Transportation

Introduction

This transportation chapter identifies how Tulsa's transportation building blocks will provide mobility choices to a broader group of users, diversify the economy, and aid in building a sustainable community. Implementing these transportation building blocks in Tulsa involves the introduction of some familiar transportation components as well as some new components.

The chapter goes into detail regarding the tools, or components, needed to implement the transportation building blocks. The main enhancement areas of the transportation chapter are:

- **Street System Enhancements**
- **Transit System Enhancements**
- **Pedestrian Enhancements**
- **Bicycle Enhancements**

Each of the enhancement sections contains its respective current use, future use, specific tools, and the plan priorities.

Chapter Contents

Transportation

Part I: Tulsa's Transportation Vision and Challenges

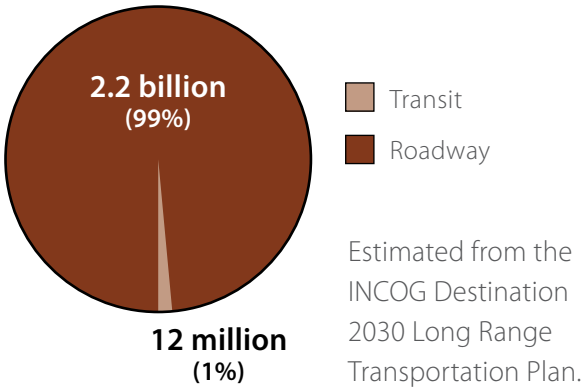
Our Vision for Tulsa places an emphasis on coordinating transportation facilities' design with the land uses they serve, so Tulsans have a wide range of transportation options. Like many American cities, Tulsa's transportation system has historically been oriented to support automobile-oriented land uses. While it is likely that cars will continue to play a big role in how Tulsans get around town, the public input process found significant support for expanding the range of transportation options.

Unlike land use policies that guide the development of private property, transportation policies primarily address the public infrastructure of streets, alleys, bikeways, sidewalks, and transit services. Additionally, transportation policies influence how private development affects the transportation system both directly- via physical improvements (e.g. management of auto access across city rights-of-way, or the construction of streets as part of new development) as well as indirectly- through programs that reduce travel demand and encourage alternatives to the automobile.

Changing Tulsa's Approach

Expanding the range of transportation options will require a different approach than the traditional, auto-oriented facility planning and design strategies that primarily focus on automobile capacity and alleviating traffic congestion. Much of Tulsa's 1,217 lane miles of arterial streets and 465 lane miles of expressways were built with this traditional approach to programming transportation improvements. While the strategy has succeeded in providing Tulsans with a broad and generally uncongested road network, it has also produced few alternatives to the automobile. Roads that have many wide lanes, large intersections, and a relatively few pedestrian amenities (i.e. wide sidewalks, medians with trees, parallel parking, and short intersection crossings) are not conducive to walking, biking, or transit.

Chart 1: Capital Costs of Roadway and Transit



Estimated from the INCOG Destination 2030 Long Range Transportation Plan.

Furthermore, Tulsa's road-building legacy has proven to be fiscally unsustainable. In 2007, Tulsa's Complete Our Streets Advisory Council determined that approximately $1.1 billion dollars were needed to repair and maintain the city's streets over the next decade. That figure did not include new roadway construction, the widening of arterial streets and planned improvements to major intersections. Those additional capital projects – estimated to cost at least $500 million – will also impose their own maintenance costs.

The Complete Our Streets Advisory Council also found that Tulsa's revenues have not kept pace with the cost of maintaining infrastructure. One of the

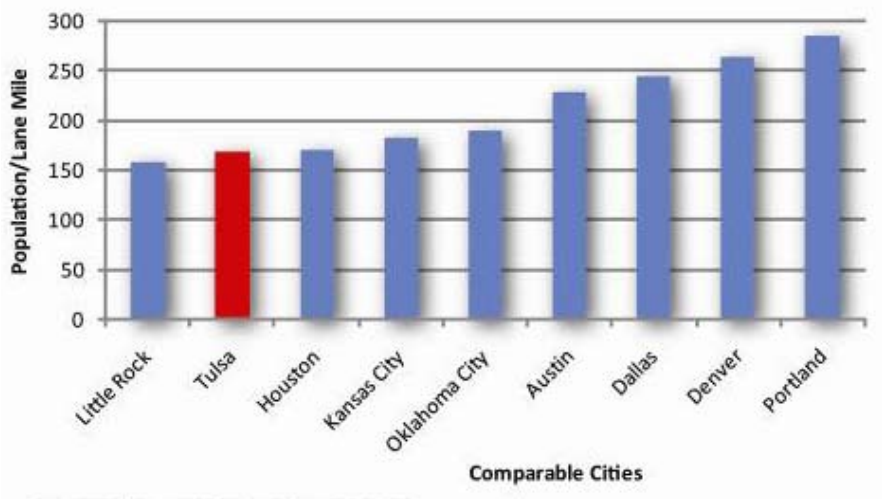
Advisory Council's recommendations was to find ways to increase sales-tax revenue through land development to help offset the cost of transportation infrastructure. Transportation policy will play a key role in this strategy. Better designed streets that provide an attractive and walkable environment enable land uses to be more productive. Visitors who arrive by foot, bike, or transit can reduce the need for on-site parking, thus increasing the amount available for businesses or housing. Wide sidewalks with street trees provide an environment for businesses that depend on foot traffic. An approach to transportation design that takes into account these factors will contribute significantly to Tulsa's fiscal health. Chart 2, below, illustrates one measure of how Tulsa compares to peer cities and depends on fewer residents to support more lane miles of roadway.

Another factor that will affect Tulsa is the changing nature of Federal transportation funding priorities. Like many cities and regions, Tulsa has relied on Federal funding to address many of its transportation needs. Federal funding is transitioning away from a formula based system that awarded funding to localities to increase vehicular capacity and serve transit dependant populations. The new approach is a proposal-based system that awards funding to enhance walking, biking, and transit facilities, in an effort to improve the livability of communities.

The principles that guide these new funding criteria, as laid out by the U.S. Department of Transportation, U.S. Environmental Protection Agency and U.S. Department of Housing, are:

1. Providing more transportation choices;
2. Expanding access to affordable housing, particularly housing located close to transit;
3. Enhancing economic competitiveness-–giving people access to jobs, education and services as well as giving businesses access to markets;
4. Targeting federal funds toward existing communities to spur revitalization and protect rural landscapes;
5. Increasing collaboration among federal, state, and local governments to better target investments and improve accountability;
6. Valuing the unique qualities of all communities--whether urban, suburban, or rural.

Chart 2: Tulsa Population Per Lane Mile



Source: Federal Highway Administration, Highway Statistics 2003

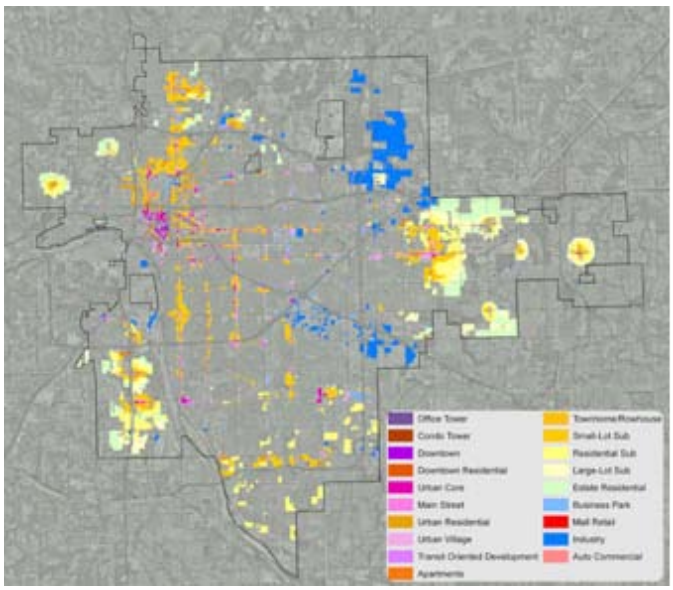
Transportation officials in Tulsa have done an admirable job attracting and securing Federal transportation dollars in the past. For this to continue, Tulsa must begin to reform its transportation decision making process to address these new livability principles. The City of Tulsa, Indian Nations Council of Governments (INCOG), Metropolitan Tulsa Transit Authority (MTTA) and programs of the Oklahoma Department of Transportation (ODOT) will need to be more deliberate in coordinating housing, transportation and environmental planning for the region to be successful in qualifying for future federal dollars.

Scenario Planning and Tulsa 2030 Goal

As explained in greater detail in the Land Use chapter, the PLANiTULSA planning process used a scenario-based approach to test different growth and transportation practices and policies. Scenario planning provides a way to evaluate growth patterns, infrastructure investments, and their impact on system performance. The PLANiTULSA team created four initial growth and transportation scenarios based on past trends and public input. These were primarily "learning scenarios", meant to test a variety of growth impacts, from the amount of land consumed by new development to the density of neighborhoods and job centers, and performance of the transportation system. Tulsans were invited to review, rank, and provide input on what they liked and disliked about each scenario.

The survey results indicated a strong preference for the two scenarios that focused growth on downtown (Scenario D) and in new communities (Scenario C). Based on this public and work with city staff, INCOG, and other stakeholders, these two scenarios were used to design the preferred Tulsa 2030 Goal, depicted in Figure 1, which will serve as a monitoring and performance guide for the comprehensive plan.

Figure 1: Tulsa 2030 Goal; Blend of Scenarios C and D Transportation Systems



Compared with the Trends Continue scenario, that was built to project Tulsa's current trends, Tulsa 2030 Goal would result in significant expansion of transportation options and a sustainable system in fiscal and livability terms.

Tulsa 2030 Goal would result in about three times as many new people living in Tulsa, when compared to the Trends Continue. This influx of new residents and businesses poses a challenge to the transportation system. Since much of the city's street and highway system is already built-out, new traffic lanes will not be feasible to facilitate the growth projections in all areas of the city.

Fortunately, Tulsa has a well connected, gridded street network that possesses the elements needed to transform into a high performance, multi-modal transportation system. Part III of this chapter details how existing streets can become multi-modal by dedicating lanes for high speed high frequency transit, adding bicycle facilities or providing on-street parking that will enable patrons to park once and walk amongst various

destinations. The PLANiTULSA team tested these types of investments to assure Tulsa has an effective and durable transportation system that works for today's users while fostering a future system that is sustainable and offers more travel options.

Using future population and employment estimates from the Tulsa 2030 Goal, one can model the transportation system and plan for future infrastructure needs. In Tulsa, the best model for performing this analysis is INCOG's Travel Demand Model. It was developed to evaluate transportation projects for the entire Tulsa Region and includes a current year road network and demographics (2005) as well as a forecast year (2030) road network and demographic factors.

The INCOG model uses specific "mode choice" algorithms to convert person-trips to vehicle-trips. The PLANiTULSA team expanded that process to estimate how people would react to new walkable land use forms and an expanded transit and multi-modal system. To accomplish this we employ a process called the elasticity method for measuring the impact of the 5Ds, (Density, Diversity, Design, Destinations, Distance). This process allows for additional refinement during the "mode choice" step to estimate transit and mixed-use trip capture.

The model identifies a number of indicators that can be used to evaluate the performance and efficiency of different scenarios. The following section summarizes the major indicators derived from the transportation model and illustrate how diversifying transportation investments will help implement *Our Vision for Tulsa*.

Tulsa 2030 Goal Indicators and Analysis

The analysis began with researching the benefits of Tulsa 2030 Goal, which uses a strategy of reducing the amount of additional roadway lane miles and increases housing and employment densities in strategic corridors and around transit stations.

One of the two fundamental transportation indicators are vehicle miles traveled (VMT) and vehicle hours traveled (VHT). The first measures how many total miles are driven in a given period, the second measures how much time is spent driving. Table 1 reports per-capita VMT and VHT. Under the Trends Continue scenario, the average Tulsan in 2030 will drive 40 miles per day, and spend 56 minutes in the car. By contrast, in the Tulsa 2030 Goal scenario, Tulsans will drive 25% fewer miles and spend 29% less time en route to where they're going. Though Tulsa's congestion is not projected to be severe, the amount of time lost to traffic congestion (Minutes of Delay) declines by 36% under Tulsa Goal 2030.

Table 1: Travel Indicators *(per capita)*

	Trends Continue	Tulsa 2030 Goal	Change
VMT (miles)	40	30	-25%
VHT (minutes)	56	41	-29%
Minutes of Delay	7.2	4.6	-36%

Source: Kimley-Horn and Associates, Inc.

Table 2: Jobs and Housing Near Transit

	Trends Continue	Tulsa 2030 Goal
Housing Units within 1/2 Mile of Transit	8,418	26,567
Jobs within 1/2 Mile of Transit	14,732	33,202

Source: Fregonese Associates

One of the key drivers of this improvement would be the location of more total homes and jobs near transit, both in new communities and from improved service to existing neighborhoods (Table 2). The PLANiTULSA public input process indicated a desire for greater transit options, both through the workshop process and the scenario survey.

As a result, transit ridership could increase by 600% percent over the next 25 years if the land use and transportation policies upon which Tulsa 2030 Goal is based are implemented (Chart 3).

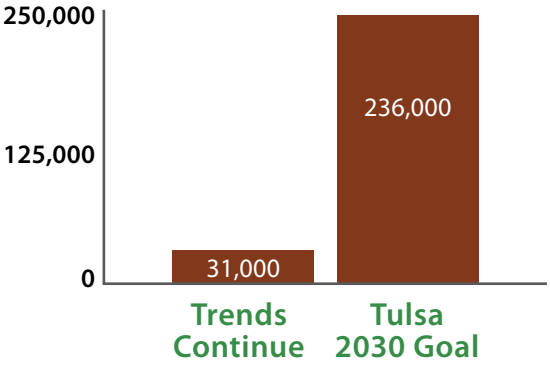
This growth in transit ridership would result in a positive change to mode split in Tulsa. Mode split, is a transportation term that describes the percentage of travelers using a particular type of transportation (i.e. automobile, walking, biking, or transit). The term is often used when analyzing the sustainability of transport within a city or region. Although there is no national standard for mode split, it is generally agreed that a 10% alternative mode is sustainable. The Tulsa 2030 Goal projects a 7% transit and 9% walk/bike mode share for the city, which is substantially better than the generally agreed upon measure (Chart 4).

This future mode share is a product of an expanded transit system and new development centers that are mixed-use, dense and walkable. The doubling of walking and biking trips is a product of expanded pedestrian and bicycling facilities in the form of multi-modal streets and easily accessible mixed-use centers that enable patrons to walk or bike amongst various destinations. This system does not only benefit these new centers in the city, it also improves the travel conditions of the entire region.

Regionally, Tulsa 2030 Goal would shift approximately 300,000 of the 3,200,000 vehicle trips that are made daily in the Tulsa region to walk or bike trips. Shifting these trips means there is greater roadway capacity available for freight, commuter and through-traffic trips on the region's system of arterials and expressways.

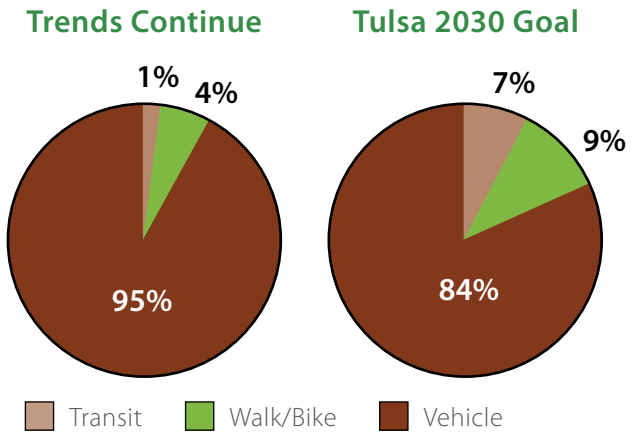
By shifting travel demand to other modes, Tulsa could reduce the need to expand road capacity. The difference in total new lane miles is not substantial; however, the number of lane miles per 1,000 new residents is dramatically lower for Tulsa 2030 Goal than under the Trends Continue scenario. In addition to a more efficient transportation system, the design

Chart 3: Total City and Regional Transit Ridership (unlinked trips per day)



Source: Kimley-Horn and Associates, Inc.

Chart 4: Mode Split (of trips per day)



Source: Kimley-Horn and Associates, Inc.

of the new streets under Tulsa 2030 Goal would support intense and fiscally productive land uses. The estimated net annual sales tax revenues to the city are substantially higher under Tulsa 2030 Goal than the Trends Continue scenario (Table 3). A further discussion of recommended street improvements is in Part III of this chapter.

The priorities under Tulsa 2030 Goal would also result in some savings in transportation expenditures for Tulsans. A better coordination of land use and transportation would provide more housing choices closer to employment and more transportation choices reduce the financial cost associated with commuting. Energy efficiency will become an increasingly important part of the nation's strategy to increase energy independence. Under Tulsa Goal 2030, the amount of fuel wasted annually will be dramatically lower - this does not take into account potential increases in fleet fuel efficiency (Table 5).

Tulsa 2030 Goal also will help decrease the harmful impact of transportation emissions on Tulsa's air quality. Even though the Tulsa region is currently in attainment of all National Ambient Air Quality Standards (NAAQS), it is more likely that under the Trends Continue scenario, the region could become a non-attainment area (i.e. being added to "the dirty air list").

In contrast, pursuing the Tulsa 2030 Goal would compliment Tulsa's local clean air efforts that are already in effect, such as the Green Traveler and Clean Cities Programs. Noxious Oxides (NoX), carbon Dioxide (CO2) and Volatile Organic Compounds (VOC) are the primary transportation related air pollutants. Tulsa 2030 Goal results in a reduction - both citywide and regionally - in these harmful pollutants when compared to the Trends Continue scenario (Tables 6 and 7).

The results of the PLANiTULSA planning process input, transportation modeling analysis, and the fiscal needs of the city all point toward a new direction for transportation investment in Tulsa.

Table 3: Lane Miles Added by Scenario

	Trends Continue	Tulsa 2030 Goal
Existing Lane Miles	1,777*	1,777*
Added Lane Miles	604	554
Total Lane Miles 2030	2,130	2,080
Added Lane Miles per 1,000 New Residents	21.1	5.4

Source: Existing City of Tulsa Public Works, 2030 Goal Kimley-Horn and Associates, Inc. from the INCOG Travel Demand Model

Table 4: Net Sales Tax Revenue (Annually)

	Trends Continue	Tulsa 2030 Goal	Change
Net Sales Tax Revenue	$16.6 million	$37.8 million	+135%

Source: Kimley-Horn and Associates, Inc.

Table 5: Fuel Wasted Due to Congestion (Annually)

	Trends Continue	Tulsa 2030 Goal	Change
Wasted Fuel (in gallons)	10,700,000	8,100,000	-24%

Source: Kimley-Horn and Associates, Inc.

Table 6: City Air Quality Indicators

	Trends Continue	Tulsa 2030 Goal	Change
NoX (tons)	9,837	8,691	-12%
CO2 (tons)	2,379,800	2,102,400	-12%
VOC (tons)	11,805	10,429	-12%

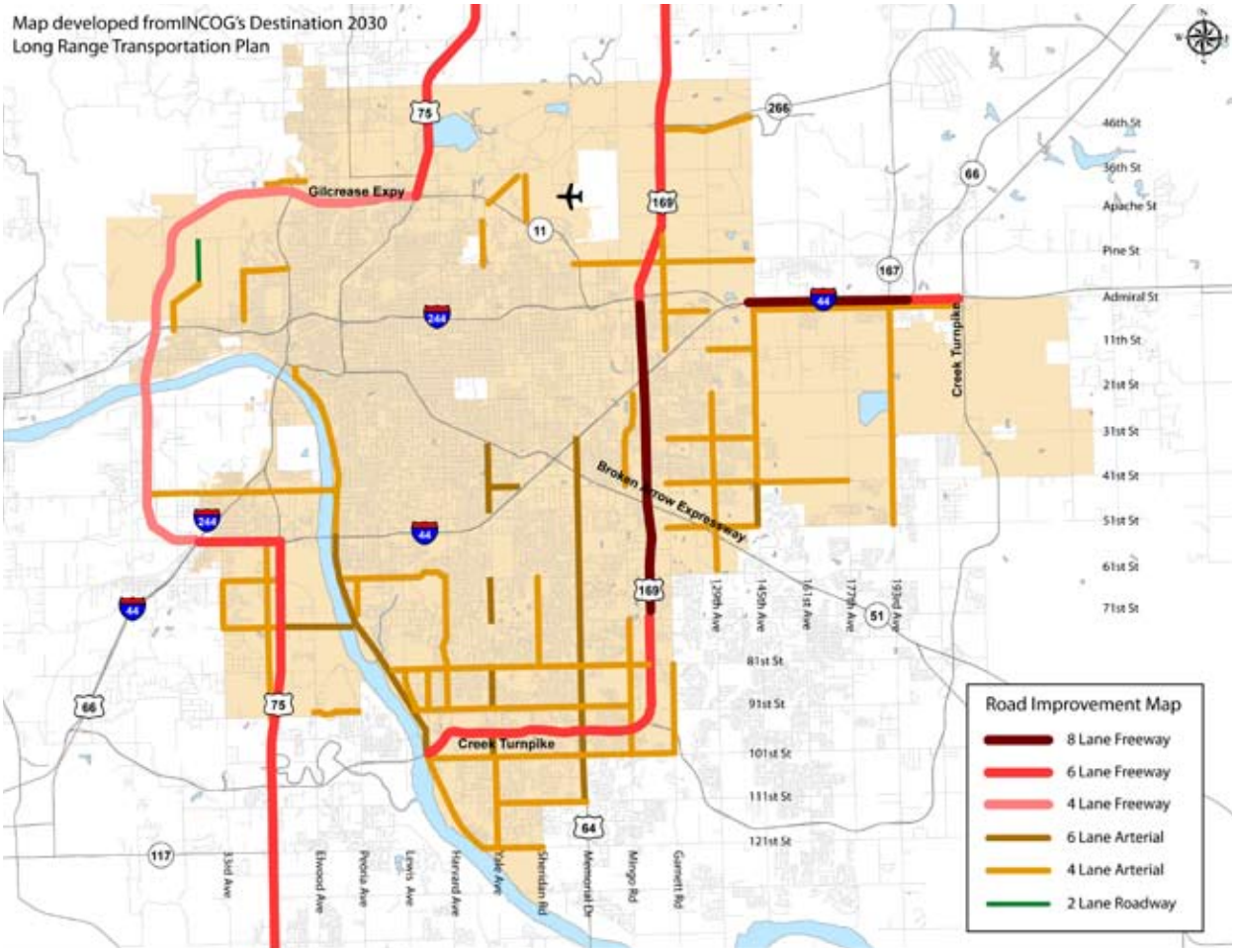
Source: Kimley-Horn and Associates, Inc.

Table 7: Regional Air Quality Indicators

	Trends Continue	Tulsa 2030 Goal	Change
NoX (tons)	18,347	15,390	-16%
CO2 (tons)	4,438,400	3,723,000	-16%
VOC (tons)	22,016	18,468	-16%

Source: Kimley-Horn and Associates, Inc.

Figure 2: Trends Continue Scenario Network



Source: Kimley-Horn and Associates, Inc.

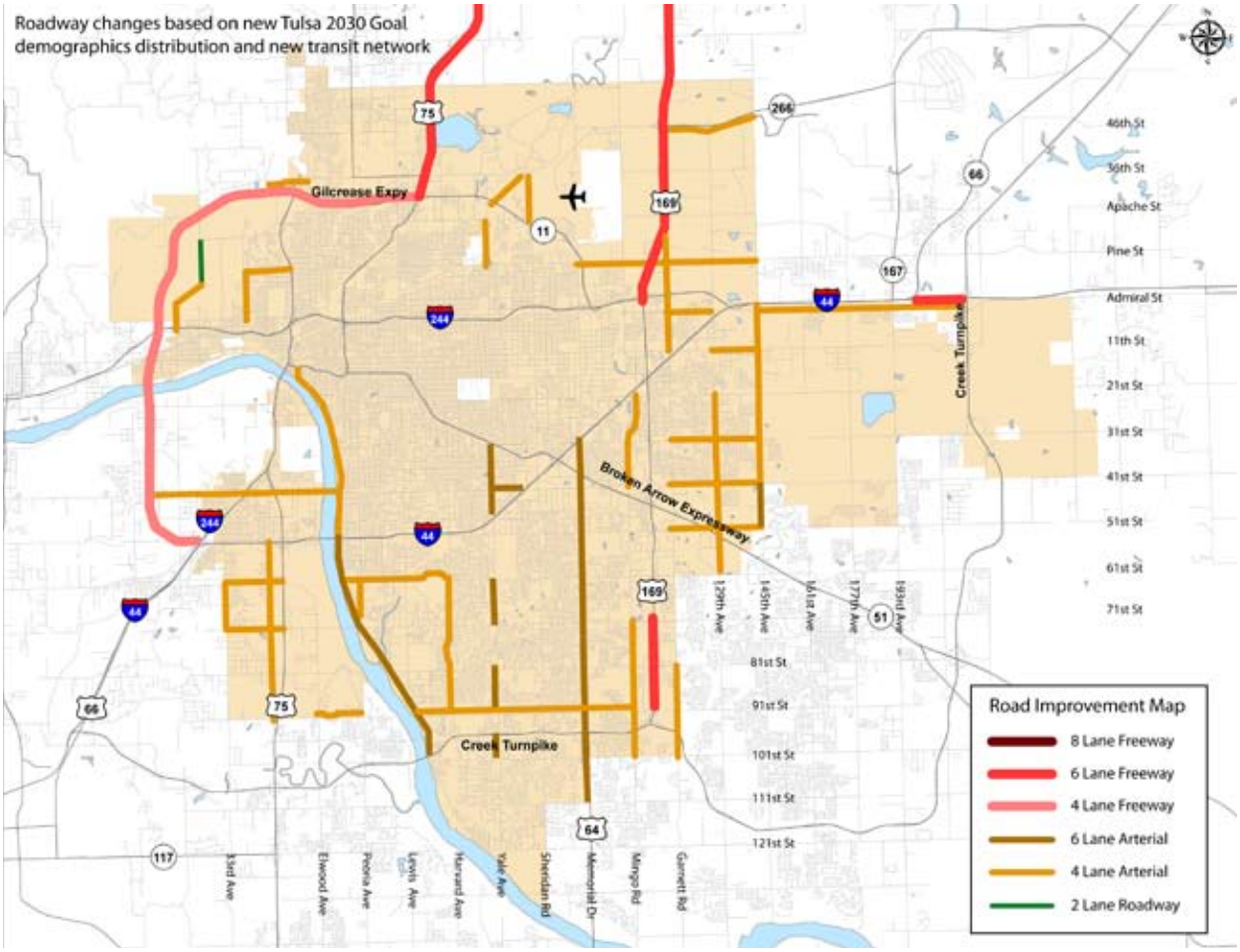
TRENDS CONTINUE SCENARIO NETWORK

Figure 2, Trends Continue Scenario Network represents the transportation system analyzed in the Trends Continue Scenario. It was based on the existing Tulsa City-County Major Street and Highway Plan, which emphasizes the widening of existing roads. This network reinforces the disaggregation of homes and employment, at great cost to the city's fiscal stability.

On the opposite page is Figure 3, the Tulsa 2030 Goal Recommended Network, which is also based on the street improvements in the Tulsa City-County Major Street and Highway Plan. However, these street improvements invest more selectively in roadway capacity in coordination with new residential and employment densities and improvements to transit service, walkability and bicycling facilities. The result is an expanded, but more multi-modal and fiscally sustainable network that better achieves Our Vision for Tulsa.

The projects in Table 8 2030 Goal Network Modifications should be considered as part of future transportation and transit planning activities. The adoption of the Tulsa 2030 Goal demographics and use of the Sustainable Network Initiative and Context Sensitive Streets process will provide transportation officials with the ability to program infrastructure improvements to complement sustainable land development patterns.

Figure 3: Tulsa 2030 Goal Recommended Network



Source: Kimley-Horn and Associates, Inc.

Table 8: Tulsa 2030 Goal Recommended Network Modifications

Road – Extent	**Currently Planned Improvement**	**Tulsa 2030 Goal Revised Improvement**
US 169 – From E 71st St. to IH 244	8 Lanes	**Remain 6 Lanes, High-Capacity Transit Implementation**
IH 44 – From East IH 244 Split to Hwy 66	8 Lanes	**Remain 6 Lanes, Demographic Redistribution**
US 75 – From IH 44 to south of Tulsa	6 Lanes	**Remain 4 Lanes, High-Capacity Transit Implementation**
Creek Turnpike – From Riverside Dr to US 169	6 Lanes	**Remain 4 Lanes, Demographic Redistribution**
71st St – From US 75 to Riverside Dr	6 Lanes	**Remain 4 Lanes, Demographic Redistribution**
193rd Ave – From IH 44 to 51st St	4 Lanes	**Remain 2 Lanes, Demographic Redistribution**
Yale Ave – From E 101st St to E 121st St	4 Lanes	**Remain 2 Lanes, Demographic Redistribution**
81st St – From Riverside Dr to US 169	4 Lanes	**Remain 2 Lanes, Demographic Redistribution**
101st St – From River Rd to Garnett Rd	4 Lanes	**Remain 2 Lanes, Demographic Redistribution**
River Rd – From Creek Turnpike to 121st St	4 Lanes	**Remain 2 Lanes, Demographic Redistribution**
121st St – From Yale Ave to Sheridan Rd	4 Lanes	**Remain 2 Lanes, Demographic Redistribution**
Lewis Ave – From 81st St to 91st St	4 Lanes	**Remain 2 Lanes, Demographic Redistribution**
Delaware Ave – From 81st St to 91st St	4 Lanes	**Remain 2 Lanes, Demographic Redistribution**

Source: Kimley-Horn and Associates, Inc.

Transportation

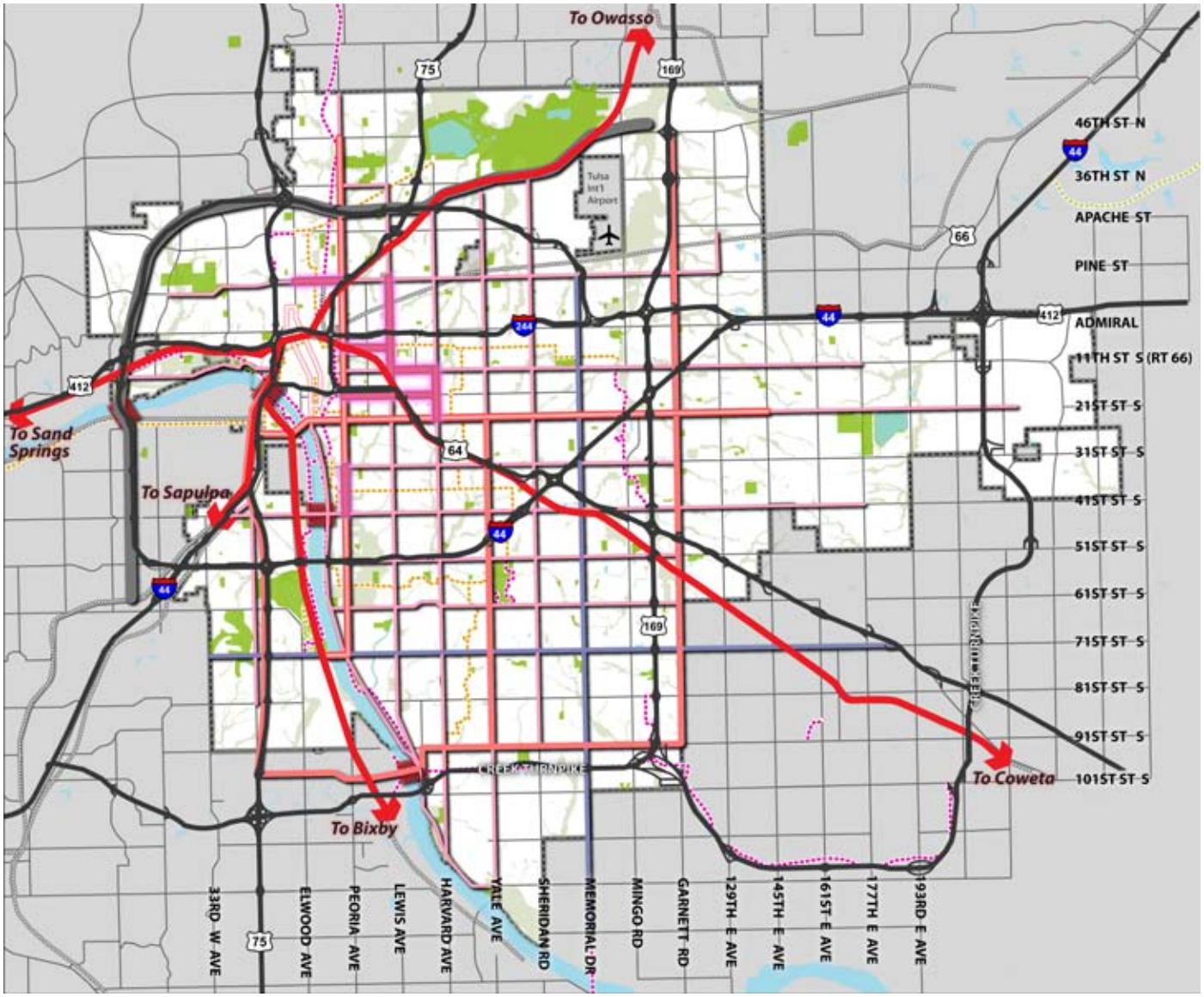
Part II:
The Route for Tulsa

Celeste Vaughtart

Our Vision for Tulsa envisions a more robust transportation system with a variety of options for getting around town and supports sustainable land development forms that aid in strengthening the economy. Fundamental to achieving this vision will be the reinvestment in Tulsa's existing network to increase connectivity, enhance pedestrian, biking, and transit spaces, and maintain mobility for commerce and freight. This plan focuses on two primary approaches to achieving these aims: enhancing the multi-modal quality of Tulsa's existing (and future) network, and expanding the transit system.

Getting more out of the existing street system, managing maintenance costs and enhancing transportation options will be achieved through a process that unites city planning agencies with the community and developers. This process is called Context Sensitive Solutions (CSS) and it will be a part of every small area planning effort. CSS is a collaborative, interdisciplinary approach that involves all stakeholders to develop a transportation facility that fits its physical setting and preserves scenic, aesthetic, historic and environmental resources, while maintaining safety and mobility for all users (bike, pedestrian, auto and transit).

Figure 4: Tulsa's Transportation Vision



Source: Kimley Horn Associates

TRANSPORTATION

- Rail Transit
- Streetcar
- Frequent Bus
- Bus Rapid Transit
- Main Street
- Commuter Corridor
- Multimodal Corridor
- Possible Multi-modal Bridge
- Freight Corridor
- Multi-use Trail
- Bicycle Trail
- Hiking Trail
- Existing/Planned Freeway
- Regional Parks
- Open Space

TRANSPORTATION VISION

The PLANiTULSA Transportation Vision illustrates the improvements to the street, transit, bicycle and pedestrian assets. The exact alignment and technology of transit investments may be refined during a formal alternatives analysis (AA).

Table 9: Transportation and Land Use Building Blocks

Land Use Building Blocks	Transportation Building Blocks			
	Main Streets	Multi-Modal Streets	Commuter Streets	Residential Collector Streets
Downtown	Y	Y	X	Y
Centers	Y	Y	Z	Y
Corridors	Y	Y	Z	X
New Residential	X	Z	X	Y
Existing Residential	X	Z	Z	Y
Employment	X	Y	Y	X

X = Not Applicable
Y = Applicable
Z = Acceptable

HOW THE TRANSPORTATION BUILDING BLOCKS RELATE TO LAND USE

The overarching approach to integrating land uses and transportation facilities is known as Context Sensitive Solutions (CSS). CSS takes an interdisciplinary approach to street design that will further encourage coordination between traffic engineers, planners, urban designers, architects, emergency response officials, and the community when designing new streets or reconstructing existing streets. This approach fosters communication with those designing other elements of the community and results in better facilities and places.

Transportation Building Blocks

The two overarching concepts for Tulsa's transportation strategy are building the city's multi-modal street system and enhancing transit. These make up the fundamental building blocks of the city's future transportation system, and are designed to work hand-in-hand with land use policy by way of a Context Sensitive Solutions process.

A Multi-Modal Street System

Tulsa is fortunate to have a well connected street network with an array of roadway sizes and characteristics. These right-of-ways assure that the transportation system can evolve as the city grows and travel modes mature. In the past the network absorbed increased traffic due to higher vehicular ownership levels and long-distance commutes. With changing community desires for transportation choices and sustainability, Tulsa's network can be adapted for transit priority and/or desire for more bicycle, pedestrian and placemaking initiatives. This can be accomplished in concert with improving freight, cargo and through traffic movement because of redundancies in the roadway and highway network.

Expanded Transit System

Tulsans are very dependent on their personal automobile for daily travel. A combination of factors plays into the daily decisions of how people commute. The Association for Commuter Transportation (ACT) cites lack of choice as the number one reason people commute via private vehicle. The input compiled from the initial PLANiTULSA telephone survey identified support for more alternatives like rail and streetcar transit.

How we Get There: Context Sensitive Solutions (CSS) Approach

Currently Tulsa uses a conventional transportation decision making process which is governed by automobile travel demand and level of service criteria. In CSS these are still important criteria, but are balanced with other context-related criteria including community objectives, thoroughfare type and the type and intensity of the adjacent land uses.

CSS will be a vital element to building public-private partnerships to develop the new centers, multi-modal corridors, main streets and residential streets articulated in *Our Vision for Tulsa*. Appendix XX offers a sample CSS policy and process.

Multi-Modal Street System

The first transportation building block is the multi-modal street system. A multi-modal street balances the needs of all modes of travel, giving people the option to walk, bike, ride transit or drive. **The street types include Main Streets, Multi-Modal Streets, Commuter Streets and Residential Collector Streets.** These street types attempt to strike a balance between functional classification, adjacent land use, and the competing travel needs.

This approach diverges from conventional street designs that emphasize automobile mobility and speed to the exclusion of other users and adopts the Institute of Transportation Engineer's Recommended Practice for Walkable Urban Thoroughfares. Concurrently, the new street classification system, retains the city's existing classification system of arterials, collectors and local streets.

The following classifications will guide the function and redevelopment of existing facilities and the design of new ones in support of the new land use forms. The conversion to multi-modal streets will occur incrementally as roads are re-designed, small area plans recommend changes to the road character and on-street bicycle facilities are needed to link key destinations and connect the off-street trails to neighborhoods.

Table 10: Conventional vs. CSS Approach to Transportation Design

Conventional	Context Sensitive Solutions
Context	**Context**
Urban Rural	Suburban General Urban Urban Center Urban Core
Design criteria are primarily based on	**Design criteria include**
Functional class	Community plans/ objectives
Design speed	Functional class
Forecast travel demand	Thoroughfare type
Level of service	Adjacent land uses

Source: ITE Recommended Practice for Designing Walkable Urban Thoroughfares: A Context Sensitive Approach

Note: The Context Sensitive Solutions process described in the appendix provides an explanation of how this new street classification interacts with the Tulsa City-County Major Street and Highway Plan. It provides guidance on selecting cross-sections and a process to guide the prioritization of roadway attributes in constrained right-of-ways.

Main Streets

Main streets serve the highest intensity retail and mixed land uses in Tulsa's areas such as downtown and in regional and neighborhood centers. Like multi-modal streets, main streets are designed to promote walking, bicycling, and transit within an attractive landscaped corridor. Generally, main street activities are concentrated along a two to eight block area, but may extend further depending on the type of adjacent land uses and the area served.

Main streets can be designed with two to four travel lanes, although typically have only two lanes. On street parking usually is provided to serve adjacent land uses. Unlike typical strip commercial developments, main streets offer the ability to park-once and walk amongst various destinations, thus reducing arterial trip making. The key is to create convenient parking that is on-street or provided in a shared public parking lot. In order to ensure the walkability of a main street, careful consideration must be made to the design elements and amount of parking lots.

When emphasizing street frontage walkability and bike pedestrian neighborhood connectivity, tree lawns and detached walks receive priority over travel lanes. Within the parking lane tree wells may be used to create a double row of street trees in combination with a tree lawn. To further create a pedestrian-friendly atmosphere, main streets have wide sidewalks, street furniture, outdoor cafes, plazas, and other public spaces.

INITIAL PRIORITY ELEMENTS

- Wide sidewalks with transit access and pedestrian plazas
- Bicycle facilities
- Curb extensions
- Tree lawns
- On-street parking

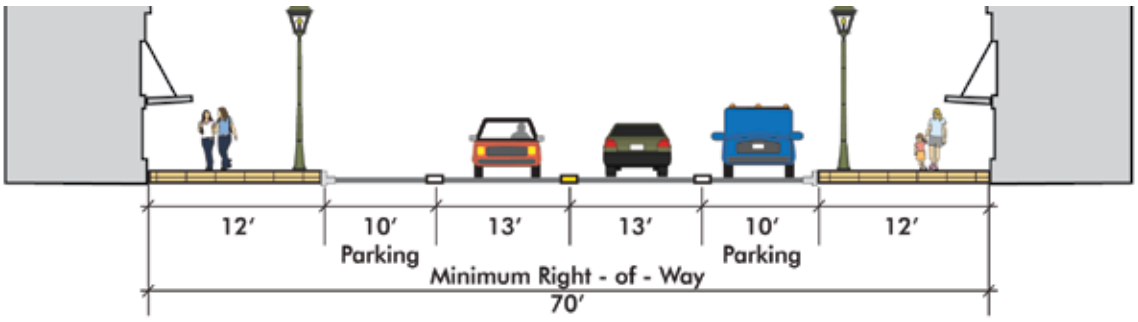
SECONDARY PRIORITY ELEMENTS

- Medians
- Width and number of travel lanes

EXAMPLES OF TRAFFIC MANAGEMENT FEATURES

- Narrower travel lanes
- Alternative paving material
- Tree planters in parking lane
- On-street parking
- Reduced pedestrian crossing distances at intersections, using curb extensions, traffic islands, and other measures
- Raised intersections
- High-visibility crosswalks

Figure 5: Sample Main Street Cross Section



Urban Artrerial, Main Street

Multi-Modal Streets

Multi-modal streets emphasize plenty of travel choices such as pedestrian, bicycle and transit use. Multi-modal streets are located in high intensity mixed-use commercial, retail and residential areas with substantial pedestrian activity. These streets are attractive for pedestrians and bicyclists because of landscaped medians and tree lawns. Multi-modal streets can have on-street parking and wide sidewalks depending on the type and intensity of adjacent commercial land uses. Transit dedicated lanes, bicycle lanes, landscaping and sidewalk width are higher priorities than the number of travel lanes on this type of street. To complete the street, frontages are required that address the street and provide comfortable and safe refuge for pedestrians while accommodating vehicles with efficient circulation and consolidated-shared parking.

Streets on the Transportation Vision that indicate a transit improvement should use the multi-modal street cross sections and priority elements during roadway planning and design.

INITIAL PRIORITY ELEMENTS

- Dedicated transit lanes
- Transit priority at intersections
- Wide sidewalks with transit access
- Bicycle lanes on designated bike routes
- Bicycle facilities
- Tree lawns
- On-street parking

SECONDARY PRIORITY ELEMENTS

- Width and number of travel lanes (on collector and local streets)
- Medians

EXAMPLES OF TRAFFIC MANAGEMENT FEATURES

- Landscaped medians
- On-street parking
- Street trees
- Narrower travel lanes
- Traffic circles and roundabouts
- Reduced pedestrian crossing distances at intersections, using curb extensions, traffic islands, and other measures

Figure 6: Sample Multi-Modal Street Cross Section

Commuter Streets

The most widespread commercial street type is the strip commercial arterial. These arterials typically serve commercial areas that contain many small retail strip centers with buildings set back from front parking lots. Because of this, strip commercial arterials have many intersections and driveways that provide access to adjacent businesses. Historically, this type of street is highly auto-oriented and tends to discourage walking and bicycling. On-street parking is infrequent.

Commuter streets are designed with multiple lanes divided by a landscaped median or a continuous two-way left turn lane in the center. Commuter streets are designed to balance traffic mobility with access to nearby businesses. However, because there are so many intersections and access points on commuter streets, they often become congested. Improvements to these streets should come in the form of access management, traffic signal timing and creative intersection lane capacity improvements.

INITIAL PRIORITY ELEMENTS

- Number and width of travel lanes
- Medians
- Transit accommodations

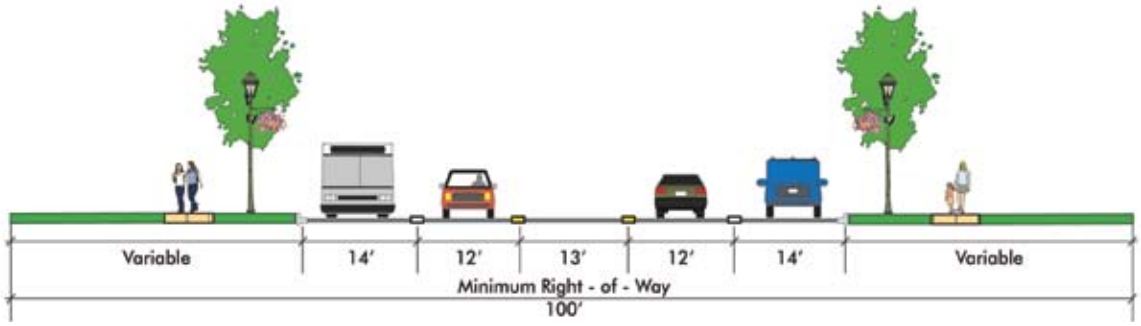
SECONDARY PRIORITY ELEMENTS

- Pedestrian facilities
- Bicycle facilities
- Tree lawns
- Two-way center left-turn lanes
- On-street parking

EXAMPLES OF TRAFFIC MANAGEMENT FEATURES

- Medians
- Consolidated driveways
- Synchronization of traffic signals
- On-street parking
- Narrower travel lanes
- Reduced pedestrian crossing distances at intersections, using curb extensions, traffic islands, and other measures

Figure 7: Sample Commuter Street Cross Section



Residential Collector Streets

Residential collector streets strengthen neighborhood cohesion, promote alternative transportation, calm traffic and connect recreational destinations. They typically can be applied in two instances: in new residential neighborhoods, or as retrofits in existing residential or downtown streets that may be wide, but do not provide sufficient parking, bicycle and pedestrian accommodations or traffic calming measures.

In both cases, residential collector streets tend to be more pedestrian-oriented than commuter streets, giving a higher priority to landscaped medians, tree lawns, sidewalks, on-street parking, and bicycle lanes than to the number of travel lanes.

Residential collector streets consist of two to four travel lanes and place a much higher priority on pedestrian- and bicycle-accessibility than on auto mobility.

INITIAL PRIORITY ELEMENTS

- Sidewalks
- Tree Lawns
- On-street parking
- Landscaped medians
- Bike lanes on designated bicycle routes

SECONDARY PRIORITY ELEMENTS

- Number and width of travel lanes

EXAMPLES OF TRAFFIC MANAGEMENT FEATURES

- Pedestrian islands
- On-street parking
- Street trees
- Narrower travel lanes
- Traffic circles and roundabouts
- Reduced pedestrian crossing distances at intersections, using curb extensions, traffic islands, and other measures
- Diverters

Figure 7: Sample Residential Collector Street Cross Section

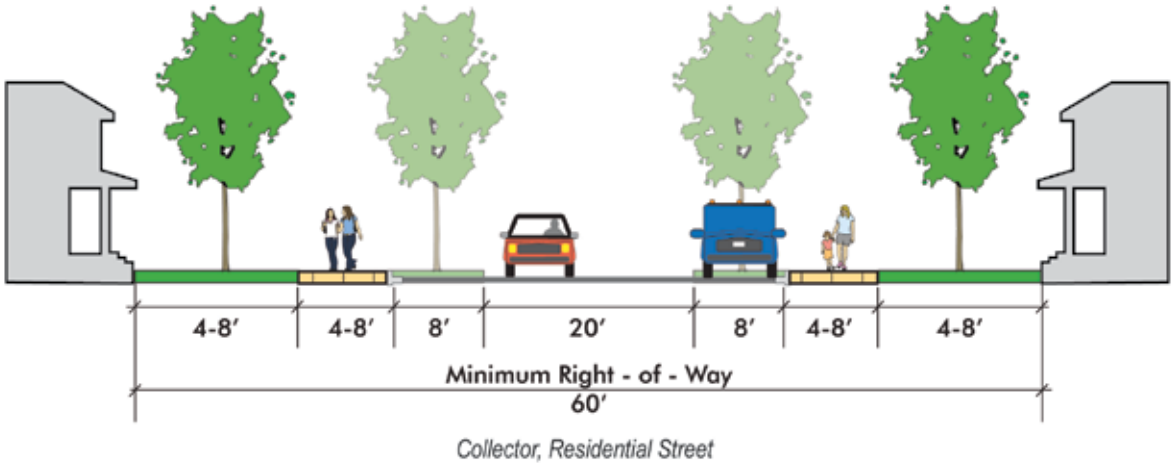


Table 11: Car Problems and Transit Advantages

Car Problems	Transit Advantage
Consumes land for roads and parking	Uses land and road space more efficiently
Slow and unreliable in high-traffic corridors	Rapid, frequent service in high-traffic corridors
Heavy traffic disrupts neighborhoods	High ridership helps build neighborhoods
Noisy and polluting	Relatively quiet and low polluting
Burns fossil fuel inefficiently	Uses cleaner energy sources more efficiently
Greater incidence of injuries and deaths for auto users and pedestrians	Fewer injuries and deaths for riders and pedestrians
Discourages walking and bicycling	Active modes feed/ distribute transit trips
Air pollution, noise pollution, reduces daily exercise and the sprawl it induces has been linked to rising obesity rates in the US.	Provides opportunities for exercise
High public costs for infrastructure and support	More capacity per dollar invested
High personal costs for ownership, insurance and use	More affordable for users

Source: Adapted from *Metrolinx, Green Paper #7*, March 2008

Expanded Transit System

The current delivery of public transportation in the Tulsa region is provided by the Metropolitan Tulsa Transit Authority (MTTA). The fixed route service provides riders with access to regional shopping, health care and employment centers. The existing routes of the MTTA bus system offer a safe, reliable and affordable transportation alternative for its current ridership. *Our Vision for Tulsa* envisions a greatly expanded transit network that provides a wider range of options than exist today.

Expanding ridership for the system should come mostly from new "choice" riders. These riders typically own cars, but can be enticed to use transit by improving the quality of service and convenience. Choice riders in Tulsa may be attracted to transit because of an array of social values, such as their desire to reduce their impact on the enviornment. But primarily they will be attracted by the qualities of a good transit system, such as fast and frequent service, amenities like bike racks, comfortable and quiet vehicles, and superior passenger safety. This also includes good accessibility from transit stations to work, home, and other destinations. Tables 11 and 12 describe some of the elements needed to attract choice riders.

The purpose of the expanded transit system is twofold. First, it provides a reliable and convenient alternative to the automobile. Secondly, this expanded and enhanced transit program will play an important role in influencing sustainable land development patterns. People living and working in and around transit corridors can rely less on the automobile and use enhanced pedestrian, transit, and bicycle facilities. Households who elect to live near transit can often reduce the number of cars they own, reducing the need for parking facilities.

The elements of the expanded transit system include rail (both light rail and commuter rail), Bus Rapid Transit (BRT) and a variation on BRT called High Frequency Bus. A streetcar system will also play a vital role in Tulsa's future transit system.

Rail Transit

The rail transit element of the expanded transit system consists of streetcar, light rail and commuter rail service. While streetcars share existing right-of-ways, light rail and commuter rail typically operate in designated rights of way separate from other forms of transportation (i.e. cars, bikes, pedestrians, and freight rail). In addition, interfaces with other forms of transportation sometimes are grade separated (e.g., rail crossing of a major street) to reduce conflicts. Commuter rail differs from light rail in that it typically serves longer distance trips, has fewer stops within a corridor, uses diesel-powered vehicles and can share track with freight vehicles. The operational characteristics of light rail include smaller vehicles, better acceleration, electric power, yet they can not share track with freight vehicles due to safety requirements. Streetcars are a variation on light rail that do not need a designated right of way and can be mixed with other forms of transportation (i.e., cars, bikes, buses, and pedestrians) in a multi-modal street.

Both commuter rail and light rail provide advantages over the automobile. As demand increases, light rail and commuter rail lines can easily be expanded by adding cars to the trains or by increasing the frequency of service. Thus, rail can serve densely built areas such as downtown and spur urban densities in strategic corridors throughout Tulsa more efficiently than vehicles alone. Rail corridors also play a vital role in providing access to special events, sports and cultural facilities, and entertainment.

THE LAND USE EFFICIENCY OF TRANSIT COMPARED TO FREEWAYS:

A typical light rail car handles 175 people during the peak hour operating conditions. Assuming 2 car trains and 5 minute headways, a light rail system can move roughly 8,400 people per hour within 40 feet of right-of-way including station locations. Thus, light rail can carry 210 persons per hour, per foot of right of way. In contrast, a four lane expressway with traffic moving in both directions (roughly 80 feet of pavement) can move roughly 9,600 people per hour, which equates 120 persons per hour, per foot of right of way.

Table 12: Car Attractions and Transit Needs

Car Attractions	Transit Needs
Door-to-door service, goes anywhere; convenient for multiple-destination trips	Enhanced service coverage and multiple-trip fares
Ready when needed	Frequent service
Comfortable and private; protection from the elements	High-quality vehicles, seating and stations; protection from the elements
Carries personal goods	Room for parcels, bikes and strollers
Fosters family travel	Pleasant ambiance for families
Provides prestige, looks nice, conveys a sense of freedom and independence	Premium experience for travelers who travel in a more sustainable fashion

Source: Adapted from *Metrolinx, Green Paper #7*, March 2008

Bus Rapid Transit (BRT)

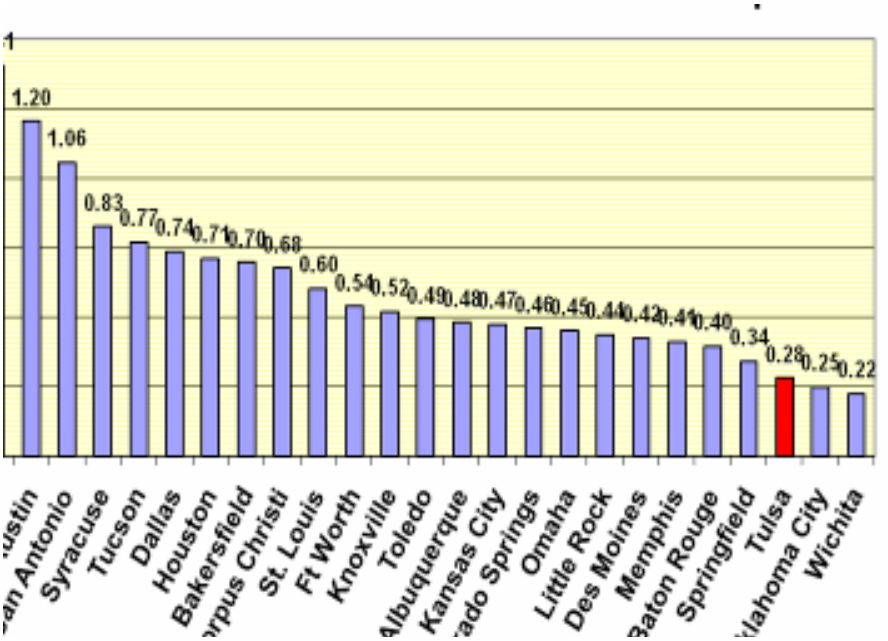
BRT is a relatively new technology that combines some aspects of rail transit with the flexibility of buses. It can operate on exclusive transit ways, HOV lanes, expressways, or ordinary streets. As compared to typical diesel bus technology, a BRT system can potentially combine new technology (using propane or other alternative non-diesel fuel), priority for transit, cleaner and quieter operation, rapid and convenient fare collection, and integration with land-use policy.

High Frequency Bus

This new form of service operates in mixed traffic and has short stop spacing. Increased efficiency of this service comes from intelligent system operations. Priority and preemption is used at intersections and real-time information is given at stops through the utilization of GPS technology.

Tulsa has a limited transit system in terms of vehicles and especially service hours. MTTA runs a quality service, but is unable to meet the needs of a 24 hour 7 day a week economy because of operational funding limitations. Equitably funding all modes of transportation in Tulsa will create a more sustainable transportation system and reduce the demand for costly roadway maintenance and construction.

Chart 5: Tulsa Metropolitan Transit Authority Service
Fixed Route Service Hours per Capita



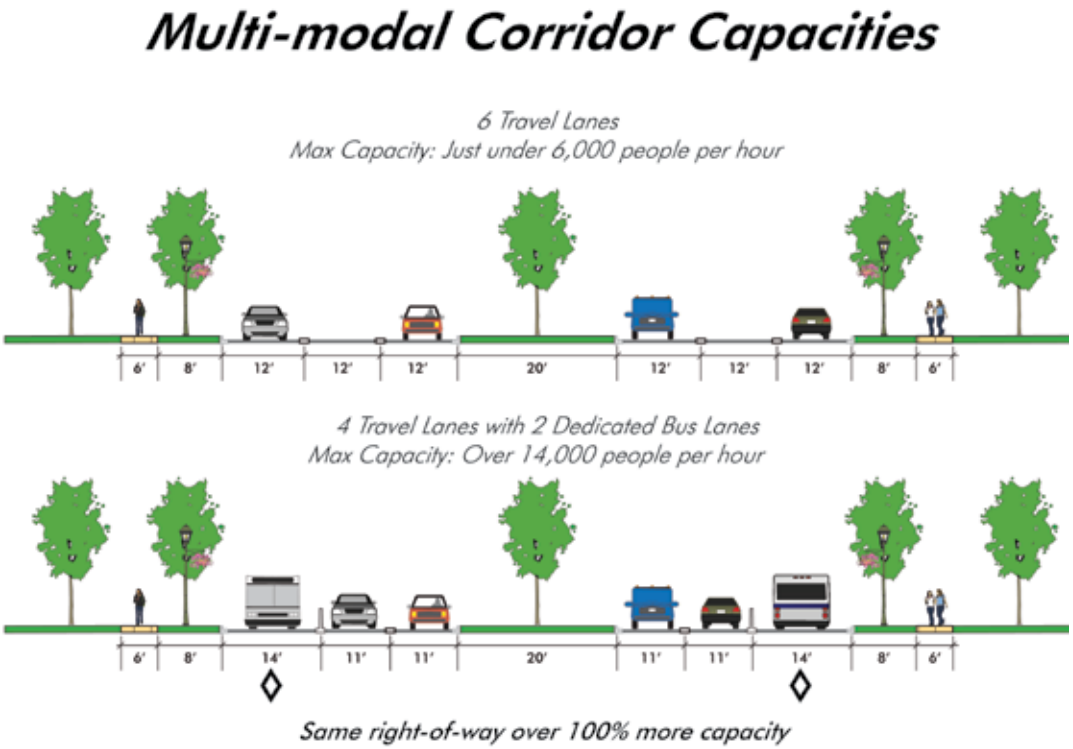
Source: National Transit Database

Transportation

Part III:
Tools for the Transportation Building Blocks

Tulsa's transportation system consists of many components that must work together to make *Our Vision for Tulsa* a reality. **These components include: the transit system, pedestrian facilities, bicycle facilities, the system-wide tools of access management, intelligent transportation systems, context sensitive solutions and sustainable network.** This section provides a description of each component, identifies how the component currently is being used and how it can be modified to realize the vision.

Figure 8: Multi-modal Corridor Capacity Improvement



Source: Highway Capacity Manual, Transit Capacity Manual

Multi-modal Street System Tools

Multi-modal corridors will be the backbone of the new transportation system, linking neighborhoods together with new centers and other regional destinations. They are multi-functional arterials designed to match the mixed-use urban development that they will support, while providing abundant opportunities to walk, ride, bike and even use a wheelchair around the neighborhood. Multi-modal corridors offer convenient transit service linking communities to adjacent neighborhoods, places of employment, and other destinations. A core tenant of multi-modal streets is its commitment to tightly integrated transportation technology (i.e. intelligent transportation systems, high frequency transit with density and distribution of adjacent land uses); these elements are essential to attracting users to the system.

Many of these corridors will be designed to accommodate future high capacity fixed-route transit that will transform the right-of-way into a high performance corridor that carries many more people in multiple modes. If *Our Vision for Tulsa* is going to be fulfilled it must begin with a greater focus on moving people through limited right-of-ways, and including flexibility in the design and redesign of them to accommodate all users and be transit-ready.

Utility integration is another function of multi-modal corridors. Conventional electrical, gas, water and sewer systems should be located in corridors and coordinated with the adjacent land uses to account for the placemaking capacity of the streets. The same is true for franchise utilities. When possible these utilities should be located underground, in a shared right-of-way with the street, sidewalk or completely concealed in an alley.

Current Use of Multi-modal Streets as a Tool

Tulsa's current roadway network is characterized by a grid of arterials spaced at one-mile increments with major retail centers located at the intersections and strip commercial lining the edges. Overlaying the grid in rings and radials is the expressway system. The intersections of the grid and freeway are fertile ground for big box retails developments, office parks and other uses that demand frequent and easy auto access. On occasion a transit line and a walkable street may overlay this auto-oriented framework, but short of that, sustainable land development patterns are forced to grow in a network designed for sprawl.

Future Use of Multi-modal Streets as a Tool

Tulsa must develop a new circulation pattern to match the new approach to building and development—as outlined in the Land Use Chapter - one that accommodates the car as well as transit and that enhances pedestrian-friendly places.

The transportation network proposed in the Transportation Vision Map is diverse, mixing different levels of auto use with transit, biking and walking. It sets up a new hierarchy of streets that allow through-traffic and reinforce access to existing neighborhoods, centers and transit stations. This new network will allow transit to be incorporated in a way that is affordable, appropriately spaced and inherent to the system.

The new network will be implemented by first investing in operational and reconstruction improvements, and then by increasing new roadway capacity at key locations using a context sensitive design process that compliments adjacent land uses. In recognition of Tulsa's continued need for automobility, not all roadway improvements will not result in multi-modal streets. Some parts of the network will consist of

Commuter streets, which provide for truck and longer distance auto trips. They provide a viable alternative to congested expressways or stop and go arterials and support more auto-oriented land-uses such as industrial, manufacturing, warehousing and other low density types.

New Transportation Planning Process Tools

Public investment in both on-street and off-street facilities to accommodate alternative modes of travel will allow the City to provide a vital and efficient multi-modal network of streets. These investments should be preceded by small area planning efforts that uses a context sensitive solutions process and sustainable network modeling. Under this approach, even small projects can be an opportunity to make meaningful improvements. In repaving projects, for example, an edge stripe can be shifted where adequate right of way exists to create more room for cyclists. In routine work on traffic lights, the timing can be changed to better accommodate pedestrians walking at a slower speed.

The maintenance and reconstruction of existing infrastructure and the findings of sub-area, corridor and small area planning should be used to prioritize infrastructure investments. This plan defines a number of tools to increase the durability, sustainability and livability of Tulsa's streets.

Access Management

Access management means the planning, design and implementation of land-use and transportation strategies that control the location and flow of vehicular traffic into and out of businesses and residential developments. Access management currently is dealt with on a case-by-case basis through the development review process. Where it is feasible, commercial driveways are consolidated as redevelopment occurs in high traffic corridors.

In order to improve access management, a coordinated and consistent access management policy is needed. Such a policy should address the different street types and functional designation of streets, including the nature and intensity of the adjacent land use. In specific problem areas on existing commercial roadways, corridor access management plans should be developed and implemented.

Tulsa should incorporate a range of strategies and techniques for access management in its zoning, subdivision, development review, and transportation design standards and guidelines.

Intelligent Transportation Systems

Auto delay and transit headways can be improved by optimizing traffic signal equipment, using high speed communication to alert drivers and transit riders of travel information and improving coordination amongst emergency response agencies during unforeseen interruptions to the transportation system. The current Tulsa Regional ITS Implementation Plan should be updated to reflect *Our Vision for Tulsa*'s emphasis on multi-modal travel. The revised plan should shift the focus from highway video surveillance and digital message boards to arterial street traffic management and transit coordination.

Context Sensitive Solutions

Properly planning for the size, alignment and character of new roads and the retrofit of existing roads to compliment sustainable land development patterns, cultural, historical and natural resources of the community is essential to realizing *Our Vision for Tulsa*. Currently new roads are sized based upon maximizing capacity for the automobile, aligned to meet the desired speed determined by functional classification with little regard for complimenting the adjacent land use. Requests for exceptions to the current roadway design standards from neighborhoods and developers are handled on a case by case basis and are approved at the discretion of the engineering department. Similar to the access management recommendation above, a coordinated and consistent CSS policy is needed. Appendix XX offers a sample CSS policy and process.

Sustainable Network Initiative

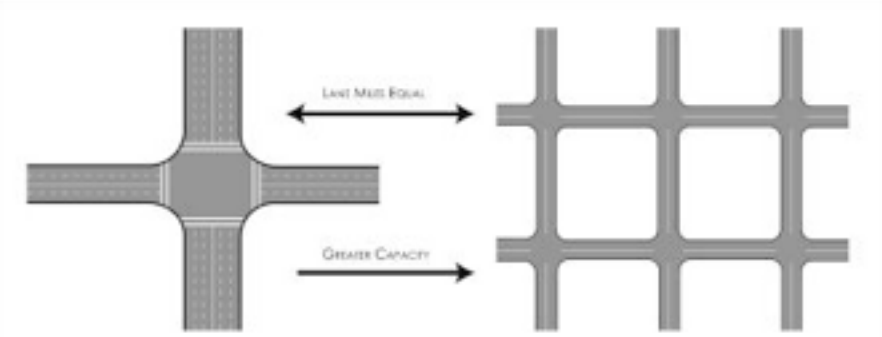
A network is a structure of streets and highways that serves and connects multiple places and people via multiple modes of travel. Sustainable networks represent a cost effective alternative to expensive grade separations, interchanges and corridors that require extensive right-of-way purchases. Sustainable networks also require local streets to be highly connected with the arterial system. This connectivity increases the opportunities for and performance of other modes of travel, such as walking, bicycling, and taking transit and improves emergency response times. Sustainable networks take a greater level of planning and creative design to build, but the result is sustainable in terms of capital and maintenance costs. Appendix XX describes several planning and modeling processes that INCOG and the City should consider when performing roadway widening, grade separation, or new street classifications.

Modernize Street Funding

Partnerships with local business groups and community organizations are essential to ensure that special streetscaping associated with context sensitive streets and other infrastructure are properly maintained. The City should institute a variety of tools to allow business and residential property owners to assist in constructing and maintaining the infrastructure and amenities developed.

Local Improvement Districts (LIDs), Local Maintenance Districts, Business Improvement Districts (BIDs) and other special districts can be used to construct and maintain infrastructure such as streets, adjacent streetscaping, curb and gutters, water and drainage utility systems, sidewalks, and alleys. These programs usually require landowners to agree to a special property tax assessment, which are used to fund the improvements. Tulsa currently uses a similar approach, tax increment financing (TIF), as redevelopment tool.

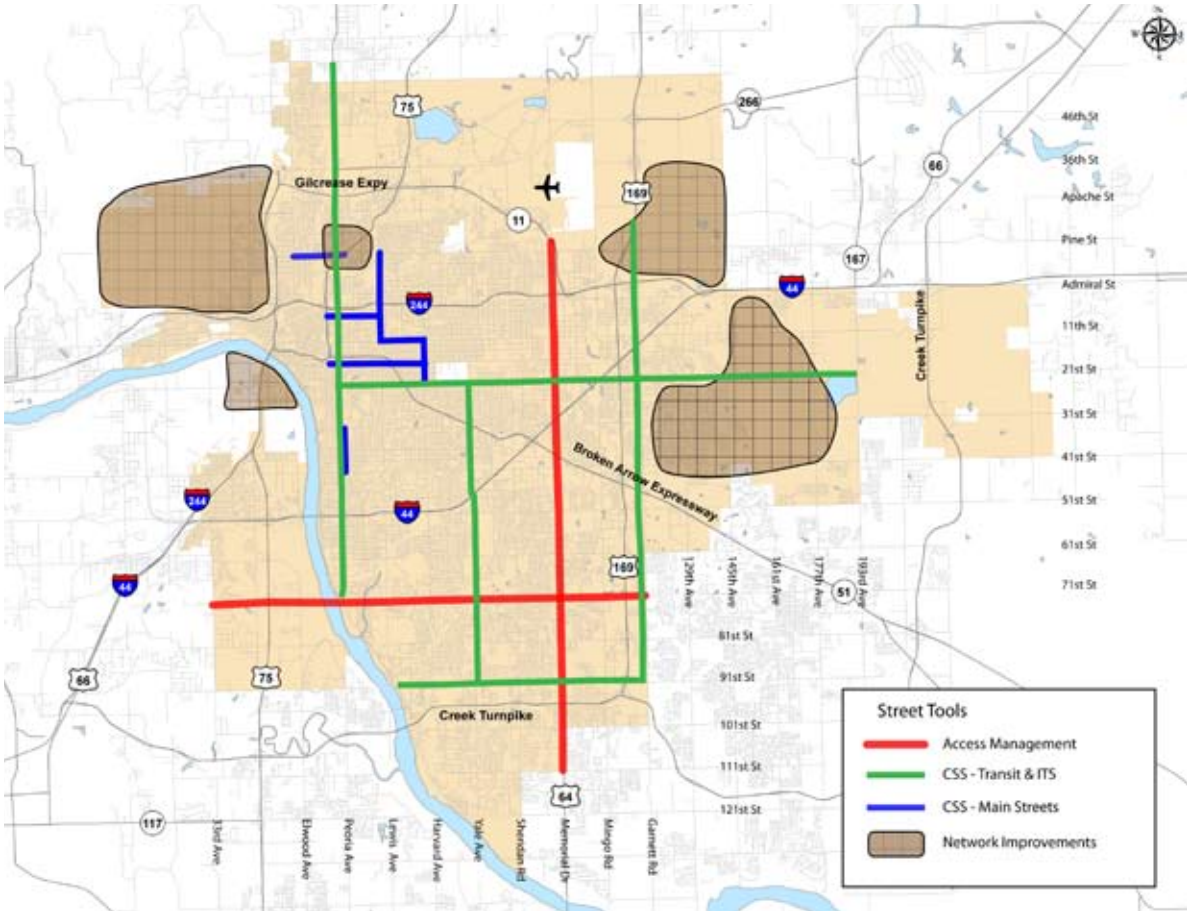
Figure 9: Capacity of Network



Where applicable, new street networks should use a variety of routes, rather than high-volume multi-lane facilities.

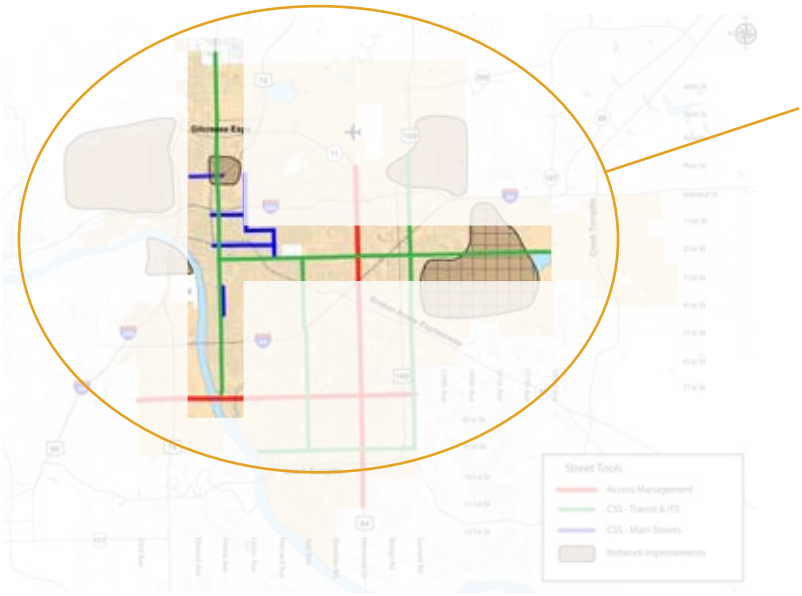
Source: Kimley-Horn and Associates, Inc.

Figure 10: Tulsa 2030 Goal Street Tool Recommendations



Source: Kimley-Horn and Associates, Inc.

Figure 11: Tulsa 2030 Goal Transit Tool Recommendations



EXPANDED TRANSIT

21st Street and Peoria Avenue make up the "Big T" (turn the page clockwise), the spine of a new expanded form of transit that will be coordinated with roadway design, traffic signal operation and sustainable land development patterns.

The ability to apportion the cost of improvements to more than one property owner and the ability to spread costs over time are two of the biggest advantages of improvement districts. In addition, these districts may be able to benefit from lower cost public financing (this may require voter approval). The larger, more expansive LIDs and BIDs also allow property owners who are unfamiliar with construction, contracting, engineering, or financing to rely on the City to undertake the process for them. The City can act as an agent to manage the project's design and construction.

In addition to these voluntary measures, demands for capacity improvements can be fulfilled through developer impact fees. This funding mechanism is commonly used to offset the costs required to serve new development. When new development comes to a community, a number of services are required to serve them; including roadways, water lines, sewer facilities, schools, parks, fire stations, libraries and police stations. Throughout Oklahoma, a number of cities are considering impact fees; Oklahoma City implemented a program in 2009.

As mentioned previously, Tulsa's abundance of lane miles is creating a maintenance and operation crisis for the city. One of the strategies for achieving a fiscally sustainable system supports major improvements to the street system based on detailed sub-area or corridor studies, which use a Context Sensitive Solutions process to coordinate sustainable land development patterns with street, transit, pedestrian and bicycle improvements to create a complete street. Figure XX 2030 Tulsa Street Tools Recommendations illustrate the application of the CSS process and highlights several catalyst corridors.

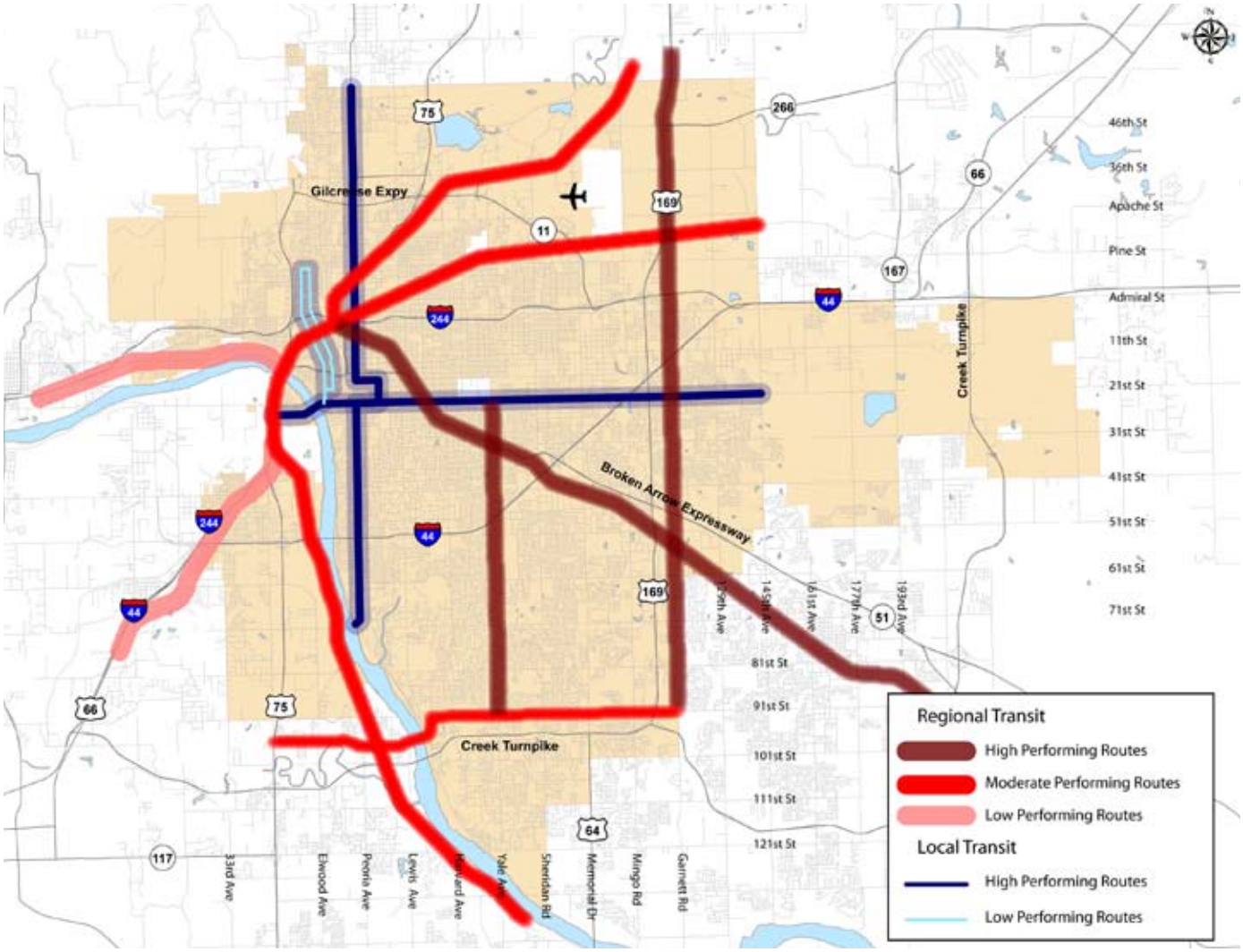
Transit System Enhancement Tools

As a tool, transit represents opportunities to provide expanded transit services, including streetcar, light-rail transit (LRT), bus rapid transit (BRT), commuter rail and high-frequency bus. Such improvements may result in new bus routes including circulator routes, higher frequencies on existing routes, appropriately-sized buses for the type of service required, increasing transit access through park-n-rides, better pedestrian connections and amenities, and improved bike access and amenities. Transit improvements should also be coordinated with roadway design projects and the programming and installation of Intelligent Transportation Systems (ITS) such as bus priority signalization, real-time bus route and transfer information at user-friendly kiosks, and information from variable message signs. These tools not only enhance transit in terms of competing with the automobile for convenience and travel times, but act as a solid public investment that stimulates private interest in development and re-development of Tulsa.

Current Use of Transit as a Tool

The Metropolitan Tulsa Transit Authority (MTTA) currently provides the only fixed-route transit service in the Tulsa Region. The routing and operation of its approximately 128 buses provides a high-quality ride experience and does an admirable job of servicing transit-dependant populations. As mentioned previously, the current system is not attractive to choice riders and employers that seek transit that supports the business community. The system's growth is severely hampered by automobile oriented street design, low population density, and the lack of complementary pedestrian and bicycle infrastructure.

Figure 12: Tulsa 2030 Goal Transit Performance



Source: Kimley-Horn and Associates, Inc.

TULSA 2030 GOAL TRANSIT PERFORMANCE

The Tulsa 2030 Goal Transit Performance map illustrates the performance for new transit routes and technologies based on preliminary transit demand modeling. The high performance routes are most viable for Federal Transit Administration funding, while the moderate to low performance routes could require local funding. The performance map is useful for prioritizing further study of the transit system in light of the demographic changes described in *Our Vision for Tulsa*.

Commuter Rail: Commuter rail service connects the large master planned communities around the region, the surrounding towns and villages, and even nearby cities, with the urban core.

Bus Rapid Transit (BRT): Bus Rapid Transit has the unique ability to function in either an exclusive right-of-way or in mixed traffic, however, the most common application assumes an exclusive right-of-way for operational efficiency and safety.

Light Rail Transit (LRT): Light Rail Transit refers more to this mode's relative simplicity and operational flexibility than to actual vehicle weight or cost. With an overhead power supply, light rail systems can operate in mixed traffic and widely ranging alignment configurations.

Future Use of Transit as a Tool

Our Vision for Tulsa articulates the opportunity for transit expansion and defines a strategy for the delivery of transit in coordination with improvements to land development patterns, context sensitive roadway designs and the addition of high-capacity fixed route transit corridors. Transit is a key to realizing *Our Vision for Tulsa* because it enables the City to increase tax revenues without extending infrastructure and enables denser development because of a reduced need for parking and roadway widening. Equitable and sustained funding for transit must be identified for the transit system to grow. Transit fares should not be expected to sustain the system, rather it should be considered a part of the economic strategy to create new centers and neighborhoods in Tulsa that are sustainable and livable.

Regional Rapid Transit System

Connecting Tulsa to the region through a rapid transit system will further position it as the regional employment leader. Regional rapid transit either uses existing freight rail corridors or re-purposes existing traffic lanes for exclusive transit use. In Tulsa, some of the most congested freeway corridors have parallel rail facilities or roadways that could be used for passenger rail and bus rapid transit, respectively.

The U.S. 169 and Broken Arrow Expressways experience the highest peak hour traffic congestion in the region. Projected ridership levels for a commuter rail line that runs along the Union Pacific right-of-way adjacent to the Broken Arrow Expressway are eligible for consideration of Federal Transit Authority funding. PLANiTULSA addressed the need for future growth in the corridor to be transit-oriented to support the long term viability of the corridor.

Traffic congestion in the U.S. 169 Expressway corridor represents an opportunity for Bus Rapid Transit to provide a safe, reliable and efficient alternative for commuters seeking to access to Tulsa's employment centers. PLANiTULSA explored the application of Bus Rapid Transit in this corridor using expressway or adjacent arterial right-of-

way. While both alignments provide an opportunity to relieve congestion, the arterial placement provides more opportunities for sustainable land development forms. A transit alignment alternatives analysis should consider both ridership and development potential.

Transit Access

The City has initiated a new public works effort to establish the need for retrofit of public facilities such as bus shelters and civic facilities to meet the needs of persons with disabilities. The Tulsa Americans with Disabilities Act Transition Plan should be expanded upon to include a comprehensive look at infrastructure needed to link bus stations and stops to retail, employment, educational, medical, civic and residential areas. In partnership with the private sector, the Transit Access Program should emphasize:

- **Improving the doorstep to transit stop experience**
- **Encouraging the integration of transit stops and stations into new and existing developments**
- **Enhancing the appearance and character of transit stops in neighborhoods and business areas**
- **Improving the level of maintenance at stops in response to complaints from the community**

High Frequency Bus

Transit priority improvements should be completed in certain areas to improve the operation of transit travel in congested areas by using priority green phases, exclusive bus lanes and special bus stops that decrease passenger loading times and improve the ability of the bus to reenter the traffic stream. These measures should be implemented on key arterial streets and major bus transit corridors beginning with Peoria Avenue and 21st Street as depicted in the Vision Map. The concept of timed-transfers should be tested and implemented. A timed-transfer station should be constructed adjacent to the intersection of 21st and Utica. The primary purpose of a timed-transfer system is to synchronize all or select transit routes so that they meet almost simultaneously at the same location during regular intervals. This will help minimize wait times between transfers. 21st at Utica Avenue is also a prime location for the application of Transit Oriented Development and creation of a park-once district.

Development-Oriented Transit

This program seeks to expand transit for the purpose of promoting economic development in under-served areas that lack adequate access to transportation.. Similar to how the streetcar suburbs of the past defined areas like Sand Springs, the provision of new transit into areas of change as defined by *Our Vision for Tulsa* can promote a land development pattern that is much more dense, livable and sustainable from a fiscal and environmental standpoint. PLANiTULSA has defined development oriented transit opportunities in the form of streetcar and light rail (see map). The implementation of these transit lines should be explored through public-private partnerships with property owners, private developers, foundations and civic groups.

Transit-Oriented Development

In response to future rail, BRT and streetcar service growth should be encouraged around transit facilities by supporting Transit-Oriented Development (TOD). TOD is a way for Tulsa to make long-range coordinated transportation and land use decisions that will provide a variety of housing and mobility options and create active places where people can live, work, shop, interact and recreate. The program will address: transportation access for pedestrians, bicycles, transit and automobiles; the type and density of land use; urban design; and parking. The program also works with private property

High Frequency Bus: High Frequency bus service operates in mixed traffic and has short stop spacing. Increased efficiency of this service comes from intelligent transportation systems that provide real-time information to users via web and mobile communication devices.

Transit Oriented Development (TOD): TOD creates a higher density residential development within walking distance of transit, in particular light rail and bus rapid transit. Costs of these developments can be taken on by developers, but cities can introduce incentives to promote TOD development. In time, tax revenues from these developments can contribute back to local infrastructure, making them value-added projects.

Streetcar: Streetcars function as a hybrid between buses and light rail transit. Oftentimes, streetcars are implemented in downtown areas and other large activity centers.

owners and potential developers to help implement and develop incentives for TODs. Potential TOD incentives include reductions in parking requirements for mixed-use zone districts and tax increment financing to assist with operating and maintaining the transit facility.

Streetcar

Fun to ride and clean-running streetcars will generate a big community pay-off, both in terms of development dollars and enhanced livability for Tulsa. Streetcars work best to spur development and stabilize neighborhoods by connecting current destinations, such as Downtown Tulsa with emerging eclectic neighborhoods. Potential areas include 18th and Boston as well as areas that have potential for infill, such as the vacant land near the OSU and Langston University campuses. *Our Vision for Tulsa* describes a streetcar line that would revitalize Boulder Avenue and Cincinnati Avenue through downtown and into immediately adjacent neighborhoods.

Pedestrian Enhancement Tools

As a tool, pedestrian enhancements become the primary transportation element that connects all travel modes. Increased pedestrian amenities and well-planned pedestrian connections enhance walking as a viable form of transportation, especially when integrated into transit-oriented developments.

A "pedestrian-friendly" environment is essential to the success of many of the other concepts defined in *Our Vision for Tulsa* including mixed-use centers, increased transit use, main streets and park once districts.

BENEFITS OF PEDESTRIAN ENHANCEMENTS AND TRAVEL INCLUDE:

- **Reduced vehicle miles traveled and less environmental pollution.**
- **Increased community and social interaction and potentially less crime because of increased activity and observation by pedestrians.**
- **Improved health due to exercise and stress reduction.**
- **Additional open space, park trails, view corridors, visual relief and aesthetics in business areas and other neighborhood districts.**
- **Interconnections and access for all citizens to parks, campus districts, entertainment and public facilities (including museums, zoos, sports stadiums, entertainment facilities and special events among others).**
- **Reduction of individual travel costs (auto maintenance, parking, fuel).**

Multi-Use Trail: A multi-use trail is a route separated from other roads by a barrier or open space, that is designed to accommodate a mix of non-automotive users (e.g. walkers, runners, strollers, wheelchair users, roller skaters, and cyclists).

Current Use of Pedestrian Enhancements as a Tool

Pedestrian enhancements currently are addressed on an individual basis through Tulsa's development review process. Standards are applied to projects as related to issues such as building placement, building entryway location and pedestrian connections.

Tulsa constructs new and improved pedestrian facilities through the use of a Capital Improvement Program (CIP). Special attention has been paid to providing curb ramps and other facilities to accommodate persons with disabilities. Tulsa is actively pursuing a transition plan that will move the city to full compliance with the American with Disabilities Act (ADA). Tulsa has 67 miles of off-street multi-use trails that are used for recreational walking and jogging.

Future Use of Pedestrian Enhancements as a Tool

The multi-modal and livable streets described in *Our Vision for Tulsa* must apply to everyone traveling along the road. A sidewalk without adequate curb ramps is useless to someone using a wheelchair. A street with an awkwardly placed public transportation stop without safe crossings is dangerous for transit riders. At the same time, a road with heavy freight traffic must be planned with those vehicles in mind and pedestrian access should be limited. Older adults and children face particular challenges as they are more likely to be seriously injured or killed along a roadway.

The future use of pedestrian enhancements will focus on improving non-vehicular access to new centers and existing destinations. Priority locations for enhancements should be transit stations and stops, routes from neighborhoods to schools and along multi-modal corridors, livable and main streets. These enhancements come in the form of better coordination between public works and private development to create a cohesive pedestrian environment, complete sidewalk connections, reduce neighborhood street speeds with traffic calming and slow speed design and enhance and improve location and coordination of transit stops into new developments and public works projects.

Bicycle Enhancement Tools

Bicycle enhancements help provide a viable alternative to driving for the commuter cyclist and facilitate bicycle travel for the recreational cyclist. Successful enhancements emphasize adequate, well-maintained, continuous and secure facilities. Connection of the bicycle system to other modes consists of connections to the travel system itself and to the end of the trip. Many bicycle facilities, especially trails, have multiple commuter and recreational users and should be designed for this multiple use. A bicycle-friendly environment consists of significant regional trails linked to a network of major streets with striped bicycle lanes and/or signed bicycle routes. The system maximizes connections to other modes such as pedestrian routes and transit, and minimizes unsafe interactions with auto traffic at intersections.

BENEFITS OF BICYCLING INCLUDE:

- **Fewer vehicle miles traveled and less environmental pollution.**
- **Reduced land and financial resources devoted to vehicle parking and travel lanes.**
- **Improved health through exercise and stress reduction.**
- **Reduced individual travel costs (auto maintenance, parking, fuel).**

Current Use of Bicycle Enhancements as a Tool

The use of bicycles is a key component to realizing *Our Vision for Tulsa*. They are seen as an extension of the transit system, an alternative to private, single-occupancy vehicles and important factor in the health and livability of the population. The plan calls for expanding the 41 miles of on-street bikeways in the City of Tulsa with concepts like those used on the 3rd Street/4th Place bikeway, 36th Street, 56th Street, and the north-south connector.

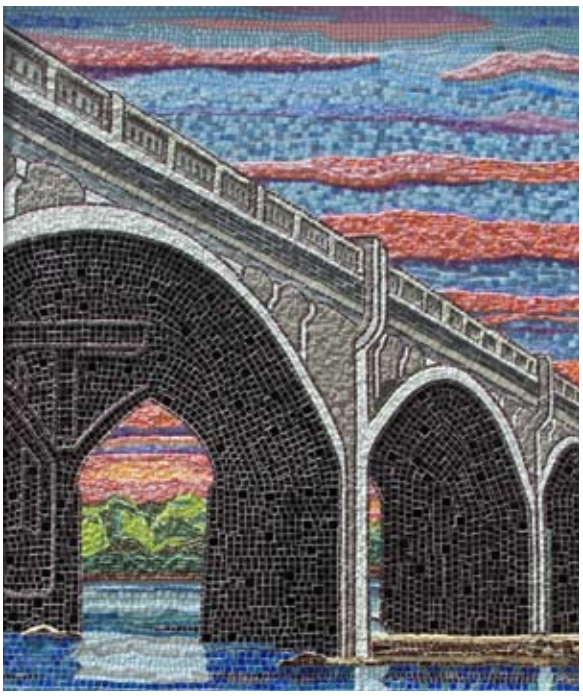
Future Use of Bicycle Enhancements as a Tool

The multi-modal streets defined in this chapter will enhance the existing off-road multi-use path system and will result in the creation of a network for all modes of travel including bicycles, pedestrians and transit users. A network approach helps to balance the needs of all users. Instead of trying to make each street perfect for every traveler, Tulsa should create an interwoven array of streets that emphasize different modes and provide quality accessibility for everyone. This means in some instances auto travel lanes should be re-purposed for bicycle and/or transit priority. *Our Vision for Tulsa* should be referenced during any public works project to guide design and enhance the bicycle network.

Multi-Modal Street Design: Multi-modal streets emphasize bicycle, pedestrians and transit infrastructure. They can be located in a number of different areas such as town centers, commercial districts, regional centers, employment centers and residential neighborhoods. Multi-modal streets can be a main street or a large arterial, but the focus remains on moving people and not just automobiles.]

Transportation

Part IV: Conclusions



Linda Allen

Prior to the PLANiTULSA planning process, a sustained effort has been underway to recast local and national transportation systems so they expand choices and contribute to financial and environmental sustainability. The transportation engineering and planning community has developed context sensitive, multi-modal facilities that support land use goals.

Summary

Today Tulsans enjoy relatively low travel congestion and a high degree of auto-mobility. Tulsa's planners and engineers have built a roadway system that moves automobiles very well. But, the emphasis on the automobile has come at the expense of other transportation choices. Thus the reasons for modifying the planning, programming and implementation of transportation programs in Tulsa are less a matter of mitigating traffic congestion and more about equity for all users and new economic development opportunities that can be realized with transit and unique street designs. Using Tulsa's transportation networks more efficiently will also contribute to the fiscal sustainability of the system.

The six livability principles and the subsequent changes to the federal funding mechanism bode well for the implementation of *Our Vision for Tulsa*. The priorities of this plan not only align with new federal initiatives, but they address the desire of residents to improve the transport system. The PLANiTULSA public input process registered support for expanded choices in the form of transit, bicycling and walking. Transition to include these forms of travel will take the courage of today's leaders and officials to resist the temptation to react to traffic congestion by only utilizing roadway capacity fixes and look for long-term solutions using the tools identified during this public visioning process

Guiding Principles for Transportation

Capturing these hopes, dreams and aspirations for Tulsa's future is essential as we move forward in making our future vision a reality. The Citizens' Team, a diverse group of volunteers, developed the following guiding principles. These principles serve as the foundation for future planning efforts, and will ensure that the comprehensive plan remains consistent with the vision.

- The city invests in the critical infrastructure necessary to develop a robust and diversified economy.
- A variety of transportation options serve the city, so that all Tulsans can go where we need to go by driving if we want, but also by walking, biking or using public transit.
- The transit system is designed as a consumer good and attracts people without a vehicle, as well as people who have a vehicle and choose to use an alternative.
- Tulsa's civic, business and government institutions ensure that everyone has equal opportunity and access to housing, employment, transportation, education and health care, regardless of background, ethnicity, or neighborhood.
- Schools are safe, easy to walk and bike to, and part of a world-class education system.
- Residents have easy access to parks and natural areas.
- City planning and decision-making is an inclusive and transparent process.
- Once adopted, city-wide and neighborhood plans are funded, implemented and monitored for performance.
- Residents have a voice in solving their community's problems today and are a part of planning for tomorrow.

Transportation

Part V: Priorities, Goals & Policies

This section is organized into priorities, goals and policies that if followed will move Tulsa towards the community's vision.

Priorities are the big idea topical areas that address the guiding principles. They capture big picture changes that must occur to implement the plan.

Goals establish specific, measurable, attainable and realistic objectives that guide plan implementation by ensuring that the community and stakeholders have a clear awareness of what must happen to move Tulsa toward the Vision.

Policies delineate the steps needed to achieve the goals.

IMPLEMENTATION & ACTION PLAN:

*In addition to **priorities, goals and policies,** the Plan recommends the **Strategic Actions** that should be taken in the first 3 to 5 years following plan adoption. These strategic actions are found in the Implementation and Action plan.*

Transportation Priorities

Transportation decisions should be focused on improving the range and quality of Tulsa's travel options, supporting land use goals and maintaining fiscal sustainability. Our Vision for Tulsa provides an overview of the top transportation priorities. This section includes detailed priorities, goals and polices that build on the transportation priorities described in the Vision.

TRANSPORTATION PRIORITY 1

Provide a Wide Range of Reliable Transportation Options So Every Tulsan Can Efficiently Get Where They Want To Go

Goal 1—

All Tulsans have a variety of transportation options for getting around the city. Policies to support this goal include:

1.1 Coordinate closely with MTTA to provide for transit-supportive enhancements in the high frequency bus, bus rapid transit, streetcar, light rail and commuter rail corridors.

1.2 In coordination with INCOG, establish a grant program to fund small area and neighborhood transit-oriented development planning efforts

1.3 Prioritize infrastructure investments for high capacity transit corridors

Goal 2—

Tulsa has a sustainable network of roadways, trails and transit infrastructure that is well maintained and not a burden on future generations to operate. Policies to support this goal include:

2.1 Adopt a network approach to transportation projects that focuses on connecting people to places—ultimately allowing places to become more intense centers of economic development.

- Consider operational and reconstruction priorities prior to roadway expansion and extensions.
- Explore an addition to the local roadway project development process that includes the examination of a street network alternative.
- Re-tool the regional travel demand model to be sensitive to transit and internal capture factors.
- Refine the regional project selection criteria to consider multi-modal measures of effectiveness.
- Require a roadway connectivity index to be applied to all future subdivisions and developments.
- Encourage development of an interconnected and diverse street pattern to ease congestion, more evenly distribute traffic, and offer flexibility of routes.

TRANSPORTATION PRIORITY 2

Maintain and Enhance Tulsa's Existing Transportation System Through Strategic Investments

Goal 3—

The city's transportation system is cost-effective and adequate to meet the needs of the current and projected population. Policies to support this goal include:

3.1. Develop transportation projects using a context sensitive solutions process that involves stakeholders early in the process.

3.2. Use a mixture of quantitative and qualitative measures to prioritize transportation infrastructure projects and monitor the system for operational and maintenance issues.

3.3. In coordination with INCOG, create a robust region-wide travel demand modeling system that estimates transit and internal trip capture based upon land use sensitivities.

3.4. In coordination with INCOG, calibrate the region-wide travel demand model with a periodic travel survey that provides detailed travel information for motorists, transit users, pedestrians, and cyclists.

3.5. Develop a survey-based system to prioritize and track the city's street pavement program performance.

3.6. Investigate optimization and intelligent transportation options prior to capacity improvements.

3.7. Work with INCOG and adjacent cities and counties and the state to maintain and/or expand the transportation system in ways that are plan-driven, user-friendly and fiscally sustainable.

Goal 4—

Tulsa has high performance operations for all modes of travel; this is achieved by preserving and optimizing the current transportation system using the latest technology and programs. Policies to support this goal include:

4.1 Prioritize transportation system optimization, transportation demand management and transit enhancements over roadway widening.

4.2 Create a transportation demand management program that promotes travel choices using a business to business outreach model that is incentivized with a means of recognizing businesses and individuals within the community.

4.3 Conduct traffic and transit modeling to compare capacity additions to system optimization measures and prioritize projects accordingly, relying less on engineering judgment and programmatic prioritization methods.

4.4 In coordination with INCOG, invest in a transportation operations center to serve the region with intelligent transportation system tools and report traffic and transit conditions in real-time.

Goal 5—

The allocation of transportation funds is modernized to align with the vision. Policies to support this goal include:

5.1. In partnership with INCOG, develop a program that will administer new federal grants aimed at sustainable development and livable communities.

5.2. **Leverage new federal funds with private investment to achieve a positive land use-transportation connection, which will improve mobility, enhance air quality, support economic growth, and ensure the financial stability of the transportation system.**

5.3. **Explore transportation funding sources including user fees, development impact fees and public-private partnerships. Review best practices from other locales.**

Goal 6:—
The amount of taxable land is increased and the burden of providing parking on a parcel by parcel basis is reduced. Policies to support this goal include:

6.1. **Establish off-street parking standards to reflect actual parking demand.**

- Evaluate parking requirements for each land development zoning classification to take into account mixed-uses, transit availability (or future services), and other factors that mitigate on-site parking demand.
- Create a shared parking district overlay to be used in conjunction with a shared parking analysis to estimate actual parking needs. For redeveloping areas, investigate the availability of parking and seek means to provide new parking through on-street or public parking lots.

TRANSPORTATION PRIORITY 3

Ensure That Transportation Investments Enhance the Land Uses They Serve.

Goal 7—
Transportation facilities fit their physical setting and preserve scenic, aesthetic, historic and environmental resources, while maintaining safety and mobility. Policies to support this goal include:

7.1 **Enhance transportation Tulsa's right-of-ways so they both serve as great public places and promote multi-modal travel.**

- Enhance current roadways with a combination of light fixtures, signs, and sidewalks to make the city's roads unique, and to help residents and visitors recognize that they are in Tulsa.
- Provide comfortable and attractive pedestrian and bicycle facilities within existing and new developments.
- Build upon the connectivity concepts in INCOG's 2030 Bicycle and Pedestrian Plan by expanding the scope of Public Works' current ADA Transition plan to address studying and prioritizing the need for connections to off-street trails from neighborhoods and regional destinations.
- Correlate a mixed use land use development strategy to minimize auto trips and roadway congestion through internal capture of vehicular trips.
- Prioritize sidewalk, curb ramp and crosswalk rehabilitation and construction projects according to ranking that takes into account concentrations of persons with disabilities, public facilities, mixed use development and transit stop locations.

7.2 **Consider aesthetic needs as an equal to vehicular capacity demands when planning and designing transportation right-of-ways.**

7.3 **Institute a context sensitive solutions approach to transportation infrastructure by recognizing that flexibility in project development and design is necessary to balance safety, mobility, economic development, and environmental issues for new and redesigned urban transportation facilities.**

- Adopt the Institute of Transportation Engineer's Recommended Practice for Designing Major Urban Thoroughfares for Walkable Communities.
- Re-define the project design process to consider community objectives and plans prior to capacity and level of service determinations.
- Adopt a broad set of roadway right-of-way types and functions and define streets as building-face to building-face.
- Establish a process for soliciting, analyzing and funding requests for context sensitive design treatments to existing roadways.

Goal 8—
Traffic safety and mobility are improved. Policies to support this goal include:

8.1 **Adopt an access management policy for major thoroughfares and create a traffic safety review panel that will identify recommendations for accident-prone areas.**

- Conduct an incident management analysis and define crash hotspots.
- Create a model access management policy and apply to critical thoroughfares.
- Fund an access management and traffic safety program to address reoccurring collision sites with appropriate corrective actions.
- Form and proceed with a monthly meeting of the traffic safety review panel.

Goal 9—
Disentangle freight and local traffic to improve safety and mobility for all users. Policies to support this goal include:

9.1 **Address freight movements from both the land use and transportation perspectives and actively manage them for superior operation and safety.**

9.2 **Conduct a freight movement study and identify bottlenecks and critical local destinations.**

9.3 **Plan and seek partners to develop an air, rail, land and sea intermodal facility.**

9.4 **Design future major highway right-of-ways to accommodate freight rail, if feasible, and seek a by-pass of the current downtown route.**

TRANSPORTATION PRIORITY 4

Provide Multiple Transportation Choices to All Tulsans

Goal 10—
Streets contribute to the urban environment.

10.1 **Adopt a coordinated access management policy.**

10.2 **Expand funding for maintaining and, reconstructing existing infrastructure needed for both Areas of Change and Areas of Stability.**

10.3 Pursue main street, residential and multi-modal enhancements using a context sensitive solutions process on the following catalyst corridors:

- Main Street- Cherry Street and Harvard Avenue
- Residential- 6th Street
- Multi-modal- Pine Street, Peoria Street and 21st Street

10.4 Revise the Regional ITS Architecture and focus resources on corridors programmed for transit integration, specifically Peoria Avenue, 21st Street, 91st Street, Yale Avenue and Garnett Road, as depicted on Transportation Vision Map.

10.5 Provide assistance to local community organizations and business groups to form local improvement districts and business improvement districts to ensure adequate funding for construction and maintenance of streetscaping and other infrastructure.

10.6 Ensure annual funding through CIP and Transportation Improvement Program processes, coordinated with INCOG, MTTA and ODOT.

Goal 11—
Tulsans can rely on a variety of transit options to take them to jobs, shopping and entertainment.

11.1 Consistently support the improvement of the system with additional local funding and continue identification and application for State and Federal dollars.

11.2 Enhance bus transit services with higher frequency bus service, improved stations/stops and priorities for intelligent transportation systems (ITS) investments (including bus priority signalization) on the Big T route, which includes Peoria Avenue and 21st Street as portrayed in the Vision Map.

11.3 Establish a timed transfer point at Utica and 21st streets and promote transit oriented development and park-once districts.

11.4 Design and Re-design the following roads for accommodating BRT:

- Garnett Road
- 91st Street
- Yale Avenue

11.5 Develop a transit-oriented development program incentives, including: promotion of shared parking; creation of new zone districts and/or overlays that allow for reduced parking requirements and support a mix of transit-supportive land uses; and development of dedicated funding to "land bank" key land parcels near stations to preserve future development opportunities.

11.6 Develop a development-oriented transit program to explore public-private partnerships to create transit programs that do not currently meet the Federal Transit Authorities program funding.

Goal 12—
Pedestrians have easy access to jobs, shopping and recreation.

12.1 Support the ADA Transition Plan objective to perform a calculated sidewalk inventory of key civic and private destinations and neighborhoods and expand and include information to develop a Pedestrian Master Plan for the entire city that will include:

- Workshops to elicit the public's pedestrian priorities and concerns.
- A review of pedestrian elements recommended in other city plans and a review of public feedback from the pedestrian workshops.
- Creation of a tool to prioritize improvements by identifying important pedestrian corridors and destinations in the city (i.e. arterial and collector streets served by transit, neighborhood destinations, downtown, TODs, pedestrian shopping corridors, schools, parks and large entertainment facilities).
- Identification and prioritization of improvements.
- Creation of pedestrian amenity guidelines for Areas of Change and Areas of Stability.
- Continue program for providing curb ramps and other facilities to accommodate persons with disabilities and improve access to transit.
- Development of partnerships that are coordinated with Tulsa's Parks and Recreation Department to enhance pedestrian connections between parks and other recreational facilities.
- Investigation of funding opportunities.

12.2 Revise the city's current sidewalk maintenance policy. Currently, adjacent property owners are responsible for sidewalk improvements. A new policy needs to be developed concerning the extent of the city's involvement in and funding for maintaining and enhancing sidewalks. This should include developing a dedicated funding source for sidewalk maintenance and enhancement, and/or the use of local improvement districts to fund streetscape improvements (including sidewalks, street furniture, trees, and other amenities).

12.3 Coordination with MTTA, INCOG and ODOT and adjacent municipalities to invest in pedestrian infrastructure to support transit ridership in expanded transit corridors.

12.4 Ensure the continued development of sidewalk improvements with other improvements on major arterial corridors where opportunities to enhance the pedestrian environment exist.

Goal 13—
Tulsans safely and efficiently use bicycles to go to work, shop and recreation areas.

13.1 Develop a Bicycle Master Plan and revise the Trails Master Plan as necessary to focus on connecting neighborhoods with destinations, such as employment, shopping and recreation. The master plan should include priorities to:

- Improve integration of on-street bicycle facilities with Tulsa parks and off-street trail system through the use of road diets, traffic calming, signage, bike lanes and shared lane markings.

- Improved circulation into and around downtown. This includes additional on-street pavement markings and exploring a bicycle boulevard concept using a lane of existing traffic.
- Continued efforts to expand bicycle advocacy, education and enforcement.
- Adopt a complete streets policy and add coordinate funding and simultaneous construction of bike facilities with street, drainage and other infrastructure improvements.
- Review of private and public development projects to ensure adequate bicycle parking and access. Amend Tulsa's zoning ordinance to require bicycle parking in new development, based on a review of best practices. The number of bike parking spaces required by the ordinance should be determined based on the total off-street parking spaces required. Specific rules and regulations governing the dimensions and design of bicycle parking should be adopted.
- Develop detailed inventory of bicycle facilities (routes, parking, amenities) and bicycle plans as part of the small area planning process.
- Establish dedicated funding to implement the Bicycle Master Plan and revised Trails Master Plan.