</td>
<td>7,580,854</td>
<td>71.0%</td>
<td>2,663,553</td>
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<tr>
<td>Total, State of Texas</td>
<td>20,851,790</td>
<td>25.8%</td>
<td>16,976,560</td>
</tr>
</tbody>
</table>

The North Texas region uses water efficiently compared to other parts of the state. As Exhibit 3.57 demonstrates, the region’s share of statewide water consumption is far below its share of the state’s population.

Water consumption varies among the state’s major cities as well. Exhibit 3.58 compares major Texas cities in terms of average water consumption for various purposes.

**Energy**

**Production**

Texas leads the nation in fossil fuel reserves and in non-hydropower renewable energy potential. It also leads the nation in crude oil production and refining capacity and in natural gas production. The natural gas in the Barnett Shale region in North Texas is a significant component of the state’s production; it has proven to be a source for growth and revenue to the region.

Natural gas-fired power plants typically account for about one-half of the electricity produced in Texas and coal-fired plants account for much of the remaining generation. Nearly all of the coal mined in Texas is lignite coal, the lowest grade of coal, and all of it is consumed in the state. Although lower in energy content than other varieties of coal, lignite coal is also low in sulfur, an important consideration in the state’s efforts to lower emissions. Two nuclear plants, Comanche Peak and the South Texas Project, typically account for about one-tenth of Texas’ electric power production. Although renewable energy sources contribute minimally to the Texas power grid, Texas leads the nation in wind-powered generation capacity, and substantial new wind generation capacity is under construction. Currently, there are over 2,000 wind turbines in West Texas alone, and the numbers continue to increase as development costs continue to drop and wind turbine technology improves.
The Newark East and Barnett Shale Fields discovered in 1981 have become a major producer of natural gas and a source of economic strength in the North Texas region. As of August 19th, 2008 there were 8,416 gas wells on record with another 4,872 permitted drilling locations. The entire Newark East and Barnett Shale fields from the years 1997 to March 2008 have extracted in excess of 3.8 trillion cubic feet of natural gas. In 2007 alone, the entire field produced 1.004 trillion cubic feet of natural gas. The output of the entire Barnett Shale field equates to approximately $5.2 billion annually, while employing roughly 55,385 permanent jobs.

The wells drilled in the Barnett Shale use large amounts of water in the fracturing process in order to stimulate the release of gas for mining. The amount of water used varies by well type. Slick water fracturing in a vertical well uses approximately 1.2 million gallons of water (3.683 acre-feet of water) in the fracturing process, while horizontal wells use approximately 3.5 million gallons of water (10.714 acre-feet of water) in the fracturing process. While total water consumption of all wells in the Barnett Shale field is not entirely known, it is approximated that current water use is less than one percent of the entire water use of the studied area with sixty percent of the water coming from the Trinity and Woodbine Aquifer.

Consumption
Due to its large population and an energy-intensive economy, Texas has the highest energy consumption of any state, accounting for more than one-tenth of total U.S. energy use. Despite large net interstate electricity imports in some areas, the Texas Interconnect power grid is largely isolated from the integrated power systems serving the eastern and western United States, and most areas of Texas have little ability to export or import electricity to and from other states. Texas per capita residential use of electricity is significantly higher than the national average, due to high demand for electric air-conditioning during hot summer months and the widespread use of electricity as the primary energy source for home heating during typically mild winter months.

The North Central Texas region has the highest energy demand in the state. A research project by the American Council for an Energy-Efficient Future analyzed energy consumption data for the region provided by the Public Utilities Commission of Texas. The study indicates that the Dallas–Fort Worth region is expected to use 73,570 million kilowatt-hours of electricity in 2008 and that the region’s peak summer demand will be 15,530 megawatts in 2008.

In recent years, the region’s development community has begun to build homes and non-residential buildings that are more energy efficient. There are several programs that certify or recognize energy conservation measures in construction. One of these is the EnergyStar program operated by U.S. Environmental Protection Agency and the U.S. Department of Energy. Local electricity providers certify that new homes meet these standards. Oncor indicates that 1,755 homes in the 10 North Texas counties it serves received this certification from January through mid-September of 2008. Leadership in Energy and Environmental Design (LEED) certification is also becoming increasingly common throughout the region, with 22 projects that have received some level of LEED certification.

Public Facilities
Transportation Network
The Transportation Department of NCTCOG supports the region’s transportation policy-making board, the Regional Transportation Council, and is responsible for monitoring the performance of the region’s transportation systems and planning for future transportation investments for the region. The current plan, Mobility 2030, provides information about current conditions as well as future demands. Mobility 2030 indicates that, in 2007, there were 151.4 million vehicle
Exhibit 3.59: LEED Certified Buildings in North Texas, 2008

**LEED Certification Level**
- Platinum
- Gold
- Silver
- Certified
miles traveled in the area addressed by this plan (the Metropolitan Planning Area shown in Exhibit 3.1 of this report).

The plan also estimates that congestion in the region in 2007 increased travel time by 34.32% and cost the region $4.2 billion. Severe congestion is focused in downtown Dallas, downtown Fort Worth, and an area along IH-635. A larger share of the area experiences moderate congestion and much of the region experiences light congestion.

The North Texas region’s transportation system includes approximately 4,500 lane miles of roadways for the use of cars and trucks. It also includes public transportation systems that offer an alternative transportation choice.

The Dallas Area Rapid Transit (DART) system serves 13 member cities. It offers approximately 130 bus routes, 45 miles of light rail transit (with 35 stations), 75 freeway miles of high occupancy vehicle (HOV) lanes and paratransit service. DART partners with The T to provide the region’s commuter rail system, the Trinity Railway Express, which currently has 35 miles of transit and 10 stations. The University of North Texas reports that from 1999 to 2007, the total value of development projects attributable to the presence of a DART station is $4.26 billion. Ridership on DART is climbing, particularly due to higher gasoline prices. DART reports that 116.8 million passenger trips were made on its system during its 2008 fiscal year. Total ridership increased 8.6% compared to fiscal year 2007.

In Fort Worth, The T provides bus service and, with DART, operates the TRE commuter rail system. And in Denton County, the Denton County Transportation Authority provides bus services and a commuter express bus service to downtown Dallas.

**Bridges**

The condition of bridges—a part of the overall transportation network—provides an important insight into the status of the region’s infrastructure. The image of the IH35W bridge collapse in Minneapolis dramatically illustrates the importance of adequate inspections and maintenance. Bridge construction and maintenance both rely on a complex web of federal, state and local support. The Texas Department of Transportation (TXDOT) documents this complexity in the periodic “Reports on Texas Bridges” which identifies bridge conditions as sufficient, structurally deficient,
functionally obsolete and sub-standard for load only (a load capacity less than permitted by the State) bridges.

The two largest TXDOT districts in this region are the Dallas District and Fort Worth District. In 2006, the Dallas District reported having 73% of its bridges in “Good or Better” condition. The Fort Worth District reported 85% in that same condition. However, the Dallas District also reported having 32 bridges that were structurally deficient, 826 that were functionally obsolete, and 10 that were sub-standard for load only. The Fort Worth District reported the same categories as 77, 221, and 5, respectively.

The classification of bridges by county and by condition demonstrates how important this issue is for the region now and into the future with more population and overall demand placed on the transportation network. For example, one-third of all bridges in Rockwall County are either structurally deficient or functionally obsolete. Collin, Kaufman and Somervell counties each have over 25% of their bridges in these categories.

**Dams**

Just because a dam has been in place for over 50 years does not mean that its continued existence can be taken for granted. Troubles from dam failures can occur at anytime, without warning and with catastrophic results. Texas has more dams listed in the National Inventory of Dams than any other state. As of 2001 there were 6,838 dams listed in Texas and 1,091 of those were in the NCTCOG Region. Of the dams in this region, 15.4% are categorized as high hazard dams.

The inventory also indicates that only a fraction of the dams in the region have had Emergency Action Plans developed or have been inspected since 1993. In fact, almost 72% (795) of the dams in the region have no recorded inspection date. As of September 2002, only 67 of the 1,091 dams in North Texas had been inspected in the last ten years.
While the region has been fortunate that there have been no reported dam failures, it is clear that:

- dams throughout the region are aging and many are nearing the end of their designed project lives;
- many of these dams are in need of evaluation and maintenance; and
- increased development pressures downstream and upstream of these dams will continue to place people, property and other infrastructure at risk.

Small Community Infrastructure

The Texas Community Development Block Grant (TxCDBG) Program (formerly the Texas Community Development Program) provides an important understanding of the conditions of community-level infrastructure in the region’s smaller cities and towns. The demographics and rural characteristics of Texas have shaped a program that focuses on providing basic human needs and sanitary infrastructure to small rural communities in outlying areas. This funding option addresses critical needs; due to the match and expenditure requirements, participants often refer this program as a “funding option of last resort”. This characteristic makes review of the program’s priorities and funding pattern especially useful in assessing the most significant infrastructure needs in our smaller communities.

Every year, the US Department of Housing and Urban Development provides federal Community Development Block Grant funds directly to states, which, in turn, provide the funds to small, rural cities with populations less than 50,000, and to counties that have a non-metropolitan population under 200,000 and are not eligible for direct funding from HUD. The Texas CDBG program is the largest in the nation and of the 24 regions in the state, the North Central Texas region has historically received a major share of the available funds. However, the amount received every year to be awarded via the program is only a fraction of the amount of need reflected in the many applications for funding.

On a statewide basis, the TxCDBG serves approximately 1,015 eligible rural communities, 244 rural counties, and provides services to over 365,000 low- to moderate-income beneficiaries each year. Of the 1,015 cities eligible for CDBG funds, 763 have a population of less than 3,000 and 431 have a population of less than 1,000. In the North Central Texas region, the program serves approximately 185 local cities and counties.

In 2007, the Texas CDBG received 665 applications for a total statewide request of $178,907,478. Of these, 161 applications were funded, totaling $44,976,772, which was only 25% of the total requests. In North Central Texas 55 applications were submitted for $17,568,550 and only $4,858,600 of that amount was funded, representing only 28% of the total regional request.

These limited funds are distributed to applicants based on a state and regional level review. The regional review component is important because of the ranking of eligible activities and the scoring priority given to certain types of projects. The categories used for the most recent regional scoring session are listed below.

<table>
<thead>
<tr>
<th>Regional Funding Priority</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st</td>
<td>Water and sewer projects</td>
</tr>
<tr>
<td>2nd</td>
<td>Housing rehabilitation</td>
</tr>
<tr>
<td>3rd</td>
<td>Streets and/or drainage</td>
</tr>
<tr>
<td>4th</td>
<td>All Other Projects</td>
</tr>
</tbody>
</table>
Exhibit 3.64: TxCDBG Funding in North Texas, 2006 and 2007
Exhibit 3.65: Landfill Locations and Availability

Landfill Lifetimes
- < 10 years
- 10 - 20 years
- 20 - 30 years
- 30+ years
Exhibit 3.66: Recycling Locations

Recycling Locations

Market Served
- ▲ Commercial
- ▼ Commercial and Residential
- ▲ Residential
Although state directives resulting from federal lawsuits regarding housing and other community needs have made all of the categories more competitive over the years, review of the past funding cycle competitions throughout the State overall and this region specifically, indicate that water and sewer projects have been and remain the top priority. The region’s smaller local governments are faced with aging infrastructure, tighter federal/state requirements and the likely addition of new residents and increasing demand for services. In the last funding cycle for example, all of the 55 applications were for water and sewer projects.

Waste

The North Central Texas region currently has 22 open landfills. Of the twenty-two landfills one of them only accepts construction and demolition waste. The estimated combined remaining capacity of the region’s landfills is 349 million tons, which equates to approximately 34 years of capacity.

Over 300 recycling facilities and drop-off sites are available in North Central Texas. These sites, shown in Exhibit 3.66, serve both residential and commercial customers.

In 2007, NCTCOG completed a study of recycling rates in communities throughout North Texas. The study calculated both an overall recycling rate for the region and individual recycling rates of 61 North Texas cities. Overall, the region’s average recycling rate was 15.8%. This information will allow cities and the region to track progress in improving recycling efforts over the coming years. Key findings of the study are:

- An average residential recycling rate of 12.2 percent.
- An average institutional/commercial/industrial (ICI) recycling rate of 17.1 percent.
- An overall regional average recycling rate (residential and ICI) of 15.8 percent.

Rates for individual cities range from zero percent to more than 35 percent. Mesquite and Plano reported over 35% recycling. Nine of the cities had no recycling programs.

Elementary & Secondary Education

The state of Texas is divided into 20 education service regions. Two regions cover all the North Central Texas counties with the exception of one county—Navarro—which is in region 12. There are also three counties which are outside the NCTCOG planning region but within these education regions. These are Cooke, Grayson, and Fannin counties. Data from the Texas Education Agency is available for each education region. The focus of this summary is on Education Region 10, on the eastern side of NCTCOG planning region, and Region 11, on the western side. Together, these two regions service 157 school districts.

Exhibit 3.67: Texas Education Agency Regions in North Texas
More than one-fourth of all Texas students attend school in North Central Texas. The region has higher shares of black, white, and Asian students than the state does overall. The state’s dominant racial/ethnic group is Hispanic students, which make up more than forty-six percent of the Texas’ student population. Slightly more than one-third of North Central Texas students are Hispanic.

The profiles for graduating students are similar to the student makeup with North Texas having higher percentages of graduates in the black, white, and Asian categories when compared to the state’s breakdowns. Slightly more graduates in the region graduated under a recommended program (77% for the region versus 76% for the state).

One component of the state’s standardized testing is designed to gauge the college-readiness of graduating seniors. For the class of 2006, 53% of tested students in Region 10 and 51% in Region 11 met the criteria for English language arts. In mathematics, the percentages were 54% (region 10) and 55% (region 11). For both subjects, 39% of students in each region appear ready for college. All of these figures are higher than comparable state figures, although not by much. Overall, North Central Texas high school graduates appear to be slightly more ready for college than their peers graduating in other parts of the state. Still, they indicate that a majority of the region’s high school graduates are not college-ready.

**Higher Education**

There are nearly 70 higher education facilities in North Central Texas, including those that are existing, planned or under construction. Together, these institutions train over 300,000 students. Within the walls of these places are the region’s next generation of businesspeople, teachers, doctors, lawyers, nurses, engineers, and skilled workers.

### Exhibit 3.68: Selected Characteristics of North Central Texas Students

<table>
<thead>
<tr>
<th></th>
<th>Region 10</th>
<th>Region 11</th>
<th>NCT Total</th>
<th>Texas</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total Students 2006-07</strong></td>
<td>694,194</td>
<td>498,041</td>
<td>1,192,235</td>
<td>4,576,933</td>
</tr>
<tr>
<td><strong>by Race/Ethnicity</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>20.6%</td>
<td>14.3%</td>
<td>18.0%</td>
<td>14.4%</td>
</tr>
<tr>
<td>Hispanic</td>
<td>37.7%</td>
<td>28.7%</td>
<td>34.0%</td>
<td>46.3%</td>
</tr>
<tr>
<td>White</td>
<td>36.2%</td>
<td>52.1%</td>
<td>42.9%</td>
<td>35.7%</td>
</tr>
<tr>
<td>Native American</td>
<td>0.5%</td>
<td>0.6%</td>
<td>0.5%</td>
<td>0.3%</td>
</tr>
<tr>
<td>Asian</td>
<td>4.9%</td>
<td>4.3%</td>
<td>4.7%</td>
<td>3.3%</td>
</tr>
<tr>
<td><strong>Total Graduates 2006</strong></td>
<td>35,235</td>
<td>26,492</td>
<td>61,727</td>
<td>240,485</td>
</tr>
<tr>
<td><strong>by Graduation Type</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minimum H.S. Program</td>
<td>23.0%</td>
<td>23.4%</td>
<td>23.1%</td>
<td>24.3%</td>
</tr>
<tr>
<td>Recommended H.S.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Program/DAP</td>
<td>77.0%</td>
<td>76.6%</td>
<td>76.9%</td>
<td>75.7%</td>
</tr>
<tr>
<td>Special Education</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Graduates</td>
<td>10.0%</td>
<td>9.1%</td>
<td>9.6%</td>
<td>10.8%</td>
</tr>
<tr>
<td><strong>College-Ready Graduates</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Class of 2006</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>English Language Arts</td>
<td>53%</td>
<td>51%</td>
<td>48%</td>
<td></td>
</tr>
<tr>
<td>Mathematics</td>
<td>54%</td>
<td>55%</td>
<td>52%</td>
<td></td>
</tr>
<tr>
<td>Both Subjects</td>
<td>39%</td>
<td>39%</td>
<td>35%</td>
<td></td>
</tr>
</tbody>
</table>
Exhibit 3.70: Five Largest North Central Texas Universities, 2008

<table>
<thead>
<tr>
<th>University</th>
<th>Approximate Enrollment</th>
<th>Year Established</th>
</tr>
</thead>
<tbody>
<tr>
<td>University Of North Texas</td>
<td>34,795</td>
<td>1890</td>
</tr>
<tr>
<td>University Of Texas At Arlington</td>
<td>25,000</td>
<td>1895</td>
</tr>
<tr>
<td>University Of Texas At Dallas</td>
<td>14,000</td>
<td>1969</td>
</tr>
<tr>
<td>Texas Woman’s University</td>
<td>12,469</td>
<td>1901</td>
</tr>
<tr>
<td>Southern Methodist University</td>
<td>10,829</td>
<td>1911</td>
</tr>
</tbody>
</table>

The top five universities have a combined enrollment of nearly 100,000 students across their various campuses. North Central Texas boasts two law schools, one medical school, one dental school, four nursing schools, and more than a dozen schools with MBA programs.

Health Care
North Central Texas has over 100 general and specialized major medical facilities spread out over the area to serve its growing and changing population. Together they provide tens of thousands of beds and employ over one hundred thousands workers.

Community Character
North Central Texas is more than a just a place to live and work; it is also a place to enjoy. The many cultural assets remind residents and visitors that a sense of who North Texans are and how they got here is equally important as what they are currently trying to accomplish. The significant landmarks and cultural areas only enhance the experience of time spent in the region.

There are nearly 100 theatres, museums, major parks and points of interest in the 16-county North Central Texas region. Some of these are internationally known. Others are lesser known but speak to the diversity and depth of the area’s culture and history. Both the eastern and western sides of the region boast excellent art museums, performance halls, and theatres. The outer counties also offer interesting museums and many have historic courthouses and other important buildings.

The character of any single community within North Texas also reflects whether that community is perceived as safe and welcoming, and whether a resident believes that the community provides the services he or she desires at an appropriate level of quality and a cost she or he is willing to pay. These factors involve a qualitative assessment, and perceptions that may not be measurable. But they are still important aspects of assessing a community’s character.

The North Texas Housing Coalition and the Institute for Urban Policy Research (IUPR) at the University of Texas at Dallas have developed a ‘wholeness index’ in an effort to examine some of the factors that make a particular community or neighborhood a desirable place to live. Their index is based on 12 quality of life indicators:

- Index crime rate
- Wealth
- School holding power
- Lifespan
- Voter turnout
- Families not in poverty
- Owner occupancy
- Access to retail
- Graduation rate
- Fit housing
- SAT scores
- Middle class housing

The wholeness index rates cities on a scale of 0 to 100, with 100 as the best rating. IUPR has applied this wholeness index to the city of Dallas for the past three years. In 2006, Dallas rated a score of 65.49; in 2007 its score was 66.79 and in 2008 the wholeness score rose to 67.41. Such indices can provide a useful method for comparing communities to one another, as well as a valuable tool for measuring progress in any single community.
Exhibit 3.71: Existing and Planned Hospital Facilities in North Central Texas, 2008
Exhibit 3.73: Major North Texas Parks
Economic Characteristics

The 16-county North Central Texas region boasts over 3.8 million jobs, just under three-fourths of all employment is in service producing industries. The greatest share of employment for any one sector is professional and business services, which accounts for almost sixteen percent of regional employment. Nearly one out of every ten North Central Texas workers is employed by local, state or federal government.

According to the Federal Reserve Bank of Dallas, “The Austin and Dallas–Fort Worth metros boast high-tech job concentrations substantially above the national average. In 2006, these industries employed 11.2 percent of private sector workers in Austin and 7.3 percent in Dallas–Fort Worth, compared with 5.1 percent for the nation. The Dallas–Fort Worth area’s 7,480 high-tech firms employed 177,629 in 2006, based on American Electronics Association categories. The companies include three of Fortune 500’s 10 largest IT services providers—EDS, Affiliated Computer Services and Perot Systems—and the second largest U.S. semiconductor maker—Texas Instruments. The latest payroll data show that Dallas–Fort Worth has the nation’s second largest telecom sector and the fourth largest computer and electronics manufacturing sector. In 2007, Dallas–Fort Worth ranked fourth among U.S. cities in computer programmers, fifth in computer systems engineers and sixth in electrical engineers.”

Wal-Mart, the world’s largest retailer, is also the region’s largest employer. The US Postal Service is also one of the top job providers in North Central Texas. One school district, one city, two healthcare systems, one defense contractors, two communications companies, and an airline round out the top ten employers in the region.

Exhibit 3.74: North Central Texas Employment by Sector, 2007

<table>
<thead>
<tr>
<th>Industry Sector</th>
<th>2007 Number of Jobs</th>
<th>Share of Regional Employment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural Resources and Mining</td>
<td>63,371</td>
<td>1.6%</td>
</tr>
<tr>
<td>Construction</td>
<td>249,852</td>
<td>6.4%</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>321,978</td>
<td>8.4%</td>
</tr>
<tr>
<td>Total goods-producing industries</td>
<td>631,201</td>
<td>16.4%</td>
</tr>
<tr>
<td>Wholesale trade</td>
<td>198,042</td>
<td>5.2%</td>
</tr>
<tr>
<td>Retail trade</td>
<td>400,750</td>
<td>10.4%</td>
</tr>
<tr>
<td>Transportation and warehousing</td>
<td>182,276</td>
<td>4.7%</td>
</tr>
<tr>
<td>Utilities</td>
<td>9,714</td>
<td>0.3%</td>
</tr>
<tr>
<td>Information</td>
<td>106,691</td>
<td>2.8%</td>
</tr>
<tr>
<td>Financial Activities</td>
<td>451,093</td>
<td>11.7%</td>
</tr>
<tr>
<td>Professional and business services</td>
<td>612,801</td>
<td>15.9%</td>
</tr>
<tr>
<td>Educational and Health services</td>
<td>354,013</td>
<td>9.2%</td>
</tr>
<tr>
<td>Leisure and Hospitality</td>
<td>323,685</td>
<td>8.4%</td>
</tr>
<tr>
<td>Other services, except public administration</td>
<td>192,163</td>
<td>5.0%</td>
</tr>
<tr>
<td>Total service-producing industries</td>
<td>2,831,228</td>
<td>73.7%</td>
</tr>
<tr>
<td>Government</td>
<td>381,629</td>
<td>9.9%</td>
</tr>
<tr>
<td><strong>Total Employment</strong></td>
<td><strong>3,844,058</strong></td>
<td><strong>100.0%</strong></td>
</tr>
</tbody>
</table>

Exhibit 3.75: North Central Texas Top Ten Employers, 2008

<table>
<thead>
<tr>
<th>Company</th>
<th>Employment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wal-Mart Stores, Inc.</td>
<td>32,800</td>
</tr>
<tr>
<td>American Airlines/AMR Corporation</td>
<td>24,790</td>
</tr>
<tr>
<td>Dallas Independent School District</td>
<td>20,000</td>
</tr>
<tr>
<td>Texas Health Resources</td>
<td>18,000</td>
</tr>
<tr>
<td>AT&amp;T, Inc.</td>
<td>16,600</td>
</tr>
<tr>
<td>Baylor Health Care System</td>
<td>16,000</td>
</tr>
<tr>
<td>Verizon Communications, Inc.</td>
<td>14,000</td>
</tr>
<tr>
<td>Lockheed Martin Corporation</td>
<td>13,647</td>
</tr>
<tr>
<td>City of Dallas</td>
<td>12,575</td>
</tr>
<tr>
<td>US Postal Service</td>
<td>12,200</td>
</tr>
</tbody>
</table>
Exhibit 3.76: Locations of Top Ten Employers

Top Ten Employers
- Central Office/Headquarters
- Employment > 100
What will North Texas be like in 2030 ... or in 2050? National forecasts of population and economic growth indicate that this region will continue to add residents and jobs well into the future. The characteristics of the nation’s people and its economy will be different in 2030 than they are today and these changes will also affect the residents and businesses of North Texas. In this chapter, these projections and trends are explained.

This chapter also brings together the plans that are in place today for development and for major investments in transportation, water service and other key facilities – those investment areas discussed in Chapter 3 for which there are long-range plans. Each of these plans considers the region’s anticipated growth. They reflect some trends that are changing the past pattern of regional development and investment, but assume that other trends will continue unchanged. Though there is coordination among the policy-makers to create and approve them, these plans are created through separate processes and are not explicitly integrated with one another. Taken together, as they are here, they paint a picture of the North Texas expected in 2030 if ‘business as usual’ is continued.

### The People of North Texas

#### Overall Growth Projections

The North Central Texas Council of Governments prepares long-range demographic forecasts for the ten counties surrounding and including the Metropolitan Planning Area. The forecasts are developed to provide a uniform empirical base for intra-regional infrastructure planning and resource allocation. Based on the planning agency’s projections, these ten counties will have over 9.1 million people living in households and over 5.4 million non-construction jobs by the year 2030. As shown in Exhibit 4.1, the Texas State Data Center and the Texas Water Development Board projections offer alternative sets of assumptions about growth that are higher and lower than the projections made by NCTCOG.

Vision North Texas has elected to use the NCTCOG projections throughout its analysis for the ten counties that these projections address. Since the North Texas 2050 project is designed to address all 16 counties in the North Texas region, NCTCOG developed 2030 projections for the six outlying counties to be used for this purpose only. These projections are shown in Exhibit 4.1.

#### Exhibit 4.1: 2030 Population Projections for North Texas (millions of people)

<table>
<thead>
<tr>
<th></th>
<th>North Central Texas Council of Governments</th>
<th>Texas State Data Center – “no migration” scenario</th>
<th>Texas State Data Center – “high migration” scenario</th>
<th>Water Development Board</th>
</tr>
</thead>
<tbody>
<tr>
<td>10-county area</td>
<td>9.1</td>
<td>6.2</td>
<td>12.3</td>
<td>8.8</td>
</tr>
<tr>
<td>16-county area</td>
<td>9.5</td>
<td>6.5</td>
<td>12.8</td>
<td>9.2</td>
</tr>
</tbody>
</table>
The 2030 projections produced by NCTCOG use the year 2000 as a base year and project population and employment in five-year increments to 2030. Over the 30-year horizon, the 10-county area is anticipated to add 1.5 million households, 4.0 million people in those households, and 2.3 million non-construction jobs. The 16-county North Texas region is anticipated to add 1.6 million households with a corresponding 4.1 million people and 2.3 million non-construction jobs. This represents an average annual population growth rate of 2.6% for these 30 years, a magnitude of growth never before experienced in the North Central Texas region. NCTCOG forecasts reflect only one set of growth assumptions. If circumstances change, real growth outcomes might be considerably different.

Demographics

Two factors will dominate North Central Texas demographic trends over the next twenty years. These are increasing diversity and the aging of the region’s population. The growth in non-white groups will be driven by migration and natural increase (births and deaths in the region). The region’s strong job market and international connectivity attract workers of all skill levels from all over the world. As long as the region’s economy remains strong, internal and external migration to the area is expected to continue. While fertility rates for non-white groups have been declining, they are still considerably higher than rates for whites. Even with mortality rates factored in, the rates of growth for most non-white groups, particularly Hispanics, outpace that of whites.
By 2030, the shape of the region’s population will bear less resemblance to a pyramid than to a rectangle. This is primarily due to the aging of the large baby boom generation. The other factor affecting the shape of the distribution will be migration, since people moving to this region tend to be those in the labor force – young and middle-aged adults.

There is likely to continue to be slightly more males than females. The more mature groups in the population are expected to be dominated even more by females while the younger population groups will continue to have higher shares of males.

Despite the impact of the aging baby boomers, natural increase and migration will keep the median age relatively close to the current figure. In 2030, the median age of the total population is projected to increase by just over a year to about 34.7 years.

The share of some key age groups will be different than in the past, however. In 2006, people in the age group that provides most of the labor force (ages 20 through 64) comprised 61% of the region’s population. In 2030, this age group will comprise only 57% of the population. On the other hand, seniors aged 65 to 84 were only 7% of the population in 2006 and will be 13% of the population in 2030. In fact, the age groups with the highest percentage increase from 2006 to 2030 are those from 70 to 74 and 75 to 79.

Housing Demand

By 2030, the region is expected to have over 9 million people living in households in the 10-county forecast area and 9.5 million people living in households in the 16-county Vision North Texas region. Household sizes, which have been generally declining for decades, are expected to continue to decline. However, the decline is not expected to be as dramatic as in the past. In fact, the average household size for the forecast area in 2030 is likely to be very close to the current household size as populations increase for those racial/ethnic groups that have historically had larger households.

These demographic changes will result in changes to the housing demand in the region. The sheer number of older and non-white residents will impact both the quantity and type of housing demanded in North Central Texas as well as the location of that housing.

Aging homeowners looking to downsize and trade in home maintenance for community living will certainly contribute to changes in housing demand. There is also likely to be an increase in demand for housing near transit. Studies have shown that certain demographic groups – singles, couples without children, elderly, and lower-income minorities – are more likely to find locations near transit attractive. Also, expansion of the region’s transit systems will locate stations closer to more neighborhoods, businesses and other destinations, making this a more convenient choice for more people.

The Center for Transit-Oriented Development has calculated the market for transit-oriented development, now and in the future, for the 42 metropolitan areas that have fixed rail transit systems that exist now or are planned to be in place in 2030. The Dallas region is expected to see a very large increase in the demand for housing within one-half mile of transit stations. This market segment was estimated at 46,429 households in 2007; the study projects that there will be 270,676 households in this transit-oriented housing market in 2030. To accommodate this anticipated demand, development around transit stations should include a variety of housing types and price levels.
Income and Wealth

Region-wide, real per-capita income is expected to increase by about 32 percent over the next 22 years. This is a higher growth rate than the estimated 26 percent increase over the last 22 years. But this increase is not expected to be experienced consistently in all parts of the region. Over the next several decades many of the counties in North Central Texas are expected to experience a decline in this index. Dallas is the only urban county expected to see an increase in relative wealth.

Exhibit 4.4: Change in Woods & Poole Wealth Index, 2008 - 2030

The North Texas Development Pattern

2030 Regional Forecast

The NCTCOG 2030 forecast was developed using a federally recognized land-use model that disaggregates the regional forecast of households and employment to 10-county projections (or control totals) and then to smaller geographies called forecast districts1. The final step is an allocation of the district numbers to an even smaller geography known as traffic survey zones2. Survey-zone-level figures can be aggregated to approximate city and market area projections. Part of the forecasting process includes extensive review by NCTCOG staff and consultation with city and county staff members. Local municipalities work with NCTCOG staff to ensure that local governments’ land use and comprehensive plans are considered in the forecast. A task force of local officials from city, county, and transportation entities acts as a governing body for the process and endorse the forecast for approval by NCTCOG’s Executive Board. The following maps are the result of this process for the year 2030. They illustrate the expected development pattern in North Central Texas if current population increases, employment growth and location trends continue. They reflect, in a general way, the long-range plans of cities within the region.

1 Forecast districts are subsets of counties. There were 478 forecast districts in the 10-county area for this 2030 forecast.
2 There were over 6,000 traffic survey zones in the 2030 forecast.
Exhibit 4.6: Forecast Non-Residential Development Pattern, 2030

Employment Per Acre

- None
- 0.01 - 0.02
- 0.02 - 0.04
- 0.04 - 0.06
- 0.06 - 0.09
- 0.09 - 0.16
- 0.16 - 0.32
- 0.32 - 0.64
- 0.64 - 1.70
- 1.70 - 3.50
- 3.50 +
Development in Unincorporated Areas

Population growth in North Central Texas is not limited to incorporated cities and previously urbanized areas. Development approvals in the unincorporated areas of North Texas contribute to the ‘business as usual’ regional pattern as well. Currently, there are over 30,000 potential new housing units representing as many as 89,000 people in special districts such as fresh water supply districts and water improvement districts. In other words, there will be almost as many new residents living in these unincorporated areas as live in the city of Frisco today.

This growth in unincorporated areas has many planning implications including provision of services such as police and fire protection. Exhibit 4.7 shows locations of existing residential subdivisions, with undeveloped lots, in special districts.

North Texas Investments and Infrastructure

In this section, the plans for investment and infrastructure that affect the region are summarized. The section addresses the same set of investment and infrastructure issues considered in Chapter 3. There are no current plans for some of these issues. While the plans summarized here may have used the same or similar data sources and assumptions, they were not developed in coordination with one another.

Natural Assets

Currently, there are no regional plans related to the future of North Texas’ natural assets of habitat, plants, animals, open space areas and corridors, tree canopy or carbon footprint.

There are studies of particular topics that have been conducted for other purposes. For example, the Environmental Impact Statement of an individual project considers the project’s impact on endangered species. Also, there are studies underway on particular topics but for smaller areas within the North Texas region. Two examples relate to the urban forest in the city of Dallas. The first example is the work of the Dallas Urban Forestry Advisory Committee, which is researching techniques to document the details of the existing tree canopy in the city of Dallas. The Committee is conducting a 20 square mile pilot project to research the potential of using advanced imagery to survey the urban forest canopy cover. This cutting-edge technology may make it more feasible to manage today’s forest and plan for the forest of tomorrow. This information will assist in efforts to improve air quality, reduce urban heat island effects and winds, and support a potential carbon sequestration program relying on the urban forest to capture and hold carbon dioxide. Second, a Management Plan for Dallas’ Great Trinity Forest has been completed. It provides a 100-year management plan for this forest, which is the largest urban hardwood forest in the nation.

Water

The 2007 Texas Water Plan analyzes water issues for the state and for each water planning region. Developed by the Texas Water Development Board (TWDB), it provides estimates of water demand and supply, and describes the steps that are necessary to ensure an adequate supply of water to meet the state’s needs. By 2050, TWDB projects that the 16 county North Texas region will have 11.7 million residents. The region will demand 3.00 million acre feet of water, 62.9% of the water demand in regions C, D and G and 14.5% of the demand statewide. The annual amount of water consumption statewide is projected to decline significantly, from 0.81 acre feet per capita in 2000 to 0.51 acre feet per capita in 2050. In North Texas, there is a very slight decline in consumption during this time.

3 Exhibit 3.56 shows the areas included in these water planning regions.
period – from 0.26 acre feet per capita in 2000 to 0.25 acre feet per capita in 2050.

Demand for water increases as the region continues to grow and by 2060 (the time horizon of the Texas Water Plan), this 16 county region is projected to have 13.3 million residents and demand 3.35 million acre feet of water, 63.3% of the demand in Regions C, D and G and 15.5% of the statewide demand.

Existing water supplies are not sufficient to meet the projected needs in 2060. The 2007 Texas Water Plan estimates that regions C, D, and G will have approximately 3.49 million acre feet of water supply available in 2060 from a combination of sources including surface water, groundwater and water reuse. These resources would be sufficient to meet the needs of North Texas by itself, but they are far below the level needed to meet all the needs of these three water planning regions, which are expected to need a total of 9.86 million acre feet of water in 2060. Clearly, additional investments are needed to meet the projected future needs of these regions and of North Texas. The Texas Water Plan identifies a total of $14.3 billion for capital improvements to serve regions by 2060. These investments support the construction of new reservoirs, increased conservation efforts, water reuse and other strategies. The recommended strategies are different for these three water planning regions, as shown in the exhibits above.

Failure to meet water needs could have a negative impact on the North Texas region’s growth and economic well-being. As part of
the 2007 Texas Water Plan, the Texas Water Development Board analyzed the economic impacts of a failure to meet water needs. If drought or a failure to invest in water supplies cause these three water planning regions to be unable to meet their water needs in 2060, the Water Development Board estimates that they would lose over 1 million residents, almost 745,000 jobs and $62.67 billion in income (from payroll, corporate income, rental income and interest payments in that year). Planning to meet water needs is an important part of the region’s future vitality; inclusion of a mix of water management strategies can make this a sustainable component of the region’s future as well.

Most of the water demanded in the 16-county North Texas region is for municipal use, which the TWDB defines as water use by residential and commercial consumers. The municipal share of water demand for the 16 counties increases from 86.1% in 2000 to 88.1% in 2060. In absolute terms, municipal water use in the 16 counties is projected to increase from 1.2 million acre feet in 2000 to 2.1 million acre feet in 2030 and 2.6 in 2050.

**Energy**

The Department of Energy predicts the North Texas region will increase its energy consumption (from all sources) by 0.5% every year until 2030. They also predict an increase in carbon dioxide (CO₂) emissions of 0.6% every year through 2030. If the region continues with ‘business as usual’ in 2030, North Texas will put 148.76 more million metric tons more of CO₂ into the atmosphere than the region did in 2005. Electricity consumption is predicted to grow by 0.5% every year as well. By 2050, North Texans will need 21% more production capacity than is currently available.

**Public Facilities**

**Transportation Network**

Transportation planning for North Texas is conducted by NCTCOG in its role as the region’s Metropolitan Planning Organization (MPO). The current plan for all aspects of transportation is *Mobility 2030*, adopted by the Regional Transportation Council in 2007. It covers the MPA area shown in Exhibit 3.1 and addresses roadways, transit, bicycle and pedestrian travel, aviation and goods movement to and through the region. *Mobility 2030* estimates the construction costs of all proposed facilities and analyzes the impact planned facilities will have on the region’s traffic congestion, air quality, environmental justice and other issues. *Mobility 2030* is fiscally constrained — it is required to include only those projects that can be funded with anticipated resources.

*Mobility 2030* includes $29.8 Billion in improvements to the regional freeway, tollway, HOV and managed lane systems, shown in Exhibit 4.10. These recommendations include an additional 3,444 lane miles of freeways and tollways and an additional 626 lane miles of High Occupancy Vehicle (HOV)/Managed Lanes. The facility locations shown on this exhibit represent general locations, not specific alignments; specific design, access details and operational characteristics are determined through detailed project development studies of each individual project.

Expanding the regional transit system is a vital part of improving the transportation network in the Dallas-Fort Worth area. Transit service includes local bus, express bus, light rail, and commuter rail service. Transit system planning is a coordinated effort involving NCTCOG, Dallas Area Rapid Transit (DART), the Denton County Transportation Authority, and the Fort Worth Transportation Authority (The T). DART and The T jointly operate the Trinity
Exhibit 4.10: Funded 2030 Roadway Recommendations

Legend:
- New Freeway Facilities
- New Tollway Facilities
- Add Capacity to Existing Freeway/Tollway
- HOV/Managed Lanes
- Improvements to Existing Freeway and HOV/Managed Lanes
- Selected New/Improved Regionally Significant Arterials
- Freeways/Tollways
Railway Express, a commuter rail service that carries riders between Fort Worth and Dallas, with several stops along the way.

Mobility 2030’s recommended passenger rail system is shown in Exhibit 4.11. It includes an additional 397 miles of rail lines. Only 146 miles of this system can be funded through current funding systems; the remainder is assumed to be funded through the new Rail North Texas Initiative. Corridor specific design, technology, alignment and operational characteristics for the Intercity Passenger, Regional Passenger and Freight Rail Systems will be determined through capacity evaluation, refinement of rail forecasts and ongoing project development. Three routes shown in this exhibit also have particular issues identified in Mobility 2030:

- ‘The Cotton Belt Corridor between DFW International Airport and the President George Bush Tollway includes $50 million worth of mitigation expenses to curb impacts such as noise, vibration, and visual impacts.
- ‘DART’s proposed West Dallas rail service will be evaluated in conjunction with the Union Pacific rail line between Fort Worth and Dallas. Further evaluation is needed to prevent duplication of service, determine alignment, vehicle technology, connectivity and staging.
- ‘DART’s proposed SouthPort rail line extension will be evaluated in conjunction with the Dallas to Waxahachie rail service. Further evaluation is needed to prevent duplication of service, determine alignment, vehicle technology, connectivity and staging.

Even with this significant investment, the region will see an increase in congestion on its roadways because the region will have more people and more jobs, and because those people will drive more. From 2007 to 2030, this plan projects that population will increase by 45.2% for the MPA, but that vehicle miles traveled will increase 59.3%. Because of increased miles of travel, and the location and timing of this travel, the hours lost to travel delay are expected to increase 65.7%. In 2030, after completing the $70.9 billion in transportation improvements funded by this plan, the region’s annual cost of congestion will be $6.6 billion (compared to $4.2 billion in 2007). Exhibit 4.12 shows the areas within the region expected to experience congestion in 2030.

Mobility 2030 identifies facilities that would help meet the region’s mobility needs but that are not currently funded. As noted above, the passenger rail system shown in Exhibit 4.11 is not fully funded without the Rail North Texas Initiative. New mechanisms are needed to fund, build and operate the recommended passenger rail system shown in that exhibit.

Additional roadway capacity is also needed to alleviate major congestion throughout the region. However, the resources needed to fund many necessary projects are unavailable. Over $1 billion of recommended roadway improvements will rely on user fees (tolls) for their implementation. While a need for additional improvements exists, many must be deferred until more money is available.

The MPA faces almost $59 billion (in 2006 dollars) in unfunded needs through 2030; including $3.4 billion needed for the Rail North Texas Initiative. These needs are listed in Exhibit 4.13. Innovation will prove more necessary as the state and region continue to grapple with a combination of higher construction costs and less revenue. The age of the existing infrastructure will also place more importance on maintenance over time.
Exhibit 4.12: Transportation Congestion, 2030

- Areas with No Congestion
- Areas with Light Congestion
- Areas with Moderate Congestion
- Areas with Severe Congestion
- Roadways

Map showing transportation congestion levels in North Texas for the year 2030, with areas shaded in varying intensities of red to indicate severity.
### Exhibit 4.13: Identified Transportation Funding Needs

<table>
<thead>
<tr>
<th>Metropolitan Transportation System Components</th>
<th>Funded Needs (Billions/2006 $)</th>
<th>Unfunded Needs (Billions/2006 $)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operation &amp; Maintenance</td>
<td>$18.7</td>
<td></td>
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<tr>
<td>Congestion Mitigation Strategies</td>
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<td></td>
</tr>
<tr>
<td>Bicycle &amp; Pedestrian Facilities and Transportation Enhancements</td>
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<td></td>
</tr>
<tr>
<td>Rail and Bus Transit System</td>
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<td></td>
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<tr>
<td>HOV and Managed Facilities</td>
<td>$3.3</td>
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<tr>
<td>Freeway and Toll Road System</td>
<td>$26.4</td>
<td>$12.72</td>
</tr>
<tr>
<td>Regional Arterial and Local Thoroughfare System</td>
<td>$5.7</td>
<td>$6.0</td>
</tr>
<tr>
<td>Additional Cost to Purchase Right-of-Way</td>
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<td>$1.1</td>
</tr>
<tr>
<td>Rehabilitation Costs</td>
<td>$2.6</td>
<td>$32.1</td>
</tr>
<tr>
<td>Goods Movement/Rail Freight Costs (Trans-Tx Corridor)</td>
<td></td>
<td>$6.7</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>$70.9 (55%)</strong></td>
<td><strong>$58.6 (45%)</strong></td>
</tr>
</tbody>
</table>

**TOTAL ALL NEEDS**

- **$129.5 Billion**
- **$70.9 Billion** (55%)
- **$58.6 Billion** (45%)

### Education

There are currently over 1,100 elementary and over 600 secondary public schools in the region. In addition, there are over 230 private schools. The region is expected to add nearly 400,000 school-aged children over the next 22 years. This growth in the student population will necessitate additional schools, perhaps as many as 500 more, by 2030.

The locations and capacities of these facilities will be dictated by housing choices made by future residents. It is possible that existing facilities could be updated or reconfigured to service more students. It is just as possible that new facilities will need to be built to service substantial groups of residents who live farther away from existing facilities. Either way, the future of North Texas means more students and therefore more educational facilities.

Individual school districts plan for future facilities based on their own projections of future student demands. Currently, there is not a coordinated process for examining the need for new schools throughout North Texas, nor is there an assessment of whether future student demands could be met by existing facilities within the region if the students’ families lived near existing facilities.

### Health Care

The health of a community is tied to the health of the individuals in that community. With a growing population comes a corresponding need for additional medical services. Also, an aging population will need even more general and specialized health care services. As health care improves and people live longer, these services will be needed for longer periods of time. Meeting the health needs of North Texas’ future residents will mean that the region must consider the demands for health care of a growing and changing population. The region’s private and public sectors will need to provide trained physicians, nurses and other health care providers, as well as the facilities and technology that enable these practitioners to meet the needs of North Texas residents.

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4 For this report, school-aged is defined as between the ages of five and eighteen years, inclusively.
North Texas – and Texas in general – faces challenges in terms of health and health care. The United Health Foundation ranks each state on a set of measures related to health. In 2007, Texas ranked 37th of the 50 states on this measurement of overall health issues. This assessment notes that Texas has the highest rate of uninsured residents among the 50 states – 24.5% of Texans are uninsured (an increase from 23.7% in 1990). Also, from 1990 to 2007, the percentage of obese Texans rose from 12.3% to 26.1%. A recent study by the Centers for Disease Control and Prevention connected the high levels of obesity in the state to diabetes, with Texas ranking 46th of the 50 states in its adult diabetes incident rate. While the North Texas region may score better than the state as a whole on these measures, they are still of concern for the region. If these trends continue into the future, there will be greater health care challenges for the region and a lower quality of life for its residents. To the extent health is related to the region’s pattern of development (as discussed in Chapter 3), the region’s choices about its urban form will affect the health of North Texas residents.

Texas is ranked 42nd among the 50 states in its ratio of primary care physicians relative to the population. This is an area where future needs will be especially acute. The number of medical students electing to become family practice physicians has fallen considerably due, in part, to a decrease in real pay for family practice compared to medical specialties. Many medical students are choosing specializations which allow more regular working hours and better pay. Compounding the issue is the fact that many current family physicians are nearing retirement age. The region already has a medical school, a dental school and nursing programs and several universities. The region needs to train and attract quality healthcare workers to ensure the continued vitality of the region.

In addition to basic medical care, there are other factors affecting the health of North Texas citizens. A few of these are highlighted below.

- Toxic substances in the air, water, and earth weaken the immune system and jeopardize the ecology and habitat in which we live.
- While some death and disease can be directly attributable to diet and lifestyle, there is no doubt that hazardous environmental conditions like air and water pollution, toxic building environments, poor soil quality and other stressors are often contributing factors.
- Land use and transportation patterns have been linked to public health in a number of recent studies. Studies suggest that an automobile dependent land use pattern damages human physical health because it promotes car dependence and sedentary lifestyles.
- Over the last 30 years, land use trends have resulted in ever increasing economic segregation of the region’s urban and non-urban residents. Poverty is often associated with poor health. A disproportionate percentage of our African American, Hispanic and other ethnic residents are low income.

These examples serve as an illustration that there are many aspects contributing to regional health and well being. Just as important as the need for more doctors is the need for more attention to environmental and social factors that affect health.

As with education, there is not a unified or coordinated planning effort to ensure that needed health facilities will be in the right locations to serve the region’s future growth pattern.
North Texas is already moving away from the development patterns that have shaped its past. Private and public investments are supporting sustainable infrastructure projects like recycling, energy efficiency and water conservation. City planners and real estate developers are creating places that incorporate new urbanism concepts, resource efficient design, and pedestrian-friendly environments. If these choices were made widely throughout the region, they would result in a future that is very different from ‘business as usual’. At the same time, other changes in demographics and personal preferences mean that the people who will be North Texas’ future residents will probably want a different sort of region than the one that results from ‘business as usual’. Finally, changes in the global and national economy and environment suggest that North Texas will face a different set of opportunities and challenges in the future. In this chapter, these alternatives to the ‘business as usual’ future are explored.

The first part of this chapter describes changes that are under discussion or already underway in the region. It provides examples, from this region, of development and investment that are different from the practices of the past. It also highlights findings of recent studies that may help North Texas evaluate the benefits and implications of changes from ‘business as usual’. It notes some of the global and national trends that affect North Texas.

The second part of this chapter reports on the changing preferences of North Texas stakeholders. These preferences were expressed during the series of subregional workshops held by Vision North Texas in 2007 and 2008. This part of the chapter presents the results of small group exercises to create a vision and a distribution of anticipated growth; it also examines the results of electronic keypad polling of workshop participants.

The third part of this chapter focuses on alternative scenarios for the region’s future. It summarizes the set of alternatives that were defined and evaluated in 2005. Those scenarios have now been modified to incorporate the input from stakeholders. The chapter ends with a set of five possible scenarios for North Texas 2050.

New Directions

Global and National Issues

Climate Change

As discussed in Chapter 3, the scientific evidence is strong for the connection between increasing greenhouse gas emissions and changes to the earth’s climate. Though the U.S. is home to less than 5% of the world’s people, it produces 25% of the CO₂ emissions on the planet. Two key contributors to greenhouse gas emission – the transportation and building sectors – are affected by the pattern of development and mobility in metropolitan regions. Several recent reports, including “Growing Cooler: The Evidence on Urban Development and Climate Change”, propose that reductions in vehicle miles traveled must be a major focus of strategies to reduce a region’s ‘carbon footprint’. Alternatives to the ‘business as usual’ development pattern for North Texas appear likely to support these reductions. For example, the alternative scenarios studied in 2005 reduced vehicle miles traveled by 5 to 9% compared to the NCTCOG forecast.
Other local action on climate change is already underway in North Texas cities. The U.S. Conference of Mayors has drafted a climate protection agreement that has been signed by over 500 Mayors on behalf of their communities. The cities that sign the agreement commit to three actions: strive to meet or beat the Kyoto Protocol targets in their own communities; urge state and federal governments to meet or beat these targets; and urge Congress to pass bipartisan greenhouse gas emission legislation. As of early 2008, over 60% of the people in the North Texas region were living in cities whose mayors had signed the U.S. Conference of Mayors Climate Protection Agreement.

The International Council for Local Environmental Initiatives (ICLEI) has established a variety of programs to help its member local governments reduce the carbon footprint of their organizations and communities. Many North Texas cities are ICLEI members. Numerous North Texas communities have formed Sustainability Committees or Task Forces and several have offices or staff members who are responsible for sustainability initiatives ranging from energy conservation education to LEED building design.

The Texas Triangle

Several national initiatives have focused in recent years on the role metropolitan regions play in the nation’s economic vitality. Organizations including the Brookings Institution, the America 2050 project, Texas A&M University and the Metropolitan Institute at Virginia Tech are involved in research to understand how the largest of the U.S. metropolitan areas contribute to the nation and to propose federal efforts to support these regions. This research proposes that many of the metropolitan areas defined by the U.S. Census Bureau actually combine into ‘megaregions’ or ‘megapolitan areas’. The Texas Triangle is one of these megaregions. It includes the North Texas region and extends south to include the Houston region as the second point in the triangle and San Antonio as the third point (thus also including the Austin region). These studies argue that strategies for global success should include efforts to make seamless connections within this megaregion.

Investment Decisions

Grey and Green Infrastructure

Impervious cover in the region has been shown to affect the amount and quality of stormwater that reaches the region’s rivers, lakes and streams; it contributes to the urban heat island effect that in turn impacts public health. It represents cost for construction, maintenance and operation of buildings and paved areas. Use of natural systems can reduce the amount of ‘grey’ infrastructure in a region and can help reduce impervious cover. Simply paving over less area also helps reduce impervious surfaces and heat in the urban area. The analysis of alternative scenarios during the first phase of Vision North Texas found that the polycentric scenario would require 3.5 square miles less paving for the region’s transportation system than would the baseline 2030 forecast scenario. This reduction in paving – an area the size of University Park – does not consider additional reductions that could result from reducing other types of paved surfaces (such as parking lots) or from designing streets differently (with green drainage areas instead of concrete channels, for example). Development patterns and green design could make a notable impact on the region’s impervious cover.

A second ‘green infrastructure’ initiative already underway in North Texas is iSWM – integrated storm water management. This program, developed by NCTCOG, encourages communities to use natural drainage and retention systems to manage stormwater flows. It provides best management practices and design guidance that individual cities can adopt and implement.
A third ‘green infrastructure’ approach, previously discussed, increases the planting and management of trees in the region’s urban forest. This approach will have the potential to increase the financial and functional value of the urban forest; as well as reducing the region’s carbon footprint, as well as contributing to air quality and reducting the urban heat island.

Choosing New Travel Modes
Research underway at the University of Texas at Arlington is exploring the attitudes and perceptions of North Texans related to new modes of travel. Through surveys and focus groups, this work has investigated the factors that cause carpoolers to choose this mode of travel and the perceptions of high occupancy vehicle (HOV) lanes and managed or ‘high occupancy toll’ (HOT) lanes. The research focused on travelers in the Dallas-Fort Worth region. It found that, for carpoolers, the ability to use HOV lanes is “the most important factor in decisions of carpool formation”. Most single occupancy vehicle (SOV) focus group participants “indicated that they would be willing to pay to use managed lanes, at least once in awhile.” Continuing research should result in a better understanding of the mode choice decisions made by North Texans for different types of trips, and should provide more precise estimates of the costs North Texans are willing to pay for managed lane facilities.

Drive ‘Til You Qualify
A common phrase within the housing community, ‘drive ‘til you qualify’ captures the economic decision-making of many households, who have chosen to spend more time commuting because housing in more remote parts of a metropolitan region is more affordable. Recent reports indicate that some of these outlying communities may be experiencing higher foreclosure rates than communities closer to the center of the region. For example, the Dallas Morning News conducted an analysis of foreclosure rates by city for Collin, Dallas, Denton, Rockwall and Tarrant counties in September 2008. Although Dallas and Fort Worth had the highest number of foreclosures among the cities in these counties, the outlying communities had a higher rate of foreclosure. The highest foreclosure rate (as a percentage of total housing units) was in Aubrey, at 7.4%, followed by Oak Point, Princeton and Haslett. None of the larger central communities had foreclosure rates above 2%. The balance between commute and housing costs may change as gas prices become less certain, congestion increases, and mortgage rates and qualifications become less generous.

Increased Investment in Energy Efficiency & Renewable Energy Sources
Energy demand in the North Texas region is expected to increase because of the region’s growth in population and employment. A study by the American Council for an Energy-Efficient Economy studied the increase in demand for electricity (overall and during the summer peak) in the Houston-Galveston and Dallas-Fort Worth-Arlington MSAs. It then evaluated the potential effect of a suite of nine energy conservation policies (listed in Exhibit 5.1) on electricity needs in 2013 and 2023. The study concluded that this group of policies “has the ability to meet 101% of the load growth in the

Exhibit 5.1: Energy Policies in ACEEE Policy Suite

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<tr>
<th></th>
<th>1</th>
<th>Expanded Utility-Based Energy Efficiency Improvement Programs</th>
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<tbody>
<tr>
<td></td>
<td>2</td>
<td>New State-Level Appliance &amp; Equipment Standards</td>
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<tr>
<td></td>
<td>3</td>
<td>More Stringent Building Codes</td>
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<td>4</td>
<td>Advanced Energy-Efficient Building Programs</td>
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<td>5</td>
<td>Energy-Efficient State &amp; Municipal Buildings Program</td>
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<td></td>
<td>6</td>
<td>Short-Term Public Education &amp; Rate Incentives</td>
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<td>7</td>
<td>Increased Demand Response Programs</td>
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<td></td>
<td>8</td>
<td>Combined Heat &amp; Power Capacity Target</td>
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<td></td>
<td>9</td>
<td>Onsite Renewable Energy Incentives</td>
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</table>
DFW Metro Area over the next 15 years, reducing electricity use by over 24% in 2023”. The study also notes that some of these policies could actually be implemented more effectively at the local level than at the state level. This analysis suggests that North Texas could successfully meet the needs of its future residents and businesses with less reliance on new energy-generating facilities than past trends would suggest.

In addition, the study calculates that these policies will “significantly reduce customer expenses for electricity”. It estimates that “total net cumulative savings are nearly $10 billion over the next 15 years” for the Dallas-Fort Worth-Arlington MSA; air pollution is also expected to be reduced through this approach to electricity provision.

**Economy and Education for Global Competitiveness**

Two analyses highlight the challenges and opportunities North Texas residents and businesses face in a rapidly-changing global economy. In 2003, The Perryman Group conducted a fiscal and economic benefit analysis of a unique program at Texas Instruments (TI). The program created a new TI wafer fabrication plant in North Texas and combined that plant with support for academic research and teaching at the University of Texas at Dallas’ engineering school. The Perryman Group concluded that this combination would help North Texas to grow its share of key emerging industries related to nanotechnology. Perryman estimated that the program would generate over $12 billion in economic benefits to the Dallas-Fort Worth Metroplex and would create over 74,000 permanent jobs. Such investments – in technology and in the academic disciplines that support it – illustrate the potential value of major private investment to the region’s economic vitality and competitiveness.

On the other hand, a report by the Governor’s Competitiveness Council released in July 2008 identifies the challenge for the state in this arena. It examined six economic clusters that offer the state future economic opportunity and then made recommendations to fill the gaps that would keep the state from becoming a global leader in these areas. A major focus was on education – the ‘talent development system’ for the state’s future. The report warns that college- and workforce-readiness are essential if Texas is to have a labor force that is competitive in these global industries. As noted in Chapter 3, state testing suggests that only 39% of the graduating seniors in North Texas are ‘college ready’ in both English language arts and mathematics. Increasing these skills will be crucial to North Texas as today’s labor force ages and business has increasingly good access to global labor markets.

**Approaches to Planning and Development**

**Comprehensive Planning**

The North Central Texas Council of Governments (NCTCOG) analyzed the current long range plans for 108 of the region’s municipalities and found that cities are adopting new approaches to development and investment as they update their comprehensive plans. The cities with existing or planned transit stations are adopting comprehensive plans that support transit-oriented development around these stations. These projects, with a mix of uses, higher development intensity and pedestrian amenities, will take advantage of the region’s investment in light and commuter rail transportation. They will increase transit ridership because they result in higher numbers of residents and destinations within walking distance of the transit station. They will also help the region accommodate the anticipated increase in the market for housing units close to transit.
Exhibit 5.2: Comprehensive Plans Analyzed
Planning for Special Areas

Small communities and individual neighborhoods have been the focus of specialized plans in recent years. These plans typically address the character of the special area, whether this is based on its natural and cultural features, the heritage of its residents or some other characteristic. For existing communities that lack the resources a major developer would bring to a project master plan, the resources of UTA's School of Urban and Public Affairs provide valuable assistance in preparing community plans. In the past five years, such plans have been completed or are underway for the:

- City of Forest Hill
- The Center City / University District of the City of Arlington
- The Ideal neighborhood in Dallas’ Southern Sector
- The Near South East community in Fort Worth
- The Joppa neighborhood (a historic Freedmans’ Town) in Dallas’ Trinity River Corridor
- The Oakland/Lancaster Village community in Fort Worth
- The Mill Street Renaissance area in Dallas’ South Dallas/Fair Park community
- The Bexar Street community in Dallas’ Trinity River Corridor
- The Vickery Meadows area of Dallas

Such special area plans make it possible for communities to identify their own needs and the landmarks and other places that give a community its unique identity. Planning for development that retains and builds on these features will help the North Texas region offer a diversity of neighborhood choices to future residents. It also supports the revitalization of developed areas and continues the benefits of investment in already-existing infrastructure.

Infill and Greenfield Development

New developments in North Texas are shifting to infill locations; increasingly, they include a pedestrian orientation. NCTCOG’s Development Monitoring database tracks major developments with over 80,000 square feet of building area or over 80 employees. In 2003, 87.5% of the major developments were located on ‘greenfield’ sites (land that has not had any previous development). In 2008 to date, 90.7% of the projects completed were greenfield projects, but only 79.8% of those under construction and 78.0% of those announced have been greenfield projects. The projects announced in 2008 include over 21% infill projects, a notable increase from the 7.5% of projects completed in 2003.

Pedestrian orientation is also a much more frequent characteristic of projects in recent years. Of the projects completed in 2003, 95.3% were auto-oriented and only 4.7% were pedestrian-oriented or of a hybrid design that included features of both orientations. For the
projects announced in 2008, 18.3% are pedestrian-oriented and 11.8% are hybrids; only 69.9% are auto-oriented. This represents a notable shift in development project design in only five years.

Impact of New Design and Location Choices
The American Institute of Architecture has adopted the Architecture 2030 Challenge proposed by New Mexico architect Ed Mazria. Architecture 2030 used information from the U.S. Department of Energy to calculate the contribution of the ‘building sector’ on climate change and found that buildings are responsible for 48% of U.S. energy consumption and greenhouse gas emissions annually. To reduce these contributions, the challenge calls for “all new buildings and renovations to immediately reduce their energy consumption by 50% and all new buildings to be ‘carbon neutral’ by 2030”. Mazria argues that these goals can have a significant impact on energy and greenhouse gas emissions because nationwide, approximately 75% of the building stock that will exist in 2035 will be either new or renovated. Thus, action to address future construction can have a major impact even if existing, unrenovated buildings remain unchanged.

Since so much of the North Texas region’s building stock is relatively new, the assumptions used to generate this national estimate do not apply directly to this region. Calculations are not yet available to determine how much of the entire North Texas building stock in 2030 will be new or renovated and thus could contribute to decreased energy consumption and greenhouse gas emission by 2030. However, calculations related to housing units suggest an initial estimate of this impact for the residential part of the built environment. Estimates for 2030 were developed using the region’s 2007 occupancy rates and the number of residential units demolished between 2000 and 2008. These calculations suggest that 45 to 50% of the housing stock that will exist in North Texas in 2030 will have been built since the year 2000. New housing built to higher standards could, therefore, play a notable role in addressing energy and climate change issues in this region. New non-residential construction and building renovations would contribute further to these goals. If these new buildings are located where their occupants drive less, the impact will be even greater.

Development Excellence
Begun in 2003, the biannual CLIDE Awards Program celebrates regional excellence by recognizing individuals and entities that are helping to ensure the region’s sustainability into the future. It does this by honoring projects and practices that promote the Center of Development Excellence’s Ten Principles of Development Excellence. In the first year, close to 50 applications were submitted and 13 projects were recognized. In 2005, 31 applications were submitted and eight projects were honored with awards. In 2007, 31 applications were received and 14 awards were presented. Each year, the selections are made by a national jury of prominent leaders in development, design and planning. Projects were recognized in all three years in the categories of “Public Planning and Policy”, Redevelopment” and “Raising Public Awareness”; projects in “New Development” and “Special Development” categories were each recognized two of the three years. Exhibit 5.3 shows the location of CLIDE award winners.
Changing Stakeholder Preferences

The people who live and work in North Texas are concerned about the region’s future and are interested in new forms of development and new types of communities. Vision North Texas has involved the region’s residents and has listened to their ideas about the region’s future. These ideas reflect a change in the preferred patterns of regional growth and the traditional approaches to investment in the region’s communities.

Subregional Workshop Process

When the first region-wide Vision North Texas workshop was conducted in 2005, participants recommended that similar workshops be held for smaller parts of the region. In response to this feedback, VNT conducted four subregional workshops in 2007 and 2008. The goal of each subregional workshop was to educate leaders from particular areas of the region about the issues facing both their subregion and North Texas as a whole. Participants worked together to recommend strategies that would accommodate projected growth while creating and maintaining livable communities.

Subregional workshops were held as follows:

- **Southeastern Subregion.** This workshop was held on January 27, 2007 at Lancaster High School in Lancaster. It addressed southern Dallas County, most of Ellis County and all of Kaufman County — approximately 1,900 square miles of territory.

- **Southwestern Subregion.** This workshop was held on June 30, 2007 at Aledo High School in Aledo. It addressed all of Hood and Johnson counties, southern Parker County, a portion of Palo Pinto County and southwestern Tarrant County — approximately 2,086 square miles of territory. This workshop was held in conjunction with AIA Fort Worth as part of their project to celebrate AIA’s 150th anniversary.

- **Northeastern Subregion.** This workshop was held on April 19, 2008 at Justin Wakeland High School in Frisco. It addressed northern Dallas county, all of Collin, Rockwall and Hunt counties, and eastern Denton County — approximately 2,660 square miles of territory.

- **Northwestern Subregion.** This workshop was held on May 31, 2008 at Northwest High School in Justin. It addressed all of Wise County, northern Parker County, western Denton County and the northern and central parts of Tarrant County — approximately 2,469 square miles of territory.

At each workshop, participants represented a cross section of diverse business, government, nonprofit, academic, and civic interests from communities throughout these counties. They engaged in a hands-on visioning exercise designed to help them consider alternative scenarios for how new development could occur in the region. Using oversized maps of the subregion, participants marked major regional features (such as open spaces and employment centers) and then placed color-coded Lego blocks representing new households and businesses on the map to depict preferred locations for expected growth. All groups presented their results to one another. After all participants heard the reports for the discussion groups, they used electronic keypads to provide individual responses to questions about the region’s future.
Discussion Group Results

Each of the subregional workshops began with a Lego-based version of the distribution of new households and jobs in the area, based on the NCTCOG forecast for 2030. Participants were assigned to discussion groups so each group included 8 to 12 people with diverse backgrounds. Each of these discussion groups developed a ‘headline’ statement that captured the key features of their vision for the subregion; they also provided more detailed ideas about the development pattern, environmental assets, urban design and other issues.

After the group reached agreement on a ‘headline’ and key concepts, the participants used colored markers to note important areas on a large map of the subregion. Then they used Lego blocks to illustrate their ideas about how best to accommodate future growth according to the concept expressed in their ‘headline’. Groups were assigned different levels of population and job growth to test varying options for each subregion. The high and low growth projections for the subregions were based on the work done by the stakeholders at the initial regional workshop.

The images on this page show the Lego versions of the NCTCOG 2030 forecast – the ‘business as usual’ approach – for each of the four subregions. In each case, orange Legos represent households added to
the region by 2030 and blue Legos represent jobs added to the region during that time. On the pages that follow, the headlines and Lego maps that resulted from the work of all discussion groups are presented.

The discussion groups’ results have several common themes. Across all four subregions, there was frequent support for protection of existing resources and preservation of community character. Many groups also expressed a strong desire to concentrate development, particularly in areas with existing or planned infrastructure. Compared to the regional scenarios developed during the first workshop, the more local focus at the subregional workshops allowed participants to be more specific in the way they balanced objectives such as preserving rural character while simultaneously ensuring economic viability. The limits of natural resources, particularly water, shaped the headlines, priorities and subregional forms created by many workshop groups. The general issues that ranked highest for most workshop groups were water quality and quantity, transportation, air quality, quality of life, infrastructure and economic development.

The workshop results also show the different approaches taken by different groups of stakeholders. For some, most of the new development was located close to the Fort Worth and Dallas downtowns. Other groups planned linear development patterns, some along transit lines and others along major highways. Still other scenarios reflect the concept of concentrating development in centers separated by low density development and open space. Some groups emphasized centers around transit stations while others focused on adding new mixed-use development in the cores of the existing cities in the outer parts of the region. These ideas and priorities translate into different possible development patterns for North Texas.

The images on the following pages show the ‘headline’ and development pattern created by each of the discussion groups at all four subregional workshops. In all cases, the orange Legos represent new households and the blue Legos represent new jobs.
Group 1: Nodes and Corridors. In order to preserve environmental assets, the southeast region will develop by creating growth opportunities in nodes and corridors fed by public transportation and by encouraging high density in mixed-use settings.

Group 3: Sustainable economic development and redevelopment to retain quality of life and livability of our communities.

Group 2: Development Nodes and Preservation Corridors.

Group 4: More intense makes sense!
Group 5: Healthy and safe rail-oriented growth.

Group 6: Path to sustainability.

Group 7: Growth and transportation while conserving our natural resources and open spaces.

Group 8: Conserve our natural resources and enhance our quality of life by integrating live/work/play/educate.
Group 9: Mejor Tierra – A Better Earth.

Group 10: Self-supporting, sustainable exurban nodal development linked by commuter rail.
Southwestern Subregional Workshop

**Group 1:** Urban notes win the day.

**Group 2:** Wide open spaces: economic development opportunity and quality of life.

**Group 3:** Smart growth along transit corridors through preservation/conservation of natural/cultural resources.

**Group 4:** Growth in green: path to the future.
Group 5: Preserving the best of the West through transportation-focused development.

Group 6: Transit-linked employment anchors.

Group 7: Preserving rural character with nodal development.

Group 8: Rural character, city living: development, transportation, open space.
Group 1: Building an Educated Coalition for Responsible Development: The Smart Utilization of Existing and New Resources.

Group 2: P.O.D. for T.O.D.

Group 3: On the Right “Track.”

Group 5: Efficient Facilities and Resources for a Successful Future.

Group 6: Regional Approach to Smart Growth for a Sustainable Future.

Group 7: Balanced Efficient Growth

Group 8: Live, Work, Life Together: Future Growth Accommodated through Transit Expansion and Diversification.
Northeastern Subregional Workshop

**Group 1:** Where the West Goes Green: Community, Economy and the Environment

**Group 2:** A Delicate Balance

**Group 3:** Do Grey Right to Achieve the Right Green

**Group 4:** Live Life Linked
Group 5: Utilize Our Greener Pastures Through Focused Development.

Group 6: A Clean Slate: Regionally Coordinated, Transit-Focused Development

Group 7: Community Centered Development “Cradle to Grave”

Group 8: Produce Where We Consume
Northwestern Subregional Workshop

Keypad Polling Results

Vision North Texas has used electronic keypad polling as one of its public input techniques since the initial workshop in 2005. With this technique, a series of questions are displayed on a large screen in the front of the auditorium. Each participant is provided with a handheld wireless keypad. Her or she responds to these questions based on his or her own knowledge and opinions. Responses are automatically and instantly tallied and the results are displayed on the screen, providing immediate feedback to participants about the opinions of the entire group.

The keypad polling tool encourages participation and more effective communication because everyone is heard equally. The ‘voting’ is anonymous, which allows the participants to respond based on their individual preferences, which might vary from the overall consensus recorded during the small group discussions or in a public hearing setting. Also, the anonymity allows participants to voice their true opinions without being affected by the views of the other participants.

Keypad polling is not a statistically significant reflection of the views of the community as a whole, because the people who self-select to attend a workshop do not necessarily comprise a representative sample of all residents. But this input is valuable because these workshop participants do express a range of the viewpoints likely to be held by other members of the community. Also, these individuals are likely to be involved in local policy discussions and activities that will ultimately carry out a vision for the region’s future, so their support would be important for elected leaders who seek to address these concerns. For these reasons, the participant views documented by the keypad polling suggest directions regional leaders may choose to take in shaping the future.

The first questions in the keypad polling series tested the respondents’ views about the scenarios developed by the discussion groups. The questions were aimed at finding out whether respondents felt the general direction advocated by the small groups made sense. The group responses from all of the workshops clearly support the scenarios crafted in the exercise. This question was asked at each workshop and between 84% and 95% of participants at each workshop said the scenarios represented realistic choices the region should consider, or that even more dramatic changes were needed. These responses show strong support for the concepts identified by Vision North Texas participants and for action to incorporate these ideas into local and regional policies.

The second series of keypad polling questions investigated the issues that were important in creating a desirable pattern for future regional development. The questions were designed to gain a sense of the priority measures that should be used in further evaluation of scenarios. They asked how important a set of evaluation measures was in making decisions about future development scenarios.

At each workshop, four choices were available to the participants replying:

- Essential to examine immediately;
- Important;
- Interesting but not important; or
- Not worth evaluating.

Looking at all four of the workshops, the top two issues were water supply/quality and transportation. An average of 97% of the respondents chose one of the top responses for reducing traffic. For the water issues, water supply especially, an average of 97% also chose
either essential or important as a rating.

The next two areas receiving interest were air quality and proximity of new development to existing infrastructure. Over 96% of the participants said that air quality was essential or important. The question related to locating new homes and jobs where existing infrastructure is available received an average of over 95% responding it was either essential or important.

Six other measures received an average of over 90% support for “essential” or “important”.

- Conserve energy
- Revitalization of existing downtowns and neighborhoods
- Balance jobs and housing in local communities
- Retain open space
- Is served economically by public infrastructure
- Locate new homes and jobs near rail

The final set of keypad polling questions asked respondents about next steps for Vision North Texas and the region. These responses will be used to help set priorities for action in the future. Respondents had four choices:

- Essential to undertake during the next year;
- Important to undertake as resources become available;
- Not a good use of regional resources; or
- Don’t know enough to decide.

The top choices revealed that on average 99.5% of the workshop attendees said that analyzing examples of “best practices” for sustainable development was essential or desirable in the upcoming years. (70% indicated that it was essential.) Next, over 96.5% indicated that an online resource sharing sustainability information in the region was either essential or important.

An average of over 94% of those responding said that sustainability should either be a criterion for regional investments or serve as a measurable target to strive for in the region. Participants continued to express strong support for the use of a ‘preferred regional scenario’ as the basis for regional investment decisions. From 83 to 96% of respondents felt that this was either ‘essential’ or ‘important to undertake as resources become available’.

**Alternative Scenarios**

Scenarios provide a valuable tool for considering the effect of today’s decisions on important factors that will shape the future. Merriam Webster defines a scenario as “an account or synopsis of a possible course of action or events”\(^1\). A range of scenarios are defined and then evaluated in order to test the implications of choices such as development patterns or capital investment options. Scenarios can give a community useful information about the likely outcomes of today’s decisions. Comparisons across scenarios use a consistent set of evaluation factors. They allow a community to consider how well the results meet community goals or achieve a desired vision of the future. Vision North Texas used a set of scenarios in its initial work. A second set of scenarios will be used for evaluation of North Texas 2050 choices. These new scenarios reflect the input received from stakeholders throughout North Texas at workshops during 2007 and 2008. They describe possible futures that may be desirable for the region.

\(^1\) Merriam Webster online dictionary (www.merriam-webster.com/dictionary); definition 3.
Phase 1 Scenarios

During Phase 1 of Vision North Texas (in 2004 and 2005), a total of nineteen scenarios were evaluated to examine desired futures for the Dallas – Fort Worth Metroplex. These scenarios included:

- The NCTCOG 2030 Forecast;
- The scenarios developed by the 15 discussion groups at the Vision North Texas regional visioning workshop;
- Two additional scenarios developed by NCTCOG’s Transportation Department prior to the regional visioning workshop; and
- A final scenario that combined the ideas from several workshop groups.

Of these, four scenarios were modeled by the North Central Texas Council of Governments’ Department of Transportation. These scenarios are described below; their effect on the distribution of people and jobs among community types is presented as well.²

NCTCOG 2030 Forecast

The first scenario is, in many ways, the base case for comparison of all other scenarios. The NCTCOG’s official 2030 Forecast was developed by the Research and Information Services Department of NCTCOG. It was prepared through a standard process of forecasting and modeling based on past trends and policies reflected in the comprehensive plans of the region’s cities.

This scenario is the region’s currently-approved distribution of jobs and households. Transportation modeling of this scenario demonstrated that traffic congestion would significantly increase if growth follows this development pattern. The impacts of this scenario on the region’s quality of life prompted regional leaders to create Vision North Texas as a way to identify alternatives that can be more successful.

Workshop Group Scenarios

A diverse group of stakeholders gathered at UT Arlington for the initial Vision North Texas workshop in April 2005. Participants worked in small groups to describe their desired vision for the region’s future growth. Each of the 15 small groups created alternative development scenarios, which accommodate the same amount of growth but use different geographic patterns to do so.

NCTCOG Rail & Infill Scenarios³

NCTCOG’s Transportation staff created two alternative scenarios while Vision North Texas was underway. Their policy direction is similar to some of the workshop scenarios.

The “Rail Scenario” sought to redistribute growth to more effectively use the region’s rail system. Population and employment growth (2010 – 2030) were redistributed from agricultural and high growth suburban areas to central business districts and rail station areas. Growth in existing single-family neighborhoods, airports and undevelopable lands was unchanged from the 2030 forecast. At the Vision North Texas Workshop, Groups 1, 10, 12 and 17 created scenarios similar to this Rail Scenario.

The “Infill Scenario” redistributed growth (2010 – 2030) to increase development in already-developed areas. Growth was moved from

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² This section of the report is excerpted from the “Vision North Texas Phase 1 Report”.

³ The NCTCOG Rail & Infill Scenarios affected growth only within the Metropolitan Planning Area (MPA). Due to this geographic boundary, some outlying areas within the 10-county region maintained current 2030 Forecast demographics. Additionally, the Rail & Infill Scenarios redistributed growth occurring between 2010 and 2030, assuming that the distribution of growth occurring between 2000 and 2010 remained unchanged from the official 2030 Forecast. The Polycentric Scenario includes all of the 10 counties and allocated growth occurring between 2000 and 2030.
districts, infill areas and freeway & tollway frontages. Existing neighborhoods, airports and undevelopable lands retained current 2030 projections. The scenarios developed by Workshop Groups 4 & 19 are similar to this Infill Scenario.

**Polycentric Scenario**

A final scenario was developed after the Vision North Texas Workshop in April 2005. It combines features of several workshop scenarios to create a hybrid that differs from the official forecast and from the Rail and Infill scenarios. This scenario also emphasizes development in the Dallas and Fort Worth central business districts and near transit stations. In addition, it focuses growth around centers such as the downtowns of smaller outlying communities. As a result, it distributes new growth more widely across the region but at higher intensities. It combines concepts from Workshop Groups 5, 6 and 11.

**Comparison of Phase 1 Scenarios**

The 19 scenarios produce a wide variation in the number of people and jobs in individual counties. The table below lists each county and then shows which scenario resulted in the highest and lowest share of the region’s population and employment. The table shows the percentage of regional growth in each county as well as the percentage of the 2030 total population and employment that would be located there.
### Exhibit 5.4: Population and Jobs in Phase 1 Scenarios

<table>
<thead>
<tr>
<th>County</th>
<th>Highest Scenario</th>
<th>%</th>
<th>Lowest Scenario</th>
<th>%</th>
<th>Change 2030</th>
<th>%</th>
<th>Highest Scenario</th>
<th>%</th>
<th>Lowest Scenario</th>
<th>%</th>
<th>Change 2030</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Collin</td>
<td>Group 17</td>
<td>23.7%</td>
<td>Group 8</td>
<td>6.3%</td>
<td></td>
<td>8.2%</td>
<td>Group 1</td>
<td>18.9%</td>
<td>Group 11</td>
<td>7.2%</td>
<td></td>
<td>6.8%</td>
</tr>
<tr>
<td>Dallas</td>
<td>Group 11</td>
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<td>COG 2030</td>
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<td></td>
<td>31.1%</td>
<td>Group 6</td>
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<td>Group 4</td>
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<td>Group 6</td>
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</tr>
<tr>
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<td></td>
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<td>Group 7</td>
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</tr>
<tr>
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<td>9.8%</td>
<td>Group 7</td>
<td>1.8%</td>
<td></td>
<td>2.1%</td>
<td>Group 4</td>
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<td>Group 7</td>
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<td>Group 11</td>
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<td></td>
<td>0.7%</td>
<td>Group 7</td>
<td>4.5%</td>
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<td>0.6%</td>
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<td>Group 11</td>
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<td></td>
<td>0.9%</td>
<td>Group 4</td>
<td>6.3%</td>
<td>Group 11</td>
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<tr>
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<td>0.4%</td>
<td>COG Infill</td>
<td>2.3%</td>
<td>Group 11</td>
<td>0.0%</td>
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<tr>
<td>Tarrant</td>
<td>Group 8</td>
<td>31.0%</td>
<td>Group 19</td>
<td>17.5%</td>
<td></td>
<td>23.7%</td>
<td>Group 10</td>
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<td>COG Rail, COG Infill, Groups 2, 6, 11</td>
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<td>0.4%</td>
</tr>
</tbody>
</table>

Dallas County’s share of future growth ranges from just under 15% to almost 45%. All workshop groups envision a larger share of growth in this central county than under the 2030 Forecast. Tarrant County’s share of future households ranges from about 18% to almost 31%. Notable variations also occur for Johnson and Kaufman counties, where the shares of household growth range from 0% to almost 10%. Group 11 placed the greatest emphasis on development in Dallas County; it located no new households in Kaufman, Parker or Rockwall counties. Under this scenario, almost 45% of the region’s residents in 2030 would live in Dallas County.

The geographic distribution of new employment does not vary quite as widely, but there are also important differences in these patterns. Dallas County, where 55% of the region’s jobs were located in 2000, continues to be the largest employment center under all scenarios. But Dallas County’s share of regional employment growth is less than 55% in all cases, so its share of employment declines over time. These scenarios locate 40% to 52% of 2030 jobs in Dallas County.
Tarrant County had the second highest number of jobs in 2000 (27% of the total). Group 10’s scenario would give Tarrant County a 30% share of the region’s jobs in 2030. The lowest allocation of jobs to this county (by group 7) would mean a decline to a 24% share. Collin, Denton and Ellis counties all increase their share of regional employment under all 19 scenarios.

**North Texas 2050 Scenarios**

**Role of Scenarios**

A major part of *North Texas 2050* will be a vision of the region’s preferred future. This vision will be expressed in several ways: through a brief descriptive statement, a set of goals or principles for development, an integrated framework of regional investments and one or more preferred scenarios for the geographic distribution of neighborhoods, business areas, open spaces and other regional assets in the year 2050. These preferred scenarios will be created by studying a larger set of possible scenarios and holding a regionwide dialogue about the implications of these possible patterns for growth and development.

In this report, a set of five possible scenarios are described. A scenario is not a prediction of the future; it is a description of a possible future that would result from a set of assumptions about external trends and possible choices available to decision-makers. These scenarios build on the scenarios evaluated in 2005 and on the results of four subregional workshops held by Vision North Texas in 2007 and 2008. These possible scenarios will be a topic of discussion at the subregional update sessions in November 2008; they will be a major focus of stakeholder dialogue at the Regional Summit 2008.

This is not the time for participants to pick a single scenario. Rather, participants should consider whether this set of scenarios does a good job of covering the range of reasonably possible futures that Vision North Texas should study. Stakeholder input may change the set of scenarios that Vision North Texas will study in early 2009. Results of this evaluation will be presented in the “North Texas Alternative Futures” report to be released in June 2009. These results will include a ranking of all scenarios using a consistent set of indicator measures. Debate about these scenarios will occur in summer 2009 and will shape the *North Texas 2050* vision that is created in fall 2009. The final result could be an approach that combines various aspects of the scenarios that are proposed for study now.

**Overview of North Texas 2050 Scenarios**

The five scenarios described below provide a range of possibilities for North Texas. Key features of the scenarios are summarized in Exhibit 5.5. They are described in greater detail below. The investment framework associated with each scenario is also discussed. All scenarios assume that the sixteen county region will have 9.49 million residents and 5.58 million jobs in 2030. These projections are based on the North Central Texas Council of Governments 2030 Forecast, with additional assumptions about growth and development patterns for the six counties beyond the area for which this forecast was defined. They are solely for use in this Vision North Texas project, not for other modeling purposes.

---

1 The counties outside the NCTCOG forecast area are Erath, Hood, Hunt, Navarro, Palo Pinto and Somervell.
Exhibit 5.5: North Texas 2050 Scenario Summary

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Key Concept</th>
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<tbody>
<tr>
<td>Business As Usual</td>
<td>Continuation of current trends and adopted plans</td>
</tr>
<tr>
<td>Connected Centers</td>
<td>Give people more choice about how they connect to the places where they live, work and play</td>
</tr>
<tr>
<td>Return on Investment</td>
<td>Maximize the benefit received from the extensive investment taxpayers and property owners have made in the region’s existing infrastructure &amp; development pattern</td>
</tr>
<tr>
<td>Diverse, Distinct Communities</td>
<td>Create a region with different sorts of communities and centers, built on the traditional character of regional communities but designed to meet the needs of the region’s future markets</td>
</tr>
<tr>
<td>Green Region</td>
<td>Emphasize green development or natural assets as the foundation for future regional growth</td>
</tr>
</tbody>
</table>

These scenarios will be analyzed in terms of the development pattern, benefits and impacts on the region in the year 2030. This is the year for which modeling technology and data are currently available. A qualitative analysis will extend the 2030 conclusions to compare the scenarios’ outcomes for 2050. In this way, these scenarios will guide the creation of the North Texas 2050 vision.

Business as Usual
This scenario represents the region as it will exist in 2030 if private and public decision-makers continue in the direction the region is headed today. With this scenario, the pattern of population and employment distribution will reflect past trends and the current policies of local governments regarding land use. Infrastructure investments will reflect existing adopted plans, such as Mobility 2030 for transportation facilities and the 2007 Texas Water Plan for major water supplies and facilities.

Connected Centers
This scenario envisions a region where people have more choices about how they connect to the places where they live, work and play. The amount of population and employment in the region in 2030 is the same as in the Business as Usual scenario, but the locations of jobs and housing are different and the networks that connect them are different as well. The digital image in Exhibit 5.6 provides an example of the development pattern of this scenario.

With this scenario, many human-scale mixed-use centers would be located throughout North Texas. These centers might be similar to the development projects created in recent years near DART light rail stations:

- Within about one-half mile of the center’s primary destinations, so people can walk to and from locations within the center;
- Including a mix of residential, office, retail, restaurant and public uses;
- Generally developed at a moderate intensity;
- Designed with a consistent or compatible urban design approach for the center, with features such as those associated with ‘new urbanism’; and
- Containing places for people to gather such as parks or plazas.

The investment framework associated with this scenario would include:

- An emphasis on mobility choices within the centers, particularly for walking and biking;
An emphasis on mobility choices between centers, including trails/paths, public transportation (bus, streetcar, light rail and commuter rail) and routes for travel by car;

- The potential for shared locations for public facilities and services in centers (such as libraries, schools, clinics and recycling locations);

- The potential for shared energy infrastructure (such as district heating or cooling);

- Provision of urban levels of water and wastewater services to these centers; and

- Use of parks or open spaces to define and identify particular centers.

These centers might be located in areas that are already developed or in outlying parts of the region where few urban areas exist today. As a result, some might be in unincorporated areas of the region.

This scenario is similar to the 2005 ‘Rail’ scenario.

**Return on Investment**

This scenario envisions a region that maximizes the benefit received from the extensive investment taxpayers and property owners have made in the region’s existing infrastructure and development pattern. The amount of population and employment in the region in 2030 is the same as in the Business as Usual scenario, but the locations of jobs and housing are different and the networks that connect them are different as well. The digital image in Exhibit 5.7 depicts one group’s concept of how to accomplish a return on investment.
Stable single family neighborhoods are the focus of maintenance and investment so they remain highly livable and good investments for homeowners;

Existing commercial and employment centers might be more stable because reinvestment would help existing locations remain successful in the marketplace and would make a move to a new center less economically attractive;

Mixed-use, higher intensity development might occur where land is available or underutilized along freeways and tollways;

Older commercial areas along arterial streets might be revitalized with moderate intensity mixed-use development; and

Areas that are now in agricultural use would generally remain so.

The investment framework associated with this scenario would include:

- A higher priority on maintaining and rehabilitating existing infrastructure than on extending infrastructure into areas where it does not currently exist;
- An emphasis on conservation, transportation demand management and other strategies that use existing infrastructure more effectively;
- Attention to reinvestment that helps existing infrastructure meet new needs – for example, retrofit of existing auto-oriented arterial streets to become ‘complete streets’ for all modes of travel; and
- Expansions of service areas (if needed) would focus first on locations where some services already exists; or on locations where such an expansion appears to be very cost-effective – generating its own high return on investment.

In this scenario, most of the future jobs and residents would be located within existing services areas. As a result, little new development would be expected in areas that are currently unincorporated or outside an existing utility service area.

This scenario is similar to the 2005 ‘Infill’ scenario.
Diverse, Distinct Communities

This scenario creates a region with different sorts of communities and centers, built on the traditional character of regional communities but designed to meet the needs of the region’s future markets. Instead of focusing on quantities (of new population or of facility capacity), it focuses on qualities—the features, places and experiences that make one community stand out from another and that encourage residents to develop strong and lasting ties to their own community. The digital image in Exhibit 5.8 illustrates how one workshop group envisions diverse, distinct communities.

This scenario combines some aspects of other scenarios with a different approach to the regional form. Key concepts include:

- Support for reinvestment and development in downtown Dallas and downtown Fort Worth as the centers for the entire region;
- Support for revitalization and investment in the downtowns of other communities around the region, both large and small, providing regional support for the efforts many of these communities have underway;
- By strengthening these traditional centers, create places with a mix of uses and more intense development, but in locations that reinforce community history and character;
- Develop additional centers in locations near transit stations, major employment centers and other major regional destinations;
- Use of parks and natural areas to create buffers that separate one outlying community from another, helping them to maintain distinct boundaries; and
- Ensure that the region as a whole provides neighborhoods and communities that match the market demands anticipated in the future.

The investment framework associated with this scenario would include:
An emphasis on mobility choices such as walking and biking in downtowns and new centers around the region;

An emphasis on mobility choices between these centers, including trails/paths, public transportation (bus, streetcar, light rail and commuter rail) and routes for travel by car;

Use of natural areas to differentiate communities as they grow;

Provision of urban levels of service in existing communities and focused on their downtowns;

Extension of urban services and facilities to new areas, but to centers where this infrastructure can be clustered efficiently rather than to large areas of low intensity development; and

The potential for outlying communities to include economic growth related to alternative energy generation from wind or solar sources.

This scenario also provides for the same level of population and job growth as the ‘business as usual scenario’. This scenario would involve growth in outlying parts of the region. Unlike the ‘business as usual’ scenario, this growth would be focused around existing downtowns and town centers and would occur with a mix of uses and at moderate development intensities.

This scenario is similar to the 2005 ‘Polycentric’ scenario.

Green Region
Vision North Texas began a ‘greenprinting’ process with the first of the four subregional workshops. Greenprinting is a process that uses geographic information systems (GIS) to assemble demographic and geographic data; this information is then combined with stakeholder input to develop a set of shared open space priorities within the context of regional growth and development. A set of greenprint goals has been developed and confirmed through the input of stakeholders at each of the four workshops. Many of the workshop groups emphasized green development or natural assets as the foundation for future regional growth. This scenario reflects these ideas. It includes:

An initial identification of natural assets and open spaces that create a ‘green infrastructure’ for the region and that should be protected or enhanced;

Support for development in communities where residents can enjoy the green assets envisioned by Vision North Texas stakeholders;

An emphasis on the inclusion of natural areas in the development pattern in all parts of the region;

The use of tools such as the transfer of development rights (TDR) to protect natural areas while enabling property owners to benefit from previously-approved development intensity;

Provision for new jobs and neighborhood areas that can benefit from these green assets;

Support for green jobs – economic development based on the area’s natural assets, continuing agricultural uses and eco-tourism; and

An emphasis on reducing the region’s carbon footprint even as its population and job base expand.

The investment framework associated with this scenario would include:

An initial design of green infrastructure to serve the region’s needs for parks and trail connections and for storm water management and other needs;

A strong emphasis on networks for non-auto mobility options;
The use of alternative energy sources, LEED building and conservation to reduce the region’s energy consumption needs;

An emphasis on water conservation and demand reduction above current levels as a strategy to meet the region’s needs; and

A greater emphasis on public infrastructure design, materials and locations that reduce the region’s carbon footprint.

This scenario also provides for the same level of population and job growth as the ‘business as usual scenario’. While much of the region’s development might occur within the existing urban fabric, some development of free-standing ‘green communities’ will occur in outlying areas as well. Exhibit 5.9 depicts one group’s desire to consider environmental features as the framework to the planning process.

Refinement of Possible Scenarios

These possible scenarios for the region’s future will be presented to stakeholders at four subregional update sessions in November 2008. At each session, participants will be asked whether this set of scenarios provides a reasonable range of possibilities for study. Their input will be received through general discussion and through the use of electronic keypad polling. The input of these stakeholders may modify this set of possible scenarios.

A Regional Summit will be held on December 9, 2008. At this session, participants will consider this set of possible alternative scenarios and the input received from stakeholders at the subregional update sessions. Discussion at this summit will guide the Vision North Texas advisors and Management Committee as they finalize a set of scenarios to study.

Evaluation of Possible Scenarios

During the first half of 2009, the selected set of possible scenarios for North Texas will be evaluated. In June, the “North Texas Alternative Futures” report will present the results of this evaluation. A set of evaluation measures will give an assessment of how well each scenario fits the visions described by regional stakeholders. Key measures or indicators to be used in this evaluation may include:

- The distribution of population and employment within the region
- Development within downtown areas
- Share of population and employment in communities of various form type (center city, inner tier, outer tier, separate communities)
- Proximity of jobs and housing
- Mix of single family and multi-family development
| Area                                      | Cost of investment framework | Average vehicle trip length | Rail transit boardings | Non-rail transit boardings | Vehicle miles traveled | Vehicle hours traveled | Vehicle hours of delay (due to congestion) | Lane miles needed | Roadway pavement area needed | Share of trips by non-motorized means | Nitrogen oxide (NOx) emissions | Volatile organic compound (VOC) emissions | Carbon footprint | Area in urban use | Proximity of neighborhoods to open space & natural resources | Energy consumption | Share of energy from renewable sources | Amount of benefit provided to the region by the urban forest | Water supply and availability | Water demand | Housing stock diversity | How well the housing supply matches the demands of the anticipated market | Housing affordability and condition | Jobs-housing balance | Share of development served by existing infrastructure | Safety from flooding and other hazards | Amount of impervious cover in the region | Protection of open spaces and other natural assets | Retention of agricultural lands in agriculture or related uses | Habitat diversity | Benefits to the region from the urban forest | Use of natural systems for storm water management | Preservation of historic places and community landmarks | Sustainability | Water quality in streams and lakes | Impact on obesity | Reduced number of people with asthma | Impact on other public health issues | Diversity of the region’s economy | Increase in net business formation | Increase in per capita income | Decrease in violent crime | Decrease in property crime | High school graduation rate | College-readiness of high school graduates | Match between skills needed by employers and those available in the regional labor force. |
The stakeholders of North Texas have clearly indicated that they do not want the region to follow a ‘business as usual’ approach to its future. At each workshop, participants have expressed strong support for using a ‘preferred regional scenario’ as the basis for regional investments in infrastructure. This “Regional Choices” report provides the information and analysis to begin creating such a scenario.

Subregional update sessions are scheduled for November 2008. These sessions are intended to share the results of Vision North Texas workshops and research with participants. They will also seek further input on the set of possible scenarios for analysis and on the most important issues to study when comparing these scenarios. They will begin to identify the action tools that are most important to the region’s decision-makers and investors. After these subregional update sessions, the Regional Summit in December 2008 will focus this discussion and will recommend scenarios and action tools that will be evaluated and detailed in early 2009.

The questions in this chapter will be explored with stakeholders and regional leaders at the subregional update sessions and the Regional Summit, as well as through online communications. All interested people and organizations are invited to contribute their ideas, concerns, suggestions and other comments.

Results of Research

1) What is most notable to you about:
   a) The people of North Texas today?
   b) The North Texas development pattern?
   c) North Texas natural assets?
   d) Water and energy consumption in North Texas?
   e) Public facilities in North Texas (for transportation, education, health care, etc.)?
   f) The character of North Texas communities?
   g) The economic characteristics of North Texas?

2) What features of North Texas today:
   a) Will have the biggest impact (positive or negative) on the region’s future?
   b) What features are most important to keep and build on?
   c) What features should the region seek to change?

3) Do you have other research you can share with Vision North Texas?
Results of Subregional Workshops

4) How well do the groups’ ideas reflect your views about the issues North Texas must address?

5) Which ‘headlines’ do you find most notable? Why?

6) What regional growth concepts created by the workshop groups do you think are most valuable to the region’s future?

Priority Issues for North Texas

7) What opportunities should North Texas seize as it looks ahead to 2030 and 2050?

8) What challenges must North Texas address in preparing for 2030 and 2050?

9) What role should sustainability play in shaping the future of North Texas?

10) Which land conservation issue is most important to North Texas’ future:

   a) Storm water and flooding?
   b) Green spaces in or near neighborhoods?
   c) Recreation?
   d) Water quality and quantity in rivers, lakes and streams?
   e) Habitat and natural areas?
   f) Scenic views and vistas?
   g) Historic and cultural resources?
   h) Agricultural lands?
   i) Connected trail systems?
   j) Some other issue?

11) Should the region set its regional investment priorities based on a preferred regional scenario?

Scenarios

12) How well does this set of possible scenarios represent a realistic range of possibilities for North Texas’ future?

13) What aspects are most appealing to you about:

   a) Business as Usual?
   b) Connected Centers?
   c) Return on Investment?
   d) Diverse, Distinct Communities?
   e) Green Region?

14) What aspects are least appealing to you about:

   a) Business as Usual?
   b) Connected Centers?
   c) Return on Investment?
   d) Diverse, Distinct Communities?
   e) Green Region?

15) Should any of these scenarios be dropped from evaluation?

16) Is there another scenario that should be evaluated?
Performance Measures

17) In deciding on a preferred scenario for the future of North Texas, how important is it to you that the scenario:

a) Balances jobs and housing in local communities
b) Supports revitalization of existing downtowns and neighborhoods
c) Enables residents to walk or bike to jobs & shopping
d) Provides affordable housing
e) Locates new jobs & housing where public infrastructure is currently available
f) Is served economically by public infrastructure
g) Minimizes traffic congestion
h) Locates new homes & jobs near rail
i) Improves air quality
j) Reduces flooding potential
k) Protects water quality in streams & lakes
l) Conserves the region’s water supply
m) Retains open space & agricultural land
n) Reduces the region’s greenhouse gas emissions
o) Conserves energy

Action Items

A vision for the future does not affect change unless there are actions taken to make it a reality. As Vision North Texas studies the set of possible scenarios, it will also begin identifying the most important action items that should be part of the North Texas 2050 Action Package.

18) Incentives (such as Sustainable Communities grants, buyback programs for energy-wasting appliances, density bonuses, tax abatements, tax increment financing districts, other financial incentives)

a) How important are incentives as part of the action package?
b) Which incentives are most essential to a successful, sustainable region?
c) What performance measures should be used to monitor the results from the use of incentives?
d) What existing incentives could be realigned so they will support a new regional vision?

19) “Best Practices” (specific examples of the application of these concepts to actual communities and projects)

a) How important are ‘best practices’ as part of the action package?
b) Should North Texas create an online site for sharing information on best practices identified by their owners or supporters?
c) Should North Texas document and analyze examples of best practices to provide an objective comparison of project results?
d) Should North Texas provide additional recognition for those best practices that show clear and documented results?
20) Model action tools (such as model ordinances for walkable communities or standard tools for calculating solar energy potential on a building roof)
   a) How important are model action tools as part of the action package?
   b) Which topics or issues would benefit most from the sharing of models?
   c) What good examples or models can you share?
21) Technical assistance (training programs for business employees on green design, online directories for sustainable local products, volunteer training and coordination)
   a) How important is technical assistance as part of the action package?
   b) Which topics or issues would benefit most from technical assistance?
   c) What technical expertise can you share?
22) Indicators & milestones to measure progress
   a) How important are indicators that measure progress toward a 2050 vision?
   b) What performance measures are the most important indicators for North Texas?
   c) Should there be an annual 'state of the region' report to communicate about progress?
   d) Should there be a periodic major review of progress every 5 years or so?
23) Consideration of new/modified institutions or structures (such as a regional revenue-sharing system, creation of a non-profit to underwrite sustainable features in affordable homes, or a regional carbon credit bank)
   a) How important is a change in institutions/structures to achieve a new regional vision?
   b) What changes in existing institutions/structures should be considered as part of action package?
   c) Which topics or issues would benefit most from a change in these institutions/structures?
24) Are there other items that should be included in the action package?

Other Issues

25) Are you willing to stay involved in creating North Texas 2050?
26) Are you willing to help implement a North Texas 2050 vision for the region?
27) Do you have other comments or suggestions for Vision North Texas?
28) Please provide your contact information to Vision North Texas at www.visionnorthtexas.org if you would like to be contacted about these comments or other aspects of Vision North Texas.
Appendix 1: Vision North Texas Advisors

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Maguire Partners and ULI

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City of Crandall

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Tarrant County Coalition for Environmental Awareness

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The Trust for Public Land

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City of Denton

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Urban Land Institute

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Fernando Costa
City of Fort Worth

Peter Coughlin
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Melissa Dailey
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Bruce Davis
Fort Worth National Bank

Bob Day

Jyl DeHaven
Arbiter Group

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North Central Texas Council of Governments

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Texas Instruments, Inc.

Jeffrey Hanson
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Arboricultural Services Tree Care Experts

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Dallas Regional Chamber

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Linda Koop
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Town of Addison

Libby Willis
Oakhurst Neighborhood Association

Jerry Wimpee
Rockwall County

Matthew Young
Henry S. Miller Commercial & ULI Young Leaders
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## Appendix 3: North Texas Cities, By Community Form Type

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<th>Outer Tier Communities</th>
<th>Separate Communities</th>
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Appendix 4: Exhibit Listing

Exhibit, Title, and Source

1.1 North Texas Region, North Central Texas Council of Governments (NCTCOG)

1.2 Race and Ethnicity of North Texas Residents, 2008, Woods & Poole Economics, Inc. Washington, D.C. Copyright 2007. Woods & Poole does not guarantee the accuracy of this data. The use of this data and the conclusion drawn from it are solely the responsibility of NCTCOG.

1.3 Live Life Linked, Vision North Texas

1.4 North Texas 2050 Scenario Summary, Vision North Texas

1.5 Connected Centers Scenario, Vision North Texas

3.1 Geographies of the North Central Texas Region, NCTCOG; Office of Management and Budget

3.2 North Texas Population 1900–2000, U.S. Census Bureau

3.3 North Texas Population by Gender and Age, 2008, Woods & Poole Economics, Inc. Washington, D.C. Copyright 2007. Woods & Poole does not guarantee the accuracy of this data. The use of this data and the conclusion drawn from it are solely the responsibility of NCTCOG.

3.4 North Texas Population by Gender and Race, 2008, Woods & Poole Economics, Inc. Washington, D.C. Copyright 2007. Woods & Poole does not guarantee the accuracy of this data. The use of this data and the conclusion drawn from it are solely the responsibility of NCTCOG.

3.5 The Ten Most Populous Metropolitan Statistical Areas, U.S. Census Bureau, CBSA-EST2007


3.7 Characteristics of Households for Selected MSAs, 2007, U.S. Census Bureau, 2007 American Community Survey

3.8 Households and Income for Selected Texas MSAs, 2007, U.S. Census Bureau, 2007 American Community Survey

3.9 2008 Woods & Poole Wealth Index, 2008, Woods & Poole Economics, Inc. Washington, D.C. Copyright 2007. Woods & Poole does not guarantee the accuracy of this data. The use of this data and the conclusion drawn from it are solely the responsibility of NCTCOG.

3.10 Educational Attainment in U.S. Metropolitan Areas, 2007, U.S. Census Bureau, 2007 American Community Survey


3.13 Share of Population by Race/Ethnicity for North Central Texas Counties, 2008, Woods & Poole Economics, Inc. Washington, D.C. Copyright 2007. Woods & Poole does not guarantee the accuracy of this data. The use of this data and the conclusion drawn from it are solely the responsibility of NCTCOG.


3.15 Age and Educational Attainment by County, 2007, U.S. Census Bureau, 2007 American Community Survey

3.16 Income and Poverty by County, 2007, U.S. Census Bureau, 2007 American Community Survey

3.17 North Texas Communities, by Community Type, Vision North Texas


3.19 Male and Female Population by Community Type, 2000, U.S. Census Bureau, Census 2000, SF1

3.20 Population by Age by Community Type, 2000, U.S. Census Bureau, Census 2000, SF1

3.21 Race/Ethnicity by Community Type, 2000, U.S. Census Bureau, Census 2000, SF1

3.22 Household Composition by Community Type, U.S. Census Bureau, Census 2000, SF1

3.23 Community Growth Over Time, U.S. Department of Commerce, Bureau of the Census; NCTCOG


3.25 Developed Land By County, 2001, Multi-Resolution Land Characteristics Consortium, 2001 NLCD

3.26 Percentage Developed Land By City, 2005, Development: NLCD 2001, City limits: NCTCOG 2005

3.27 Land Use by County, 2005 (thousands of acres), NCTCOG 2005 Land Use database

3.28 Generalized Land Use Pattern, 2005, NCTCOG 2005 Land Use database

3.29 Vacant & Agricultural Uses as a Percentage of County Land, 2005, NCTCOG 2005 Land Use database
3.67 **Texas Education Agency Regions in North Texas**, Texas Education Agency  
3.69 **Higher Education Facilities in North Central Texas, 2008**, NCTCOG, Development Monitoring Program; Activity Centers database; Features database  
3.70 **Five Largest North Central Texas Universities, 2008**, NCTCOG, Development Monitoring database; the Universities  
3.71 **Existing and Planned Hospital Facilities in North Central Texas, 2008**, NCTCOG, Development Monitoring Program; Activity Centers database; Features database  
3.72 **Major North Central Texas Landmarks, 2008**, NCTCOG, Development Monitoring Program; Activity Centers database; Features database  
3.73 **Major North Texas Parks**, USDA - Forest Service, NCTCOG and numerous cities across the region  
3.74 **North Central Texas Employment by Sector, 2007**, Texas Workforce Commission  
4.1 **2030 Population Projections for North Texas (millions of people)**, NCTCOG, Texas State Data Center, Texas Water Development Board  
4.2 **Share of Population Growth by Race/Ethnicity**, Woods & Poole Economics, Inc. Washington, D.C. Copyright 2007. Woods & Poole does not guarantee the accuracy of this data. The use of this data and the conclusion drawn from it are solely the responsibility of NCTCOG.  
4.3 **Projected 2030 Population By Age and Gender**, Woods & Poole Economics, Inc. Washington, D.C. Copyright 2007. Woods & Poole does not guarantee the accuracy of this data. The use of this data and the conclusion drawn from it are solely the responsibility of NCTCOG.  
4.4 **Change in Woods & Poole Wealth Index, 2008 - 2030**, Woods & Poole Economics, Inc. Washington, D.C. Copyright 2007. Woods & Poole does not guarantee the accuracy of this data. The use of this data and the conclusion drawn from it are solely the responsibility of NCTCOG.  
4.5 **Forecast Residential Development Pattern, 2030**, NCTCOG, 2030 Demographic Forecast  
4.6 **Forecast Non-Residential Development Pattern, 2030**, NCTCOG, 2030 Demographic Forecast  
4.7 **Unincorporated Residential Subdivisions**, NCTCOG, Residential Strategies, Inc.  
4.8 **Water Supply and Demand, 2010 - 2060**, Texas Water Development Board, 2007 Texas Water Plan  
4.9 **Water Use by Type, 16 County Region**, Texas Water Development Board, 2007 Texas Water Plan  
4.10 **Funded 2030 Roadway Recommendations**, NCTCOG, Transportation Department  
4.11 **2030 Passenger Rail Recommendations**, NCTCOG, Transportation Department  
4.12 **Transportation Congestion, 2030**, NCTCOG, Transportation Department  
4.13 **Identified Transportation Funding Needs**, NCTCOG, Transportation Department  
5.2 **Comprehensive Plans Analyzed**, NCTCOG, Environment and Development Department  
5.3 **CLIDE Award Winners**, Center of Development Excellence (NCTCOG)  
5.4 **Population and Jobs in Phase 1 Scenarios**, Vision North Texas  
5.5 **North Texas 2050 Scenario Summary**, Vision North Texas  
5.6 **Subregional Workshop Results: Example of Connected Centers Scenario**, Vision North Texas  
5.7 **Subregional Workshop Results: Example of Return on Investment Scenario**, Vision North Texas  
5.8 **Subregional Workshop Results: Example of Diverse, Distinct Communities Scenario**, Vision North Texas  
5.9 **Subregional Workshop Results: Example of Green Region Scenario**, Vision North Texas
Appendix 5: Bibliography

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