

# MOBILITY 2040

Killeen-Temple Metropolitan Planning Organization



## metropolitan transportation plan



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**Approved by the KTMPO Transportation Planning Policy Board: May 14, 2014**

**Effective Date: May 20, 2014**



The 2040 Metropolitan Transportation Plan development and adoption was consistent with requirements identified in the KTMPO 2011 Public Participation Plan. Public input was solicited via public workshops held in May 2013. Public comments received during these workshops were considered in the development of a draft plan. The draft plan was available for public comment for a 30 day period from March 22, 2014 to April 21, 2014, and then extended to May 14, 2014. Public hearings on the draft plan were held at ADA accessible locations, with one in the Eastern portion of the KTMPO boundary and one in the Western portion of the KTMPO boundary; two additional public hearings were held as well. Dates and locations of the public hearings are as follows:

April 1, 2014	City of Temple Council Chambers	May 7, 2015	Central Texas Council of Governments Building (Belton)
April 1, 2014	Harker Heights Activity Center	May 14, 2014	Central Texas Council of Governments Building (Belton)

Documentation of public participation is included in **Appendix C**.

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# MOBILITY 2040

Killeen-Temple Metropolitan Planning Organization

## THE 2040 METROPOLITAN TRANSPORTATION PLAN

Over the last decade, Bell County and its neighboring counties in Central Texas between Dallas and Austin have experienced unprecedented growth. By 2040, the area is expected to add more than 200,000 people and 90,000 jobs. This is equivalent to adding another city the size of Killeen in just 25 years, and there are already more people on the road than the system has the capacity to handle. Planning for anticipated growth is critical now to ensure that people and goods can continue to move throughout the region reliably and to ensure the quality of life residents enjoy today will remain in the future. The metropolitan transportation planning process requires the development of long- and short-range strategies that help develop an integrated, intermodal transportation system that facilitates these goals, a task made more challenging by dwindling revenues from state and federal motor fuels taxes. The Killeen-Temple MPO's Mobility 2040 Plan was developed through a continuing, cooperative, and comprehensive regional planning process and identifies needs, financial resources, and priorities for the KTMPO area.



The KTMPO region is located in Central Texas and includes the urbanized areas surrounding Killeen and Temple. The planning area includes all of Bell County with portions of Coryell and Lampasas counties.

## SYSTEM EXPANSION

### MTP 2040 GOALS AT A GLANCE

- ⇒ **Improve mobility, reduce congestion**
- ⇒ **Improve access to jobs, homes, goods, and services**
- ⇒ **Improve safety, reliability, and efficiency in transportation system**
- ⇒ **Promote a healthier environment**
- ⇒ **Encourage regional coordination in decision making**

As the KTMPO region grows in population, demand on the transportation system will grow as well. The 2040 MTP identifies 157 roadway projects, 13 transit projects, and 17 bike/pedestrian projects for our region for the 25 year planning horizon. Through KTMPO's Congestion Management Process, congested areas will be identified and priority given to resulting remedial projects, but only \$657 million is available from state and federal funding to address these needs. Other priorities include expanding bike/pedestrian facilities and growing successful bus services.

## ROADWAY

Located centrally between Dallas - San Antonio and El Paso - Houston, Central Texas maintains major roadway facilities that are vital to commerce, manufacturing and the military. Within our region are nationally known manufacturers of goods, distributors of various products, nationally recognized medical facilities and the largest active duty armored post in the United States Armed Services.

In 2010, the Milken Institute released its 2010 Best Performing Cities rating. The Killeen - Temple Metropolitan area was considered the best metro area in the nation for overall business climate. Growth factors and expected pass-through traffic growth on our roadways will continue to warrant major investments for safe and reliable roadway facilities.

## TRANSIT

The use of public transit is an important tool for improving mobility throughout our region. Hill Country Transit District recommends \$11 million in vehicle capital investments across the region through the year 2040. In addition, the following special capital projects are under consideration:

### Intelligent Transporations Systems (ITS):

- Vehicle Monitoring Systems (surveillance cameras)
- Transfer Center Kiosks
- Upgraded Vehicle-to-Dispatch Communications System
- Transfer Center Security Systems
- Electronic Fare Payment Smart Cards

### Regional Multi-Modal Transportation Facility:

- Transfer Terminal for transit system which could also accommodate intercity bus carriers and taxi cabs. Potential for development as a transit plaza with day care center, ATM machines, restaurants, shops, etc.

## KTMPO ACCOMPLISHMENTS IN PAST 5 YEARS

### **New Roadways:**

US 190 Bypass in Copperas Cove  
SH 9 relief route in Copperas Cove

### **Roadway Expansions:**

IH 35 widening: South Loop 363 to North Troy  
IH 35 widening: US 190 to FM 2843  
US 190 widening: Spur 172 (Main Gate) to FM 2410  
US 190 widening: SH 95 to 2 mi south of FM 436  
FM 2410 widening: Stan Schlueter to Roy Reynolds  
FM 2305 widening: SH 317 to FM 2271

### **Interchange/Overpass Projects:**

US 190 @ Rosewood Dr  
US 190 @ Railhead Rd

## BICYCLE & PEDESTRIAN

Public input supports funding for bicycle and pedestrian improvements throughout the KTMPO region. The Transportation Alternatives Program (TAP) will provide a dedicated source of funding for these types of projects.

A sidewalk inventory conducted in 2010 shows 244 miles of sidewalks in the KTMPO region. The 2040 MTP proposes 17 projects to construct additional sidewalks and trails extending approximately 32 miles.

To accommodate and support multi-modal travel, Hill Country Transit District now provides bicycle racks on all fixed route buses.

KTMPO monitors the 2011 Pedestrian/Bicycle Plan goals and objectives to ensure identified needs are met for the region.

## MULTI-MODAL ALTERNATIVES

**M**ulti Modal alternatives in the KTMPO region include rail and trucking for freight while passengers are served through rail, air, motor coach and local bus transit facilities. Located on a Congressional High Priority Corridor, the KTMPO area is one of the highest density freight zones in the United States. This corridor includes the Canada to Mexico, Dallas to San Antonio and Dallas to Houston markets. In addition to KTMPO's strategic economic location for freight, the effective movement of Fort Hood troops/equipment/supplies by all modes of transportation are a key factor in the security and safety of our nation.

### SAFETY

**S**afety issues are discovered in the region by analyzing the prevalence of crashes. The plan highlights the high crash locations and includes deeper analysis on:

- crash type
- crash location
- system user
- contributing cause

### QUALITY OF LIFE

**P**rotecting the environment, whether natural or man-made, is a key factor in ensuring a high quality of life for the region's occupants. Sensitive environmental features and areas have been identified and the MPO coordinates with appropriate groups and agencies to develop applicable mitigation strategies. Sustainable practices, and context sensitive design and solutions, are also promoted by the MPO to preserve and enhance the region's quality of life.

KTMPO monitors ozone levels via two air quality monitoring stations in the region; the KTMPO region is currently in compliance with ozone standards. The MPO is promoting awareness of air quality issues, climate change and the impact greenhouse gas emissions have on air quality, and is also exploring participation in the Ozone Advance Program. A Congestion Management Process is in place to reduce roadway congestion which will also result in cleaner air.

### SECURITY

**T**he transportation system's ability to respond and recover from an event is important to the well-being of its users. Central Texas Council of Government's Emergency Operation Plan lays out region-wide response management should a disaster occur in the region. The Killeen-Temple MPO monitors this plan to assess the ability of the system to respond to an event.

### FINANCING THE 2040 MTP

**T**he 2040 MTP includes a total of 187 projects at an estimated cost of \$2.5 billion. However, with anticipated state and federal funding significantly reduced, forecasted revenue over the 25 year planning horizon is estimated at only \$657 million. The projected revenue allows 13 transit projects and 14 roadway projects to be fully funded. Fifteen additional roadway projects are broken out by phase and are partially funded. The remaining roadway projects are listed as unfunded. Fiscal constraint will be applied to the bike/pedestrian projects after appropriate scoring criteria have been established.

Reduced state and federal funding at a time when regional growth necessitates expansion of the transportation system will create a challenging environment and may require local entities to consider other financing options and partnerships.

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# Organization History & Operations



Killeen-Temple Urban Transportation Study was formed in 1975 to conduct transportation planning for the urbanized areas of Killeen and Temple. The planning boundary was expanded in 2009 to include all of Bell County, larger portions of Coryell and Lampasas Counties, and portions of Fort Hood. At that time, the name was also changed to Killeen-Temple Metropolitan Planning Organization (KTMP). KTMP was designated a Transportation Management Area (TMA) in 2012 due to the population of the Killeen urbanized area exceeding 200,000. By year 2040, the KTMP population is expected to increase by approximately 200,000, which is equivalent to adding another urbanized area the size of Killeen. Planning for this growth now is crucial to ensure the efficient and effective movement of people and goods throughout the region.

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## HISTORY

With the passing of the Federal Highway Transportation Act of 1962, the U.S. Congress placed particular emphasis on the needs for transportation planning in urbanized areas and made long-range transportation planning a condition for receipt of federal highway funds in urban areas. All cities with a population of 50,000 or more that desired to use federal funds for transportation were required to have a comprehensive, cooperative, and continuing regional transportation planning process. This Act specifically states:

*“The Secretary [of Transportation] shall not approve...any projects in any urban area of more than 50,000 population unless he finds that such projects are based on a CONTINUING, COMPREHENSIVE transportation planning process carried on COOPERATIVELY by the States and Local Communities.”*

In compliance with this Act, the cities of Temple, Belton, Nolanville, Harker Heights, Killeen, and Copperas Cove along with the counties of Bell, Coryell, and Lampasas, and the Texas Department of Transportation (TxDOT) formed the Killeen-Temple Urban Transportation Study (K-TUTS) in 1975 (see “K-TUTS Planning Area” map). Predating 1994, K-TUTS (later KTMPO) was primarily located in TxDOT’s Waco District, with a small portion in the Brownwood District.

Two urban zones exist within this area defined by the US Census Bureau as an “urbanized area” or “UZA”—the largest encompasses the cities of Killeen, Harker Heights, Copperas Cove, and Nolanville, and the other contains Temple, Belton, and Morgan’s Point Resort. The two UZAs are separated by a narrow, mostly undeveloped gap. However, by the next decennial census, sustained rapid growth is expected to result in urban development within the gap, joining the UZAs.

Following the release of 2010 Census data which estimated the population of the Killeen UZA to be 217,630, and the population of the Temple-Belton UZA to be 90,390, the KTMPO was designated a Transportation Management Area (TMA). An MPO is given TMA designation when a contained UZA reaches the 200,000 population threshold. A TMA enjoys benefits and incurs additional requirements beyond those of smaller MPOs. Although the TMA qualifies for additional types of funding, its planning process must include a Congestion Management Process (CMP) and be certified by the Federal Highway Administration and the Federal Transit Administration no less than once every three years, and a change in composition of its Transportation Planning Policy Board may be required.

The region contains I-35, dubbed the NAFTA (North American Free Trade Agreement) Superhighway/Main Street Texas, which holds a perpendicular connection westward to the largest active duty armored post in the United States Armed Services, Fort Hood. Additionally, the region is observed as the end of the road for fleeing gulf hurricanes and boasts a significant regional rail hub active since the late 1800’s.



## METROPOLITAN PLANNING AREA PROGRESSION

In August of 2008, the K-TUTS Transportation Planning Policy Board (TPPB) directed K-TUTS staff to study a possible MPO boundary expansion due to population growth in the rural areas of Bell, Coryell, and Lampasas Counties. Members of the TPPB believed that the rate of growth in some rural portions of these counties was indicative of urban growth and that it was within reason that these areas would urbanize within the next 25 years. The study supported this assumption and the K-TUTS TPPB approved the adjusted Metropolitan Planning Area (MPA) boundary on January 21, 2009 and petitioned TxDOT for approval. The Governor of Texas delegated authority to approve MPA boundary changes to the Texas Transportation Commission (TTC) in October 2005. The TTC approved the MPA boundary changes on June 25, 2009.

Effective June 25, 2009, the K-TUTS Metropolitan Area Boundary (MAB) was expanded to encompass all of Bell County, larger portions of Lampasas and Coryell Counties, and portions of Fort Hood. The current physical extent of the MPO planning area resulting from that action is depicted on Exhibit 1.1 “KTMPO Metropolitan Planning Area” map. The boundary encompasses the urbanized area and the contiguous geographical area likely to become urbanized within the 25-year forecast period covered by the Metropolitan Transportation Plan.

Subsequent to this action, a task force made up of a subset of the K-TUTS Transportation Planning Policy Board was charged with reviewing the K-TUTS By-Laws with a specific focus on membership. On November 18, 2009, the K-TUTS TPPB voted to accept two recommended actions resulting from this effort:

**Membership Change** - modify membership to more accurately represent population distribution within the K-TUTS MAB following MAB expansion (detailed in the By-Laws section of this chapter).

**Organization Name Change** - change the name of the organization from Killeen-Temple Urban Transportation Study (K-TUTS) to Killeen-Temple Metropolitan Planning Organization, or KTMPO.

## URBANIZED AREAS

The KTMPO region contains two Census-designated urbanized areas. The eastern urbanized area includes the cities of Temple, Belton, and Morgan’s Point Resort, and the western urbanized area includes the cities of Killeen, Copperas Cove, Harker Heights, and Nolanville. In conjunction with the decennial Census of 2010, KTMPO underwent a process of “smoothing” the urbanized boundary to incorporate areas that contain roadways that function with urban characteristics. Exhibit 1.2 depicts the expansion of the urbanized areas in the KTMPO region.

The jagged urbanized boundaries were smoothed to include Census tracts that fall within areas of roadways that carry urban traffic. The gap between the two Killeen and Temple urbanized areas along the US 190 corridor primarily carries urban traffic and should be characterized as urban for planning purposes; therefore, the smoothing resulted in creating one contiguous urbanized area, though the unique characteristics of each remain.

The smoothed urbanized boundary currently touches the planning boundary at the Lampasas-Burnet county line. Future coordination with Capital Area Metropolitan Planning Organization (CAMPO) will be necessary in regional planning efforts involving this area because Burnet County falls within CAMPO’s planning boundary.



Exhibit 1.1: Metropolitan Planning Area

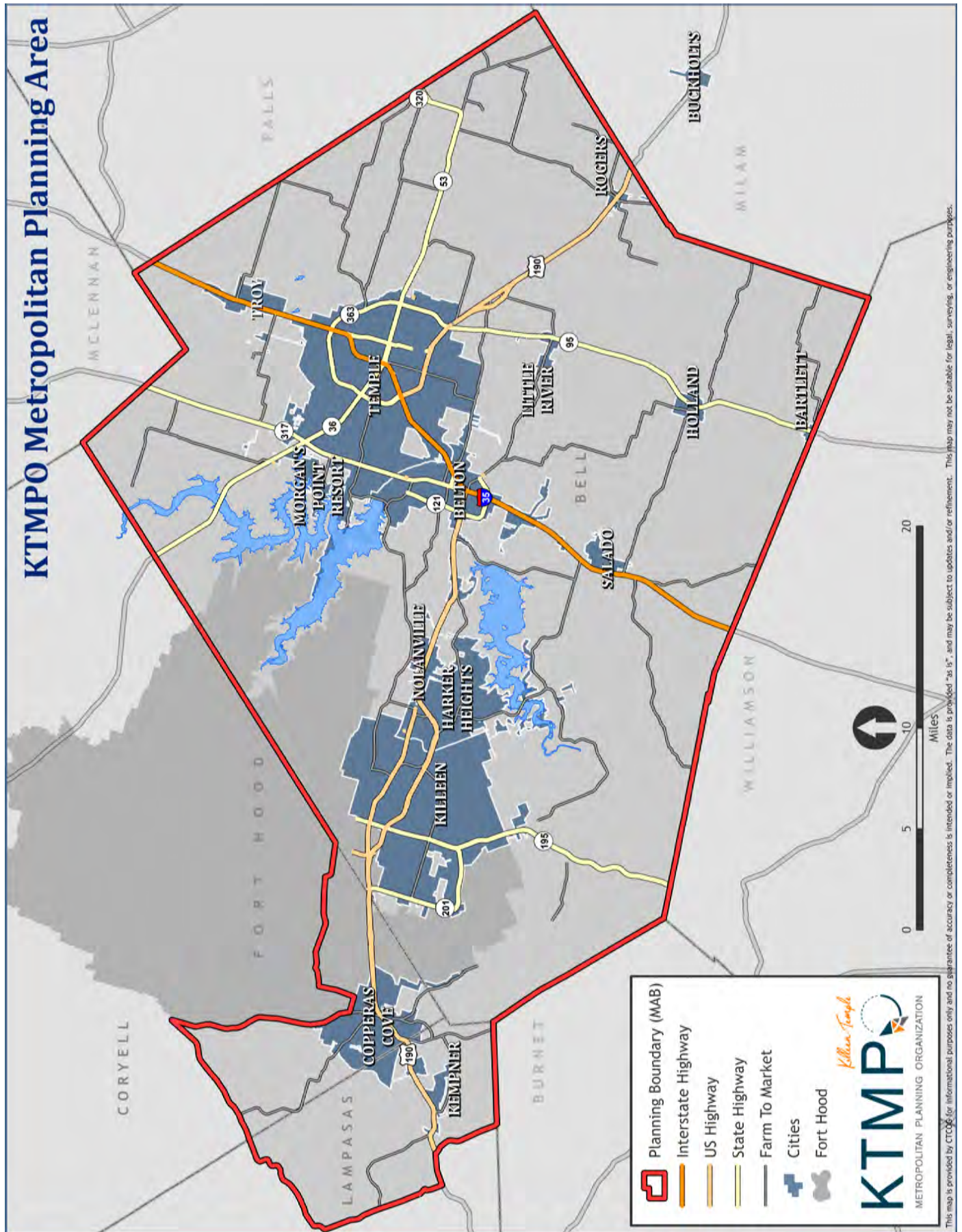
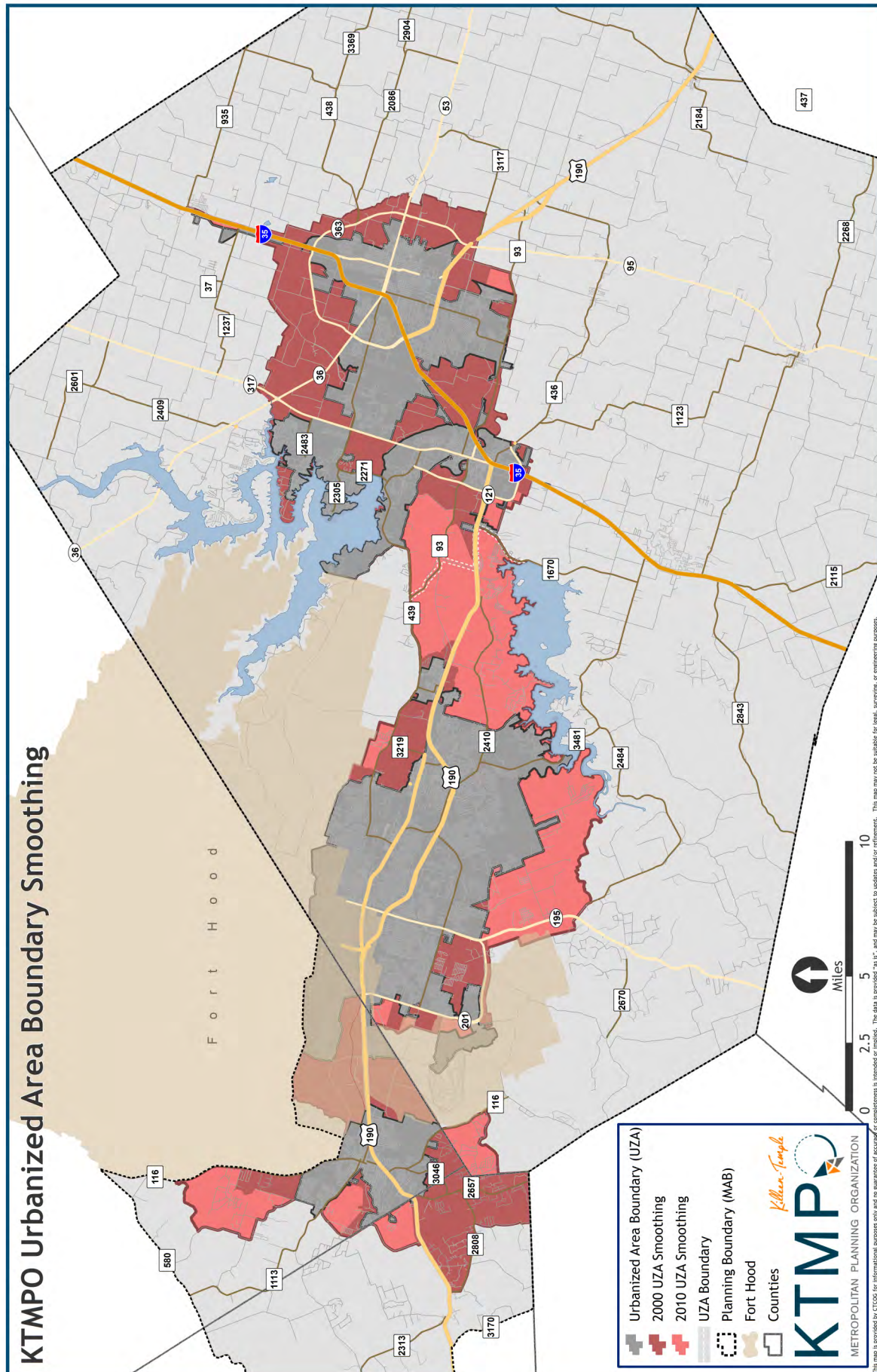




Exhibit 1.2: Urbanized Area Boundary Smoothing



## TRANSPORTATION MANAGEMENT AREA (TMA) DESIGNATION

KTMPO was designated a TMA in July 2012. TMAs must have a congestion management process (CMP) that identifies actions and strategies to reduce congestion and increase mobility. In addition, changes to funding and the selection process occur as a result of TMA designation. As a TMA, KTMPO has access to funding from Category 7 (Surface Transportation Program-Metropolitan Mobility—STPMM) and Category 9 (Transportation Alternatives Program). TMAs have the ability to select funded projects in consultation with the state; whereas in other MPOs and rural areas the projects are selected by the state in cooperation with the MPO or local government.

## OPERATING PROCEDURES

The KTMPO Transportation Planning Policy Board provides regional transportation policy guidance for those participating government entities and agencies which comprise the KTMPO and operates according to the Official By-Laws of the Transportation Planning Policy Board. A Technical Advisory Committee (TAC), made up of appointed representatives from participating entities and agencies, reviews technical issues and develops preferred technical alternatives for TPPB action. Since initial adoption in 1982, amendments have been made to the KTMPO By-Laws in 1997, 1999, 2003, 2004, 2009 (as a result of the boundary expansion), and most recently, September 18, 2013, to incorporate provisions of MAP-21. MAP-21, the Moving Ahead for Progress in the 21<sup>st</sup> Century Act, was passed by the U.S. Congress and signed into law in July 2012, and is the most recent guiding legislation for development of the country's vital transportation infrastructure.

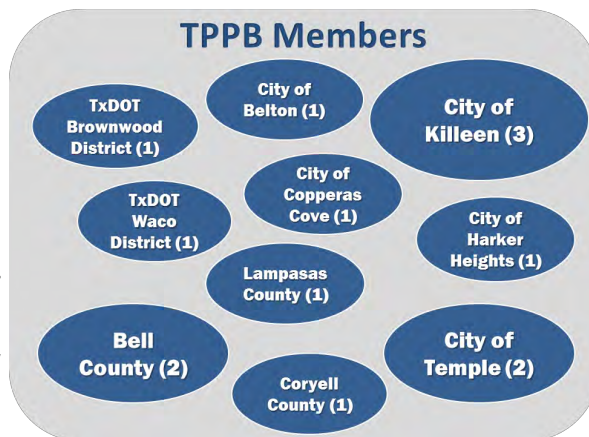
Currently, meetings are held on a schedule determined by a majority vote of the members. The TPPB and the TAC make it a practice to meet monthly, but are obligated to hold at least four public meetings a year. The chairperson may call a meeting or any member may request that a meeting be called by written request to said chairperson. Annual meetings are normally held in September.

The MPO director is responsible for all meeting notices and publicity. Specifics of the meeting will be provided to each TPPB member in writing and to the general public in accordance with the Texas Open Meetings Act. With the exception of emergency meetings, all members are notified at least three days prior to meeting. As part of the Open Meetings Act, a record of the proceedings is generated from recording and documentation. Fifty-one percent of the membership with a minimum of four agencies in attendance satisfies the established quorum.

## MEMBERSHIP

### TPPB Voting membership

The voting membership of the Transportation Planning Policy Board consists of one representative for each city with a population between 10,000 and 40,000, two representatives for cities between 40,000 and 75,000 and three representatives for populations over 75,000 as determined by the most recent Census. All cities within the MPO Boundary with a population under 10,000 shall be represented by their county official or appointee. Additionally, all counties have one designated representative, with the exception of Bell County which contains a majority of the MPO and population. The TPPB voting membership is depicted in the above graphic.





If any voting TPPB member will be unable to attend a meeting, that member may appoint a voting proxy, by writing the MPO in advance, which in turn shall be counted for quorum purposes.

The smaller cities within the study area shall be represented by their County TPPB member. However, they will be encouraged to attend all meetings and to participate in deliberations. Currently, these cities are: Nolanville, Troy, Little River-Academy, Kempner, Salado, Bartlett, Holland, Rogers, and Morgan's Point Resort.

Each of the following agencies or offices shall be represented by one non-voting member:

- Fort Hood Military base
- State Senators, State Representatives and US Representatives serving in the KTMPO area
- Federal Highway Administration
- Federal Transit Administration
- Texas Air Control Board
- Federal Aviation Administration
- Airport managers – Killeen and Temple
- Central Texas Council of Governments
- Others, as may be appropriate

Individuals serving on this Transportation Planning Policy Board shall be elected officials and shall be designated in writing by the following:

**City members** – Mayor, City Council, or Manager as designated by the governing body

**County members** – County Commissioners Court

**TxDOT districts** – Waco and Brownwood District Engineers

**Transit member** – Hill Country Transit District Board of Directors

**Fort Hood member** – III Corps Commander, or their designee

### **TAC Voting membership**

The Technical Advisory Committee is tasked with reviewing technical issues and developing preferred technical alternatives for TPPB action. The voting membership of this committee consists of one representative from each of the following:

- City of Killeen
- City of Temple
- City of Copperas Cove
- City of Belton
- City of Harker Heights
- Bell County
- Coryell County
- Lampasas County
- TxDOT Waco District
- TxDOT Brownwood District

Additionally, one non-voting seat is provided for the following entities:

- Cities: Nolanville, Troy, Little River-Academy, Morgan's Point Resort, Salado, Kempner, Bartlett, Holland, Rogers
- Fort Hood Military base
- Federal Highway Administration
- Federal Transit Administration
- TxDOT

Individuals serving on this Technical Advisory Committee shall be designated in writing by the following:

**City members** – Mayor, City Council, or Manager as designated by the governing body

**County members** – County Commissioners Court

**TxDOT districts** – Waco and Brownwood District Engineers

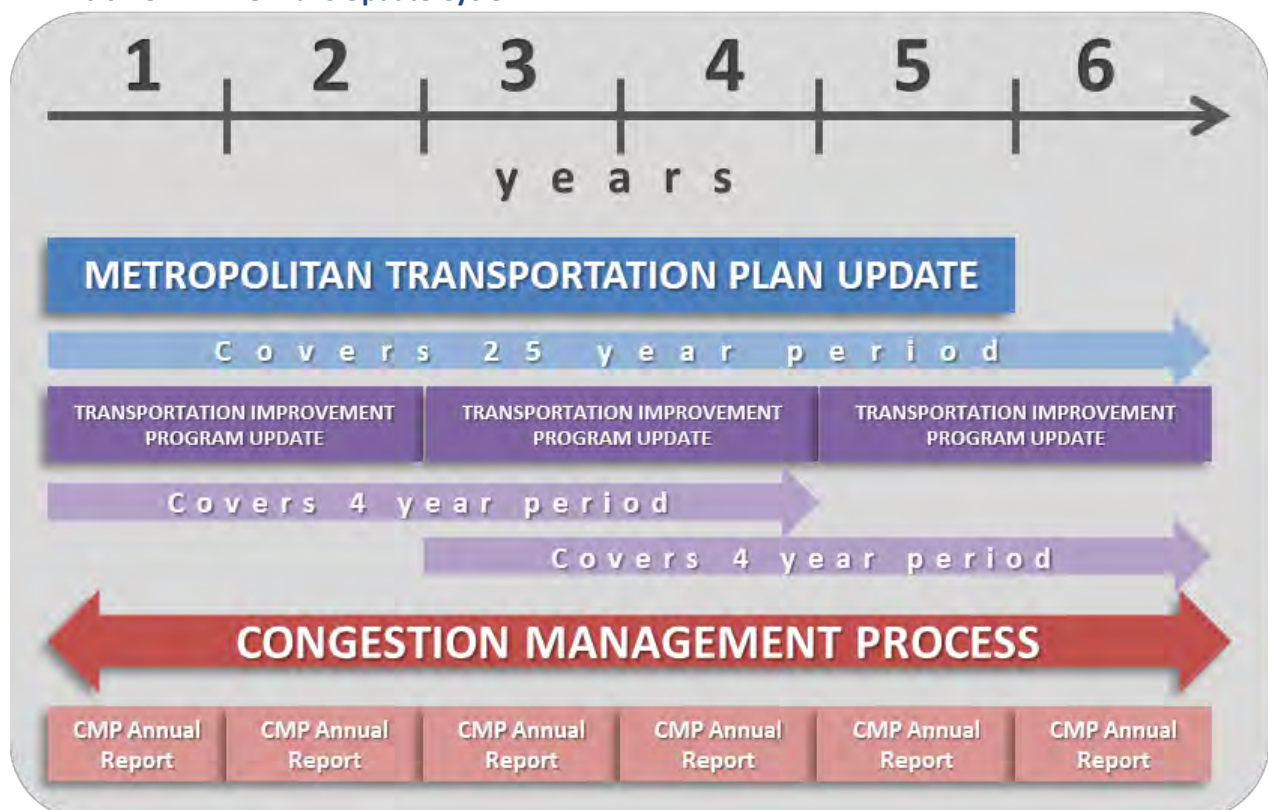
**Transit member** – Hill Country Transit District Board of Directors

**Fort Hood member** – III Corps Commander, or their designee

### REQUIRED DOCUMENTS/PLANS AND UPDATE CYCLES

The MPO is responsible for the development of several plans in addition to this Metropolitan Transportation Plan. Though separate documents with different ranges and update cycles, they are meant to inform one another so each will progress.

Exhibit 1.3: KTMPO Plans Update Cycle



**Metropolitan Transportation Plan (MTP).** Title 23, U.S.C. Section 134 (i) (1) states that MPOs shall prepare and update their MTP every four or five years, depending upon whether the MPO is in attainment with the Clean Air Act (42 U.S.C. 7407 (d)). If in attainment, the MPO is required to update the MTP every five years; if designated as nonattainment, the MTP must be updated every four years. In either case, the MPO may update the plan more frequently if desired. KTMPO is currently in attainment with air quality standards; however, designation as a nonattainment area with regard to ozone is possible in the next few years. KTMPO will update the MTP as required in 2018 or 2019. In addition, MAP-21 requires MPOs to establish regional performance measures in coordination with state and public transportation providers, based on statewide goals. Therefore, the MTP will be updated to include the statewide goals once guidance has been provided. This will likely occur before the 2018/2019 update cycle.

**Transportation Improvement Program (TIP).** Title 23, U.S.C. Section 450.324 states that the TIP shall cover a period of no less than four years, be updated at least every four years, and be approved by the MPO and the Governor. The TIP may be updated more frequently, but the cycle for updating the TIP must be compatible with the STIP (State Transportation Improvement Program) development and approval process. The TIP expires when the FHWA/FTA approval of the STIP expires. Copies of any updated or revised TIPs must be provided to the FHWA and the FTA. The KTMPO TIP is a four-year transportation planning document that includes a detailed listing of projects reasonably expected to begin within a four year period. Projects included in the TIP must also be included in the MTP and are chosen based on regional priority and available funding. Although the KTMPO TIP covers a four year period, it is updated every two years; therefore, an overlap between successive TIPs will occur.

**Congestion Management Process (CMP).** Title 23, U.S.C. Section 450.320 states the transportation planning process in a TMA shall address congestion management through a process that provides for safe and effective integrated management and operation of the multimodal transportation system. The development of a congestion management process should result in multimodal system performance measures and strategies that can be reflected in the metropolitan transportation plan and the TIP. MAP-21 requires MPOs that have been designated a TMA to develop a CMP within 18 months of the TMA designation. The CMP is a "living" document, continually evolving to address the results of performance measures, concerns of the community, new objectives and goals of the MPO, and up-to-date information on congestion issues. The KTMPO CMP includes an Action Plan that will be assessed on an annual basis. As such, the CMP will be monitored annually and updated as needed.

In addition to these local plans, the following MPO documents were used to inform the KTMPO long-range transportation planning process:

**Public Participation Plan.** This document serves as the plan for involving all citizens and transportation stakeholders in the public involvement process for metropolitan transportation planning.

**Regionally Coordinated Transportation Plan.** The purpose of this plan is to coordinate efforts to provide public transportation services to the region. The plan includes an assessment of transportation needs; identification of transportation inefficiencies and service gaps; determination of goals and objectives; and development of a workplan for implementation.



## LOCAL GOVERNMENT COORDINATION

In the fall of 2012, KTMPO began hosting quarterly “Planner Roundtable” meetings to encourage coordination and information exchange among the KTMPO member jurisdictions. The meetings provide an opportunity for the planners to discuss and compare practices and views on a variety of topics to include bike/pedestrian issues, GIS information, new development projects, roadway needs, transit needs, freight issues, air quality, environmentally sensitive areas, operating procedures/ordinances, etc. Regional coordination efforts are enhanced when all parties are engaged in discussions and aware of other’s activities and concerns. The roundtable meetings have been well attended and will continue to be an integral part of KTMPO’s regional coordination efforts.

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# MTP Development



Federal and state legislation requires each urbanized area with a population of at least 50,000 to have a long range transportation plan to identify and plan for the future regional transportation system. This MTP update is prepared for the horizon year 2040 and has been developed by KTMP staff, in coordination with TxDOT and Hill Country Transit District, reviewed by the KTMP Technical Advisory Committee and Transportation Planning Policy Board, and ultimately approved and adopted by the Transportation Planning Policy Board as the official guide to the development of the regional transportation system for the KTMP region.



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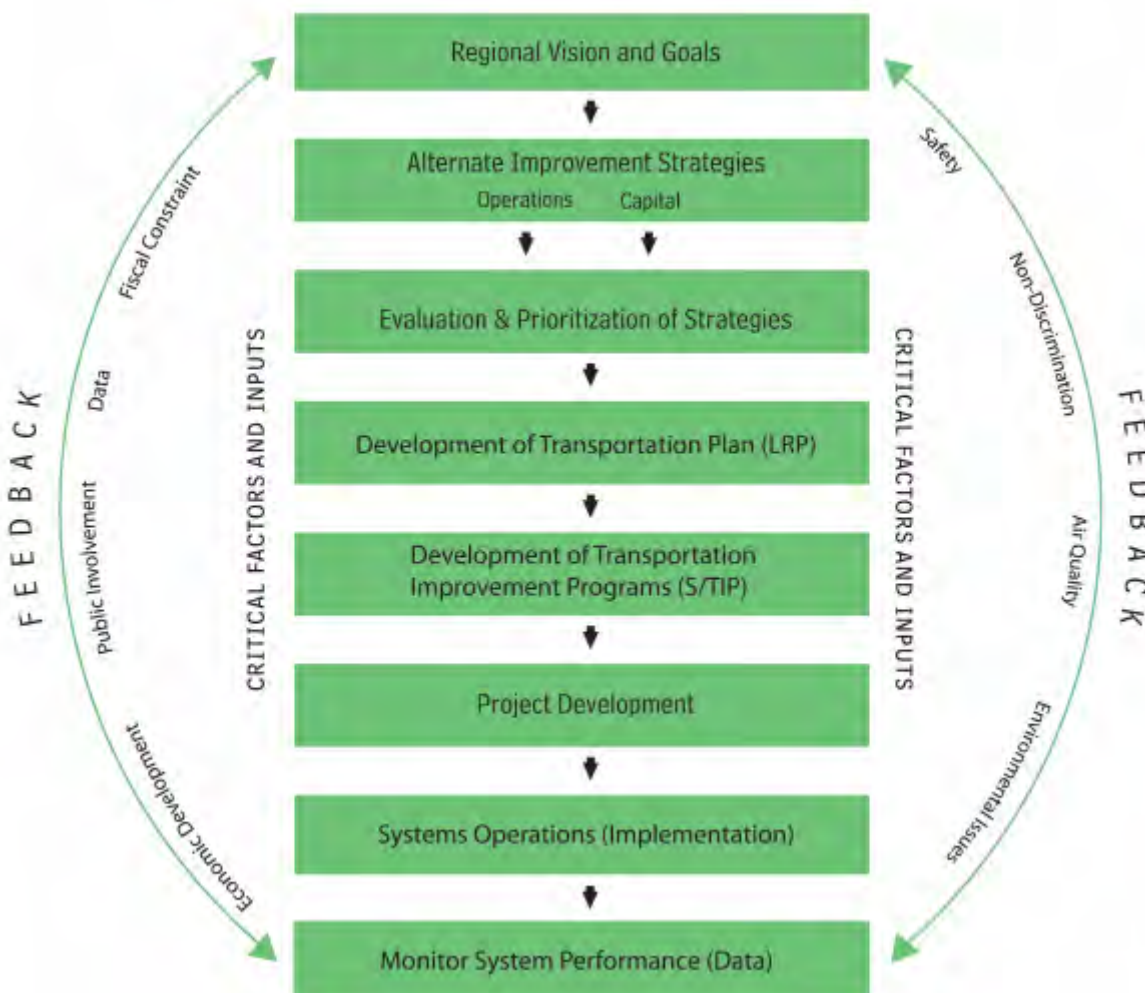
## TRANSPORTATION PLANNING AT A REGIONAL LEVEL

The Killeen-Temple Metropolitan Planning Organization planning boundary encompasses an area of 1,222 miles, which includes all of Bell County, and portions of Coryell and Lampasas Counties. Because the planning area includes 14 cities, as well as a large rural area of 1,022 miles, it is the task of KTMPO to develop a cooperative and comprehensive process to promote regional transportation planning.

As a region with two prominent urbanized areas each containing unique traffic generators, the transportation users in the KTMPO planning area truly travel on a regional level. The proximity of businesses, schools, Fort Hood, and other traffic generators to the major arterial roads and other modes of transportation are what defines the transportation characteristics and future needs in the region.

The Mobility 2040 Metropolitan Transportation Plan is the twenty-five year document that outlines the state of current transportation, projects future needs, and offers projects and other methods for keeping the people and freight in the KTMPO region moving efficiently.

**Exhibit 2.1: Transportation Planning Process**



## FEDERAL AND STATE REQUIREMENTS

The Intermodal Surface Transportation Efficiency Act of 1991, known as ISTEA, included some measures that significantly changed transportation planning. ISTEA included an emphasis on multi-modal considerations, public involvement, and better highway design. The role of the MPO was further integrated into the transportation planning process and citizen involvement became paramount to accomplishing the new directives. Although not as significant in the K-TUTS areas as in the Transportation Management Areas (TMAs), the inclusion of the Clean Air Act provisions in ISTEA highlighted the growing importance of issues beyond fast and convenient transportation.

Since 1962, there have been three iterations of the original Act: the Transportation Equity Act for the 21st Century (TEA-21), two extensions, and Safe, Accountable, Flexible, and -Efficient Transportation Equity Act: A Legacy for Users also known as SAFETEA-LU. This legislation, signed into law in August of 2005, authorized highway, highway safety, transit, and other surface transportation programs totaling \$244.1 billion, and featured changes in implementation for greater efficiency and accountability. While ISTEA and TEA-21 shaped the highway program to meet the nation's changing transportation needs, SAFETEA-LU built on this foundation, supplying the funds and refining the programmatic framework for investments needed to maintain and expand national transportation infrastructure.

SAFETEA-LU sought to address challenges facing our transportation system in more recent years – challenges such as improving safety, reducing traffic congestion, improving efficiency in freight movement, increasing intermodal connectivity, and protecting the environment – as well as lay the groundwork for addressing future challenges. SAFETEA-LU required the Metropolitan Planning Organization to consider planning strategies that would serve to advance eight transportation-planning factors identified under SAFETEA-LU:

- Support the economic vitality of the metropolitan area, especially by enabling global competitiveness, productivity, and efficiency;
- Increase the safety of the transportation system for motorized and non-motorized users;
- Increase the security of the transportation system for motorized and non-motorized users;
- Increase the accessibility and mobility of people and freight;
- Protect and enhance the environment, promote energy conservation, improve the quality of life, and promote consistency between transportation improvements and State and local planned growth and economic development patterns;
- Enhance the integration and connectivity of the transportation system, across and between modes, for people and freight;
- Promote efficient system management and operation; and
- Emphasize the preservation of the existing transportation system.

SAFETEA-LU promoted more efficient and effective federal surface transportation programs by focusing on transportation issues of national significance while giving state and local transportation decision makers more flexibility in solving transportation problems in their communities. SAFETEA-LU continued a strong fundamental core formula program emphasis coupled with targeted investment featuring safety, equity, innovative finance, congestion relief, mobility and productivity, efficiency, environmental stewardship, and environmental streamlining.

All of these federal actions have had a profound effect on the history, formation, and role of KTMPO, however, the most recent federal legislation that affects the organization and function of the MPO is MAP-21. Passed in July 2012 and effective October 2012, MAP-21 extends Highway Trust Fund taxes and ensures two years of solvency for the Highway Trust Fund. By utilizing a performance-based planning process, the objective of this long-term highway authorization is to increase transparency in the planning process and funding avenues, yet yields many policies set forth by SAFETEA-LU.

The eight transportation planning factors identified under SAFETEA-LU were continued in MAP-21. Following is a discussion of how these planning factors were considered by the MPO in the development of the 2040 MTP.

## **1 Economic Vitality**

The efficient and effective movement of people and goods is a key factor in developing and maintaining the economic health of a region. One of the MPO's goals is to enhance the economic vitality of the region by efficiently and effectively connecting people to employment, goods, and services. This is achieved by promoting projects and strategies that increase mobility and accessibility throughout the region and relieve congestion on major corridors, such as IH 35, used for connecting people, goods, and services. Level of service for the region's roadways are discussed in the MPO's Congestion Management Process to assist in identifying roadways needing improvements. These efforts will enable the region's transportation system to support economic vitality and global competitiveness, productivity, and efficiency.

## **2 Safety**

Improving the safety of all modes of transportation is important to the MPO and is a listed goal. All users of the transportation system, both motorized and non-motorized, are entitled to a safe transportation system. As the MTP was being developed, the MPO solicited input from the public regarding safety issues. The MPO also collects safety information for major roadways in the region. All of this information is considered as project and strategies are identified to address the region's safety issues.

## **3 Security**

Improving the security of the transportation system is also a goal of the MPO which is combined with safety. A secure transportation system encompasses various elements and is key to the health, safety and welfare of the region's population. In developing the MTP, MPO staff coordinated with emergency management organizations and personnel to identify critical emergency corridors and evacuation routes which are critical for the movement of people, goods, and equipment in the event of a natural or man-made threat or disaster.

## **4 Accessibility and Mobility**

Improving access to goods, employment, services, housing, and other destinations within the KTMPO region and beyond is a primary focus of the MPO and is an identified goal. The MTP acknowledges the importance of expanding the roadway system to improve access and mobility but also the importance of alternative transportation modes such as transit and bike/pedestrian facilities. As such, the MTP project listing includes roadway projects, transit projects, and bike/pedestrian projects.

## **5 Environment, Energy Conservation, Planned Growth**

Other goals of the MPO include environmental sustainability and sustainable land use patterns. Smart growth patterns encompass alternative transportation modes which may reduce congestion on roadways and reduce the waste of fuel. With fewer vehicles on the road and fewer congested roadways, greenhouse gas emissions which contribute to higher ozone levels and degradation of air quality, may in turn be lowered. All of these factors are considered in the MPO's Congestion Management Process.

## **6 Modal Integration and Connectivity**

This planning factor is included in the MPO goal to provide a wide range of convenient, safe, and affordable transportation alternatives. The MTP includes projects that support a balanced, multi-modal system with projects for roadways, transit, and bike/pedestrian facilities. Movement of people and freight via rail and air are also considered in the region's multi-modal system to enhance overall system connectivity.

## **7 System Management and Operation**

With limited financial resources, it is important to maximize the efficiency of the existing transportation system. This may be accomplished partly by regular maintenance schedules to inspect and evaluate the condition of the infrastructure and equipment and address any deficiencies. The use of Intelligent Transportation System (ITS) solutions is an important component of system management and operations. In developing the MTP, the MPO coordinated with TxDOT, the regional transit provider, and counties and cities within the MPO boundary regarding the management and operation of their facilities. System management and operation procedures are discussed in various chapters of the MTP.

## **8 System Preservation**

Preserving the existing transportation system goes hand-in-hand with efficient system management and operations. Maintaining the existing infrastructure in a state of good repair will prolong the life of the transportation system resulting in more efficient use of limited funding. The importance of this is recognized by the MPO and is stated in a funding and revenue goal to prioritize projected transportation funds to ensure the maintenance of current and future transportation systems.



## CONSIDERATION OF STATE AND LOCAL PLANS

The primary role of the federal government has been to provide guidance and leadership through establishing policy, providing financial assistance, and providing research and training. However, most transportation planning efforts occur at the state, regional, and local levels. It is important to strike a balance between multiple layers of oversight and affording more flexibility and control to state, regional, and local planning organizations. The information provided below is intended to give insight into how the State of Texas and local entities contribute to transportation planning in the KTMPO area, as well as to acknowledge their ideas, issues, and recommendations on past and current planning efforts.

### State Agencies and Plans

The Texas Department of Transportation (TxDOT) is responsible for planning, designing, building, operating, and maintaining the state's transportation system in cooperation with local and regional entities. Within TxDOT, there are 25 district offices that oversee the agency's responsibilities in each district area, as well as four regional offices, and 22 divisions housed in seven offices located in Austin, which serve in an administrative and technical capacity for the district offices. TxDOT is governed by the Texas Transportation Commission, which is a five-member commission appointed by the governor with the advice and consent of the Texas Senate. The TxDOT-Waco and Brownwood Districts oversee the implementation of transportation projects throughout the KTMPO region and work in cooperation with the MPO to carry out transportation planning tasks and activities in the metropolitan planning area.

### 2013-2017 Strategic Plan

This document is an overarching policy statement designed to provide a framework for taking action within TxDOT. It addresses strategies and tactics that are necessary in order for TxDOT to fulfill its mission and goals over five years and establishes performance measures to monitor its progress.

### Statewide Long-Range Transportation Plan 2035

In consultation with the public and various stakeholders, TxDOT developed a new long range plan in 2010 to address long-term transportation needs in Texas. Per federal transportation planning regulations, all MPO plans must be consistent with this statewide plan. The 2040 Plan is currently under development and is anticipated to be completed in October 2014.

### Unified Transportation Program (UTP)

TxDOT uses the UTP as a ten-year plan to guide transportation project development. The current UTP was approved in August 2013 and addresses 12 different categories of funding that will guide the development of both preservation and expansion projects throughout the state. The UTP represents a medium-range planning document that should be consistent with MTPs across the state.

### Texas Strategic Highway Safety Plan (SHSP)

MAP-21 requires that all states develop and implement a SHSP and that the metropolitan transportation planning process be consistent with the plan. This document identifies safety needs and directs investment decisions in order to reduce highway fatalities and serious injuries on public roads and was last updated in September 2012.

## **TCEQ and Texas Statewide Implementation Plan (SIP)**

The Texas Commission on Environmental Quality (TCEQ) maintains the Texas State Implementation Plan (SIP). This plan is a collection of regulations that explain how a state will clean up polluted areas under the Clean Air Act. Within the SIP, nine areas across the state have developed local air quality plans to clean the air and meet federal air quality standards.

All states must have a SIP establishing enforceable criteria and procedures for making conformity determinations for metropolitan transportation plans, transportation improvement programs, and projects funded by the Federal Highway Administration or the Federal Transit Administration in nonattainment or maintenance areas. Each nonattainment or maintenance area, in turn, must have an MTP that is found to be conforming and consistent with the SIP.

## **Local Agencies and Plans**

The many jurisdictions within the KTMPO planning area develop their own local initiatives and plans to guide future growth and development, including comprehensive plans, zoning plans, capital improvement plans, building codes, subdivision and platting standards, thoroughfare plans, downtown master plans, and park and open space plans. In developing current estimates and future year projections of various socioeconomic data to help plan for transportation projects and programs included in this MTP, local plans and staff were consulted to gain the most accurate and informed insight into future development patterns.

## **GUIDING PRINCIPLES**

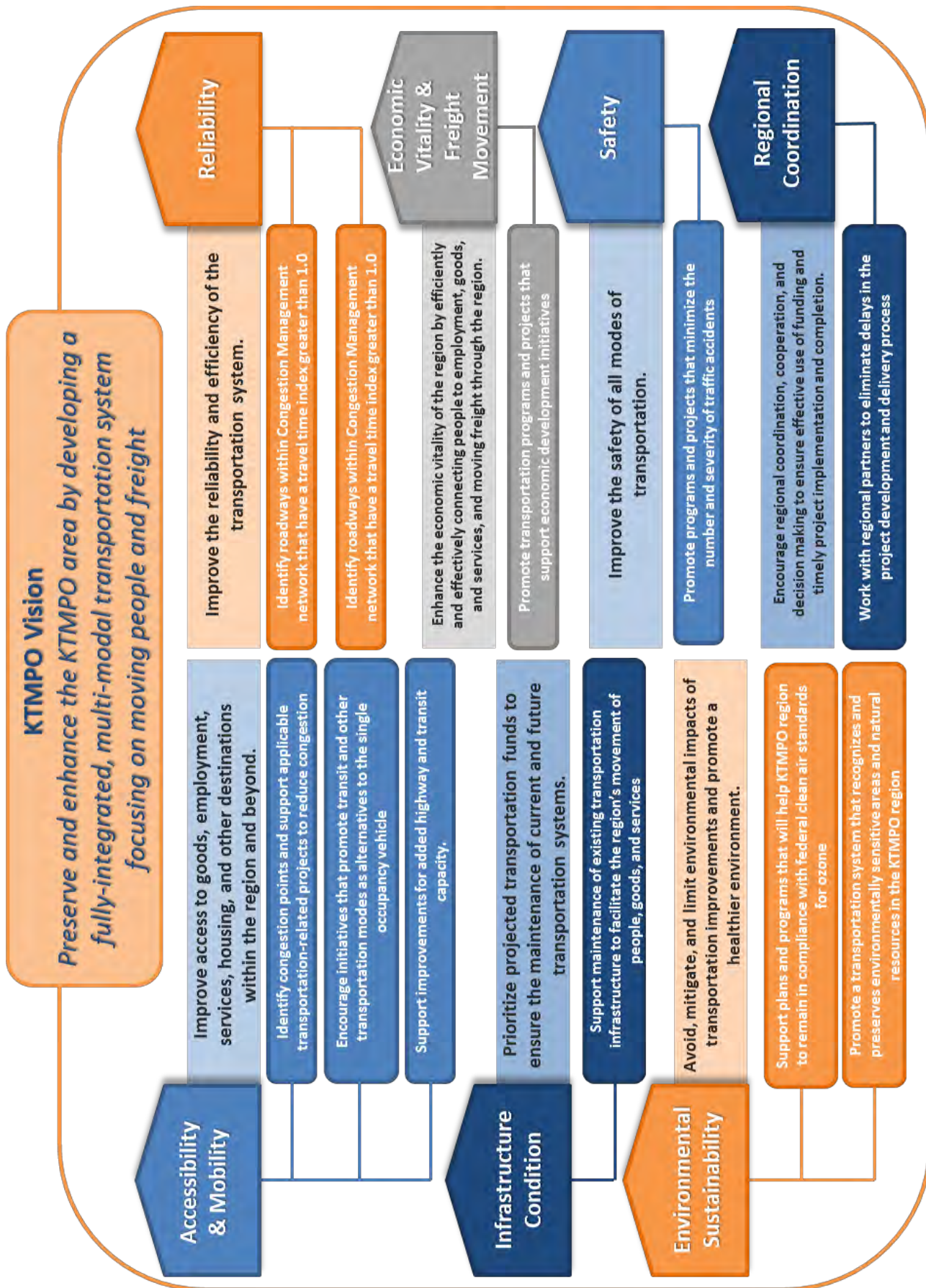
The Mobility 2040 MTP provides a blueprint for addressing mobility challenges in our region as a result of growth in our area. This long-range plan contains an integrated set of policies, strategies, and investments to maintain, manage, and improve the transportation system in the Central Texas region through the year 2040. The Guiding Principles, Vision, and Goals outlined in the 2035 MTP were considered as the 2040 MTP was developed. The Guiding Principles remain relevant for the 2040 Plan and are as follows:

### The MPO should create a plan:

- Based on the best available data and analysis on all transportation modes;
- Built on the cooperation of all stakeholders in the region;
- Developed with opportunities for public involvement and participation;
- Respects the unique character of the communities within the region; and,
- Recognizes the need to make difficult choices to implement desired long term improvements.

## **VISION AND GOALS**

With the KTMPO Guiding Principles as the foundation, KTMPO staff began the process to update the MTP. As part of this process, five public workshops were held in May 2013 to solicit public feedback and input with regard to the region's transportation system, including a regional vision and goals. The vast majority of respondents felt the current goals were still applicable. Comments regarding KTMPO's vision focused on improving safety, reducing congestion, providing a multi-modal transportation system, and improving the area's quality of life. The goals were slightly modified and continue to reflect the 8 Planning Factors identified in MAP-21. Objectives were also developed under the goals. The 2040 MTP Vision, Goals and Objectives are as follows:





## PERFORMANCE-BASED PLANNING AND PROGRAMMING

In MAP-21, the metropolitan and statewide transportation planning processes are continued and enhanced to incorporate performance goals, measures, and targets into the process of identifying needed transportation improvements and project selection. Public involvement remains a hallmark of the planning process.

Performance-based planning and programming refers to the application of performance management to achieve desired performance outcomes for the multimodal transportation system. The objective is to ensure transportation investment decisions are made based on their ability to meet established goals. MAP-21 establishes national performance goals for Federal highway programs. These performance goals will likely be integrated into transportation planning at the state and MPO levels and are as follows:



**Safety** - To achieve a significant reduction in traffic fatalities and serious injuries on all public roads.

**Infrastructure condition** - To maintain the highway infrastructure asset system in a state of good repair.

**Congestion reduction** - To achieve a significant reduction in congestion on the NHS.

**System reliability** - To improve the efficiency of the surface transportation system.

**Freight movement and economic vitality** - To improve the national freight network, strengthen the ability of rural communities to access national and international trade markets, and support regional economic development.

**Environmental sustainability** - To enhance the performance of the transportation system while protecting and enhancing the natural environment.

**Reduced project delivery delays** - To reduce project costs, promote jobs and the economy, and expedite the movement of people and goods by accelerating project completion through eliminating delays in the project development and delivery process, including reducing regulatory burdens and improving agencies' work practices.

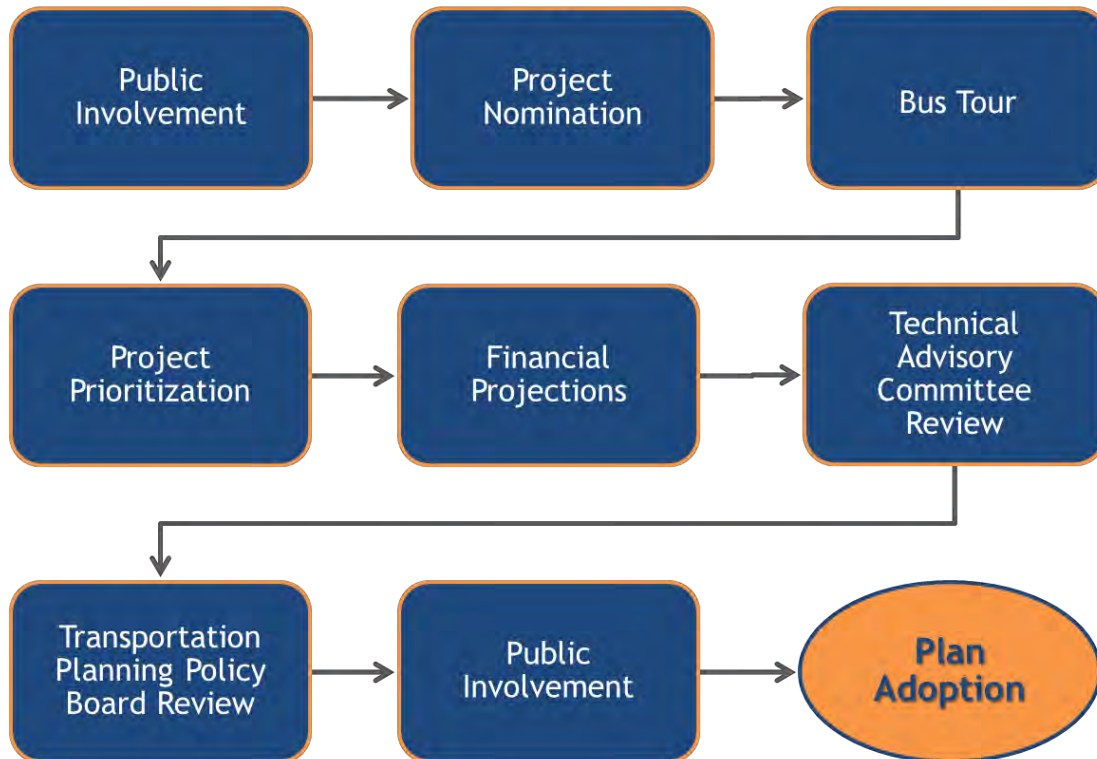
Specific quantitative criteria will be published by the Secretary of Transportation in order to measure whether these goals have been achieved. When state guidelines are provided, KTMPO's Goals, Objectives, and Performance Measures will be modified to support the state performance targets and the MPO will initiate the public involvement process to solicit input and revise the MTP accordingly.

Upon adoption of the revised Goals, Objectives, and Performance Measures, KTMPO planning efforts will include consideration of the performance targets in project prioritization and selection to ensure projects support desired outcomes. KTMPO staff will then evaluate and report the condition and performance of the transportation system to determine if desired performance outcomes have been achieved. Monitoring, evaluating and performance reporting will be an ongoing process to better understand successful approaches and inform future decisions regarding the transportation system.

## MTP DEVELOPMENT

The local entities, TxDOT districts, and public within the KTMPO planning area play a major role in the development of the Metropolitan Transportation Plan by assessing the current infrastructure in their jurisdiction and by suggesting or nominating suggested transportation projects that would enhance mobility for inclusion in the MTP Project Listing. The MTP Development and Project Selection Process details are as follows:

### MTP Development Process



### Public Involvement

The KTMPO Mobility 2040 Metropolitan Transportation Plan has been developed from a process that is marked with early involvement from the voice of the people of the Killeen-Temple region. KTMPO hosted a series of public workshops as a medium for collecting the interests of the public on the regional transportation system. The workshops solicited general and geographic feedback in the form of surveys and interactive mapping about congestion, safety, transit, bicycle and pedestrian facilities, rail, aviation, and project selection. Two primary objectives, supporting KTMPO's public involvement process, guided the development of the workshops:

1. Distribute information to the public about the role of KTMPO in the region; and
2. Receive input from the public on the current and future regional transportation system.



Remaining aligned with KTMPO's Public Participation Plan, these workshops sought to involve all individuals that use the transportation infrastructure by using communication methods that could be accessed by all. Efforts include:

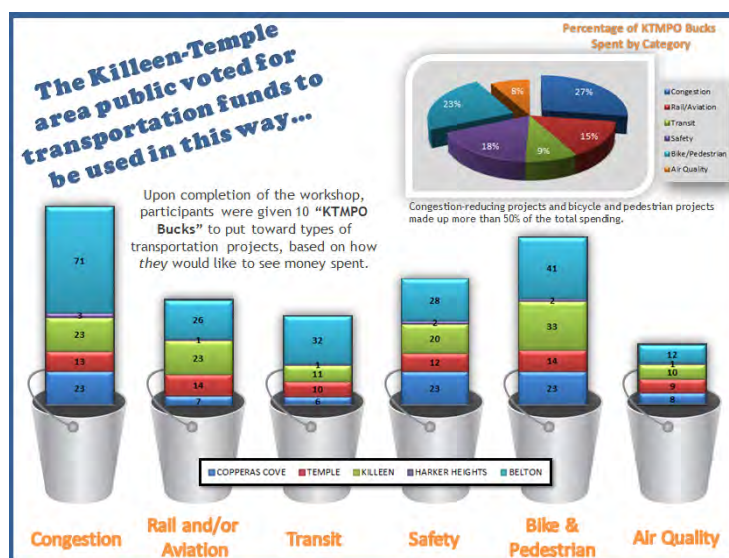
- Holding in-person workshops in each of the 5 most populous cities in the region;
- Holding 2 of the 5 in-person workshops in targeted Environmental Justice locations;
- Promoting the workshops in a variety of mediums, including the newspaper, public buildings, on the KTMPO website and social media, and by flyers and word of mouth;
- Allowing the public to complete the workshop survey online; and
- Inviting local elected officials and city planners to help staff the booths to speak one-on-one with the public.



*A snapshot of the success numbers in reaching out to the public during these workshops is displayed below.*



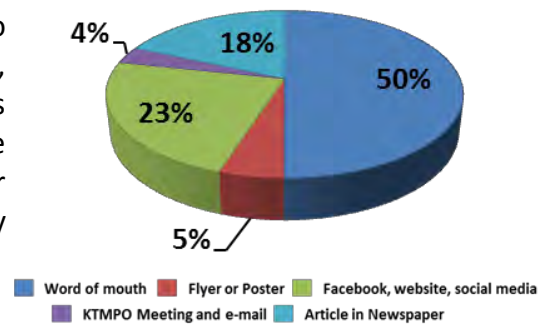
After providing feedback and receiving information at the various workshop stations, participants were asked to vote how they would like to see funding allocated for transportation in the region. They were able to be the decision-maker in the region's transportation priorities. Exhibit 2.2 below shows the public's decision.



The results of the survey showed that of the various communication methods used by KTMO to promote the workshops to all transportation users, word of mouth was the most successful, as it was the reason half of the participants showed up at one of the workshops. KTMO is gaining a stronger online and social media following, as is evidenced by these numbers as well.



**Exhibit 2.2: Public Outreach Effort Results**



The responses pertaining to the particular transportation topics will be discussed in later corresponding chapters. The complete results of the workshops can be found in **Appendix C**.

**Outcome:** Public gained knowledge of the transportation planning process and provided feedback to guide future planning decisions.

Member entities such as TxDOT, municipalities and counties, are encouraged to submit proposed improvements and/or new transportation projects due to development and noticeable changes in usage. In order for KTMO Staff to have sufficient time to analyze, research, and compile all of the project information, a deadline is set and made known to the member entities.

**Project Nominations**

**Outcome:** MPO member entities determined the transportation need of the region by the development of projects.

**Bus Tour**

The Transportation Planning Policy Board, Technical Advisory Committee, KTMO staff, and other local officials and staff participate in fieldwork to educate themselves on the need and location of proposed projects in the form of a one-day bus tour, where they view a sample of the nominated projects. This tour allows each nominating entity to showcase certain projects and future development in their areas to the members before the project prioritization process.

**Outcome:** Because of the separated UZAs, board members acknowledge that this event helps give them perspective on the transportation state in other parts of the region.

KTMPO prioritizes roadway projects in the MTP in accordance with the approved Project Selection Process (found in **Appendix B**). This process combines technical and subjective scores and results in a final score and ranking to determine regional priorities. MPO staff compiles technical data from its member entities, TxDOT, and the transportation model, and the Technical Advisory Committee complete the subjective scoring element from their perspective.

## Project Prioritization

During the scoring process, Staff noted several anomalies in the technical data which caused board members to reexamine whether the previously adopted process is still currently the best method to evaluate project priorities in the region. They suggested KTMPO staff schedule meetings with directors from other TMAs in Texas to gain perspective on advancing the prioritization process for future project selections.

To complete the prioritization process for the MTP, Staff engaged TAC members in the review of projects proposed for inclusion in the financially constrained component of the MTP to ensure the criteria stated in the approved project selection process are met. These criteria are as follows:

- 1) consistency with KTMPO goals;
- 2) identified local funding for match requirements; and
- 3) project readiness.

The TPPB considered project readiness to be a priority and they chose to reserve a percentage of funding for preliminary engineering (PE) costs. This prioritization process was completed for this MTP update and the resulting project listing found in **Appendix A**.

**Outcome:** KTMPO's member entities come together to develop a list of regional transportation priorities to guide TxDOT in their selection of future projects for the region.

## Financial Projections

The TRENDS (Transportation Revenue Estimation and Needs Determination System) Model, a tool to forecast state transportation revenues by year through the year 2040, is used to develop funding scenarios based on various assumptions with regard to tax rates and revenues. The Transportation Planning Policy Board reviews the funding scenarios and selects the scenario that most reasonably reflects projected growth and revenue for the region. This tool allows staff to forecast what types of funding will be available in the short and long range plans. More details on the financial projection process is discussed in Chapter 11.

**Outcome:** A list of regionally prioritized and affordable projects is in place to guide TxDOT

KTMPO staff drafts the Metropolitan Transportation Plan during a process of updating statistical and technical data to support its planning efforts. The updates reflect forecasted growth and travel, public input, and entity-sponsored projects for the 25-year planning period. The draft plan is provided to the Technical Advisory Committee for input, review, and approval, before forwarding to the Transportation Planning Policy Board.

## Technical Advisory Committee

**Outcome:** TAC members gain a regional transportation perspective, while providing a beneficial local perspective into the planning process.

## Policy Board

The Transportation Planning Policy Board reviews the plan drafted by staff and TAC members. They authorize staff to begin the public involvement process and will consider final approval after the public comment period has closed.

**Outcome:** A consensus is reached between the elected officials, local planners, and public on the future state of transportation in the region.

As the planning process begins with the public, it also concludes with the public. As required by the Public Participation Plan (PPP), two public hearings are held to allow for public involvement and to initiate the public comment period. This allows the transportation users to have input on the final draft before the plan is officially adopted.

## Public Involvement

**Outcome:** The public is again consulted for final input and confirms that the developed plan meets the future transportation needs of the region.

## Plan Adoption

Technical Advisory Committee and Policy Board members review final public input and officially adopt the updated Metropolitan Transportation Plan for the Killeen-Temple MPO.

**Outcome:** The Killeen-Temple region has an updated forecast of the transportation needs and desires and will continue to monitor and analyze the transportation state.

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# Demographics



Our planning boundary is characterized by a diverse group of communities who will expect the transportation infrastructure to grow and meet their current and future needs. The wide variations in population density, age, and socioeconomic status will challenge planners to consider the impacts and benefits of various projects in each community.

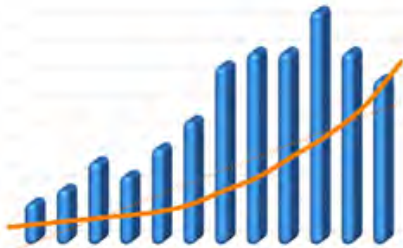
Key strengths of this area are its central position in the Texas Triangle, with access to Interstate 35, known as “Main Street, Texas” as well as the Killeen-Fort Hood Regional Airport and the Amtrak station in Temple. The area is home to two universities, two junior colleges, a variety of light industries, and several medical facilities. These elements will drive development and commerce far into the future.



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## REGIONAL OVERVIEW

The Killeen-Temple MPO serves a varied region characterized by multiple cities and urbanized areas in close proximity to rural ranchland. The KTMPO planning boundary takes in all of Bell County, as well as portions of southern Coryell County and eastern Lampasas County. Fort Hood, the largest armored military installation in the nation, is located partially within the planning boundary. The geography is generally flat with occasional steep, rocky hills and valleys. These valleys lent themselves to the construction of two dams which created two large reservoirs, Belton Lake and Stillhouse Hollow Lake. The positioning of the two lakes and the military reservation boundary have impacted much of the development and population patterns across the region.



In the last decade the area has experienced tremendous growth in terms of people, housing, commerce and traffic. Due to the influence of Fort Hood, and the combination of two Census-designated Urbanized Areas (UZA), this area is vibrant, active, and diverse. Minorities make up a greater percentage of the population than they do in nearby counties. Rural areas that were undeveloped ten years ago have been incorporated or annexed, becoming home to thousands of new residents who demand a well-planned transportation infrastructure.

**Exhibit 3.1: Population Growth (2000-2010)**

Name	2000 Census	2010 Census	Percent Increase
Killeen-Temple MPO	293,209	367,654	25.39%
Belton	14,623	18,216	24.57%
Copperas Cove	29,592	32,032	8.25%
Harker Heights	17,308	26,700	54.26%
Killeen	86,911	127,921	47.19%
Temple	54,514	66,102	21.26%
Bell County	237,974	310,235	30.37%
Coryell County	74,978	75,388	0.55%
Lampasas County	17,762	19,677	10.78%

As shown in Exhibit 3.1, between 2000 and 2010, the population of the Killeen-Temple-Fort Hood Metropolitan Statistical Area (MSA) increased by 92,348 people. The City of Killeen, with its proximity to Fort Hood, experienced the greatest increase, growing from 86,911 to 127,712 people. Other cities in the region underwent similar expansion.



## DIVERSITY

By and large, the urbanized areas within KTMPO have a more diverse population than the surrounding areas that may become urbanized in the next 25 years. Of the 293 Census Block-groups contained within the MPO boundary, 24 of them are estimated to consist of more than 50% minorities. A total of 139 Block-groups have over 25% of their population claim minority status, and all of these Block-groups are located in the UZA boundary. These areas will be referred to again in our discussion of Environmental Justice and Title VI. Below is a table showing the racial, ethnic and mean household income of the entire KTMPO region.

**Exhibit 3.2: Racial/Ethnic and Median Income**

	<i>Total Population, 2013</i>	<i>Percent of Total</i>	<i>Mean Median Income</i>	<i>Percent Low income[1]</i>
<b>KTMPO Region</b>	365,593	100%	\$47,429	20.70%
<b>RACE</b>				
<b>White / Caucasian</b>	229,796	62.50%	\$47,981	20.30%
<b>Black or African-American</b>	75,864	20.63%	\$44,980	24.60%
<b>Native American or Alaskan Native</b>	3,068	0.83%	\$56,626	23.30%
<b>Asian</b>	10,175	2.77%	\$38,558	22.70%
<b>Hawaiian Native or Pacific Islander</b>	3,119	0.85%	\$44,153	30.00%
<b>Two or more races</b>	19,151	5.21%	\$45,831	22.60%
<b>ETHNICITY</b>				
<b>Hispanic</b>	76,203	20.73%	\$43,346	21.40%

<sup>1</sup> 2010 Census income estimates compared against 2010 HHS Poverty Guidelines

Low-income populations are slightly disproportionate, with greater percentages of minority communities meeting the Health and Human Services criteria for Low-Income. Among minorities, Blacks have the largest number of people below the poverty level (approximately 18,663 people) followed by Hispanics (approximately 16,307).

Mapping these populations clearly shows where Minority, Hispanic, and Low-Income areas are concentrated within the KTMPO planning boundary. By analyzing these geographical distributions, KTMPO will focus our public outreach efforts to specific neighborhoods, described in our Title VI documents as “Communities of Concern.” One notable characteristic is that areas close to Fort Hood are more diverse; this is most likely due to the wide variety of backgrounds represented by military service-members and their families, as well as Department of the Army and Department of Defense civilian employees. An assessment of these communities of concern and proposed roadway projects is discussed in Chapter 10, Environment and Quality of Life.

Exhibit 3.3: Environmental Justice (EJ) Areas

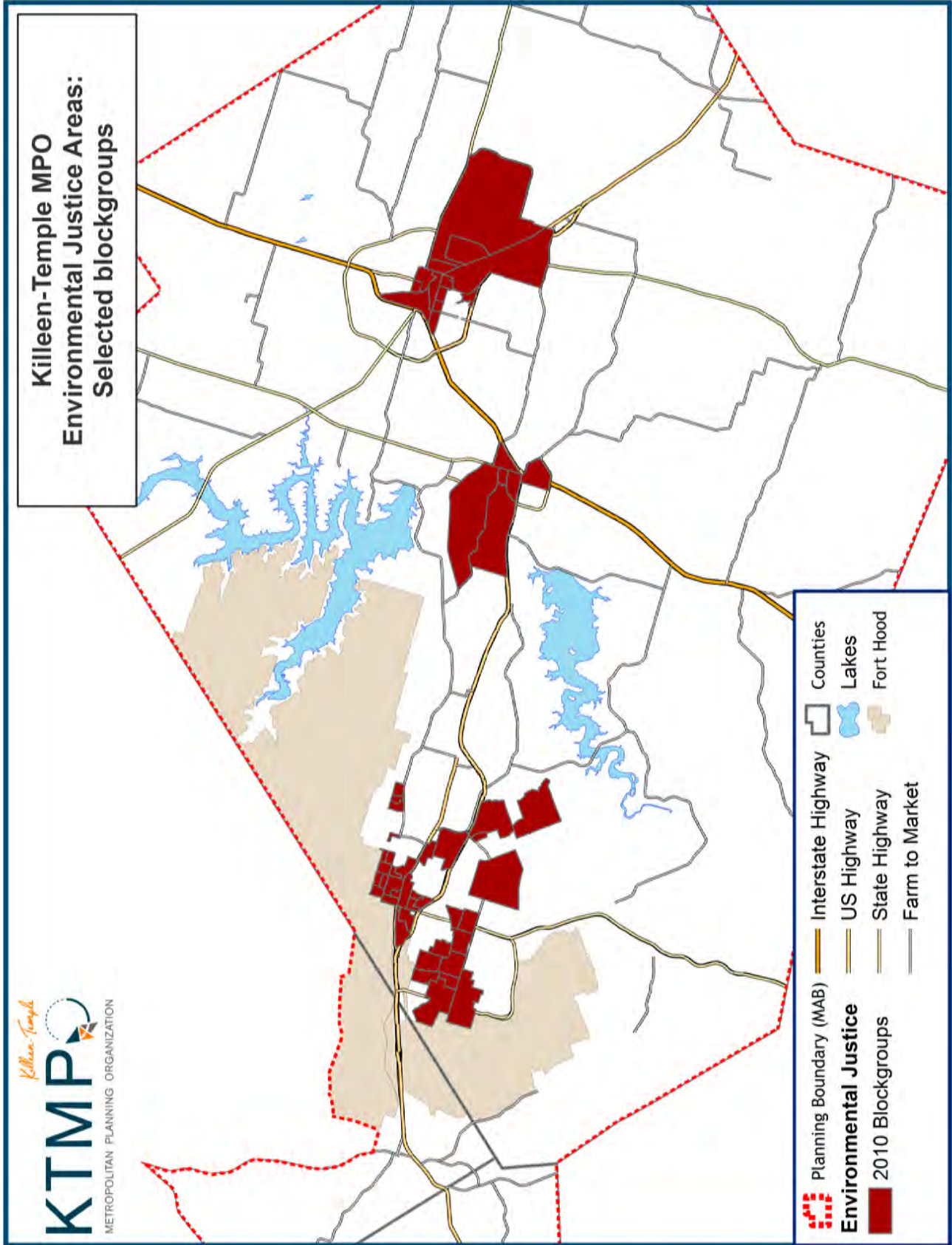




Exhibit 3.4: Hispanic/Latino EJ Areas

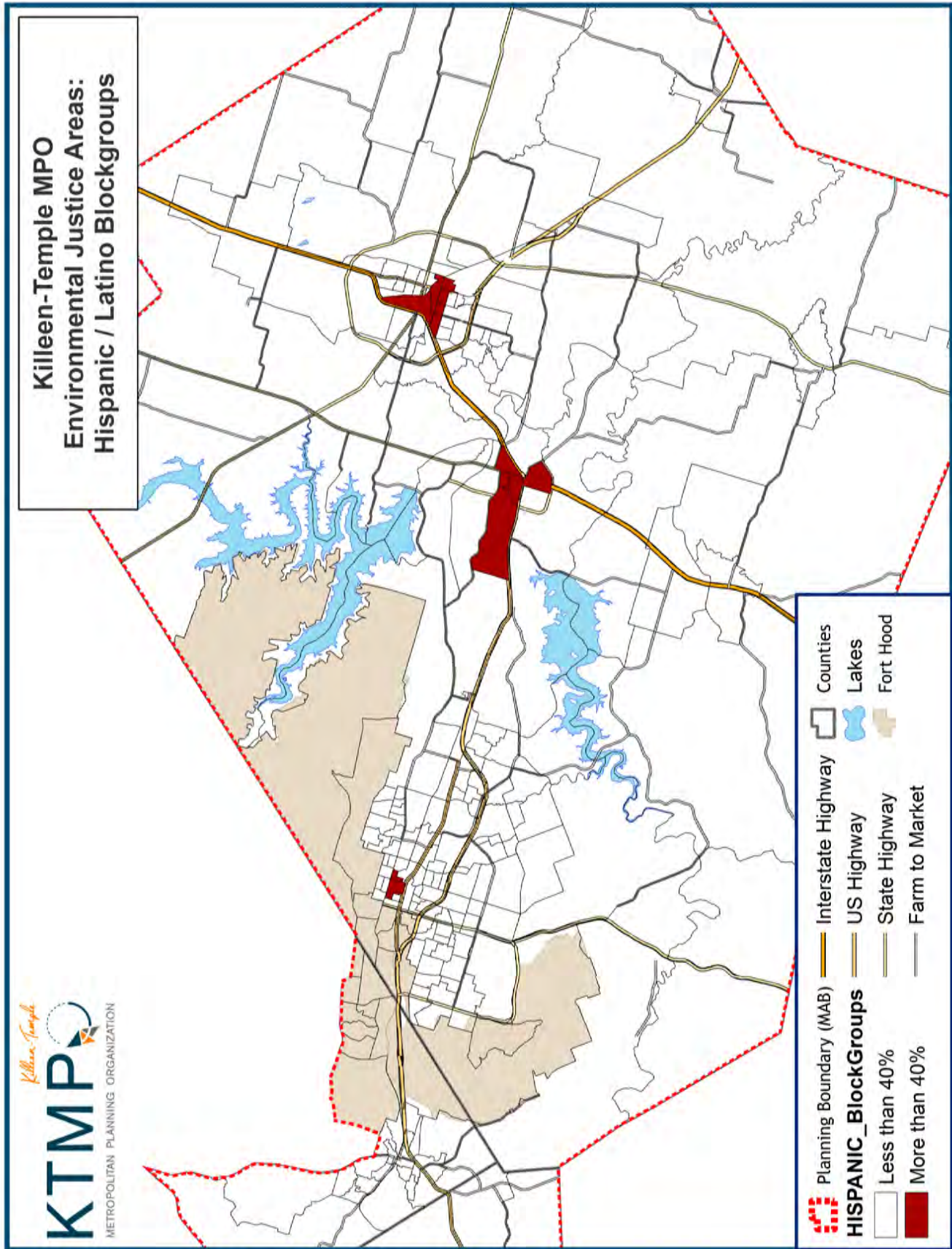




Exhibit 3.5: Low Income EJ Areas

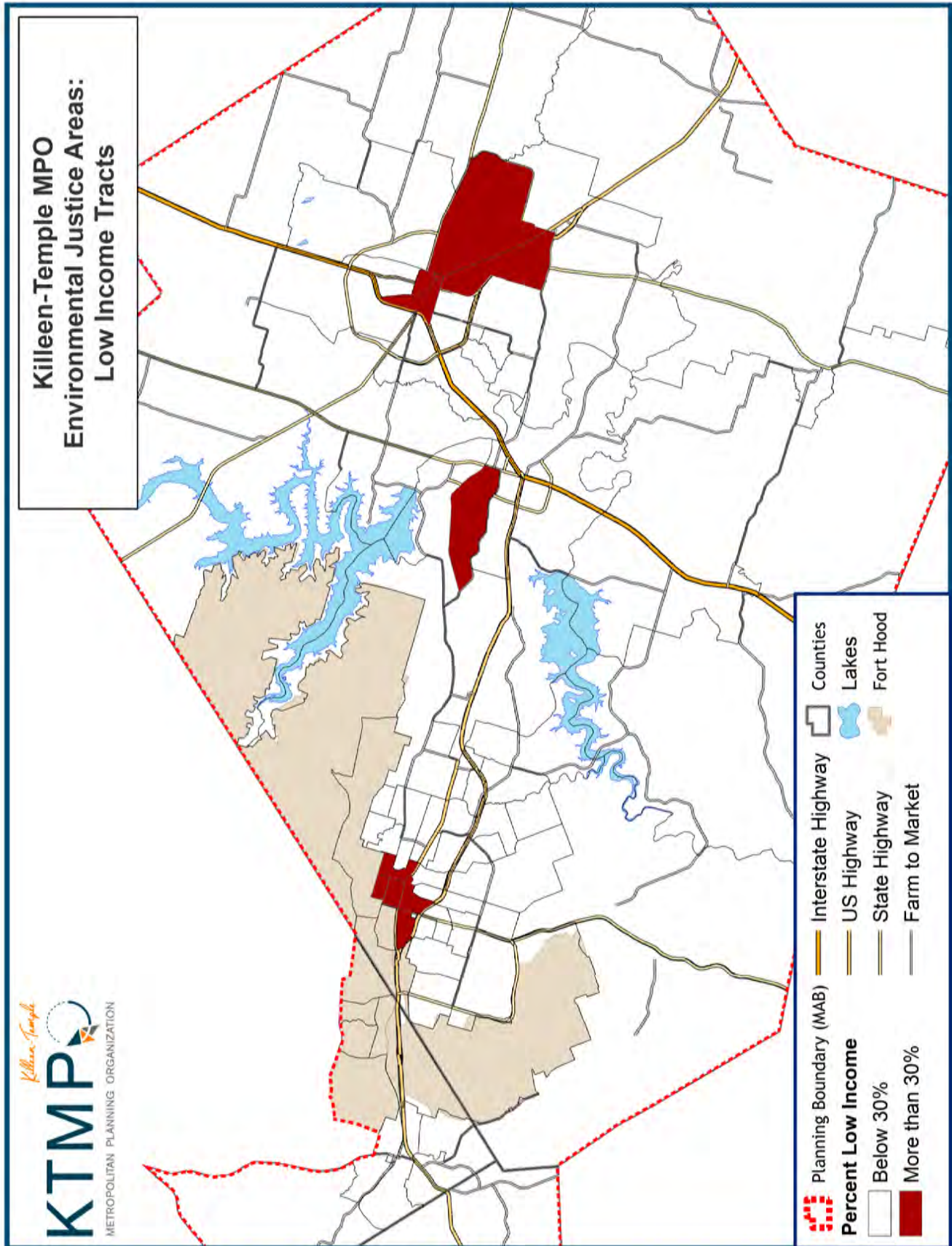
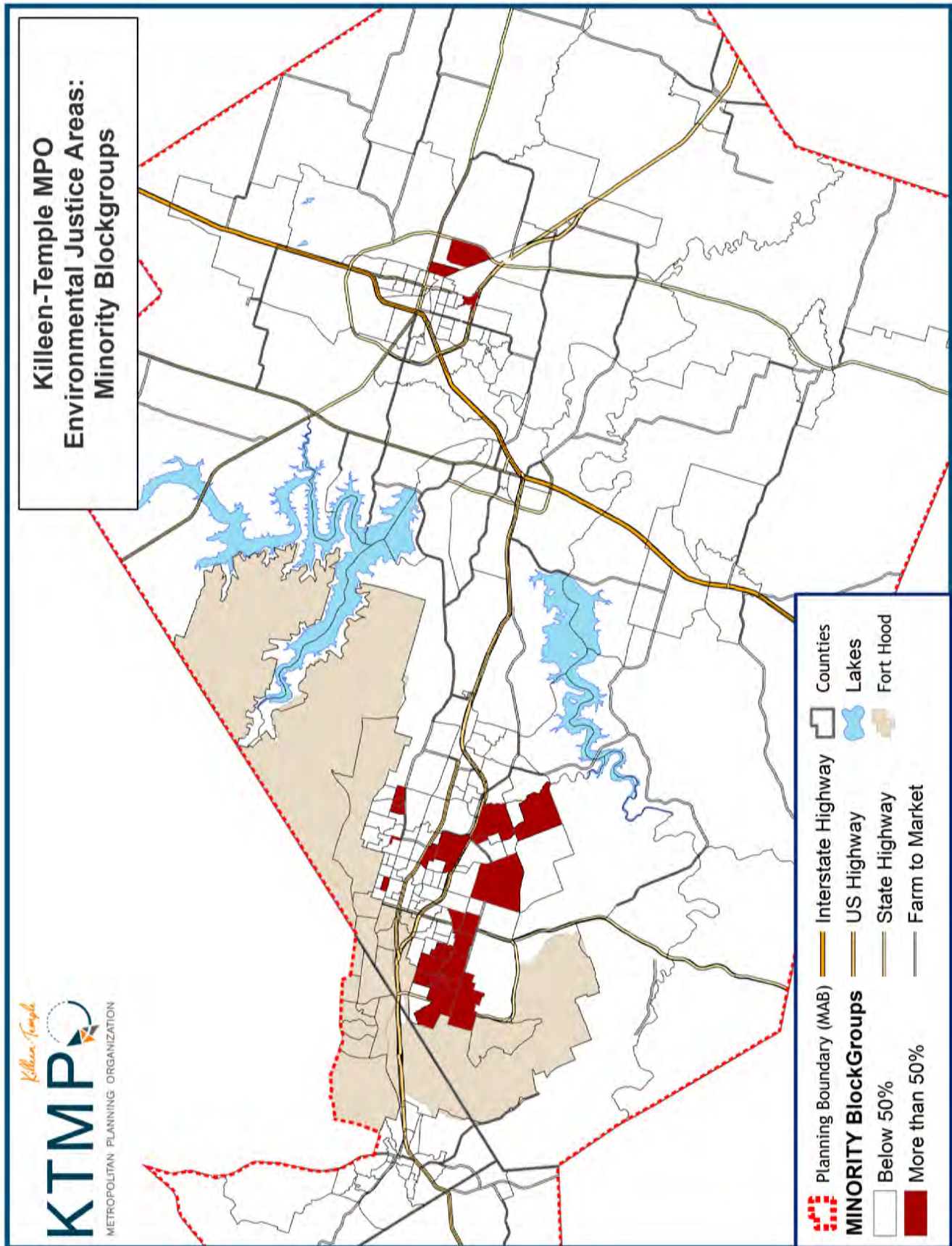


Exhibit 3.6: Minority EJ Areas





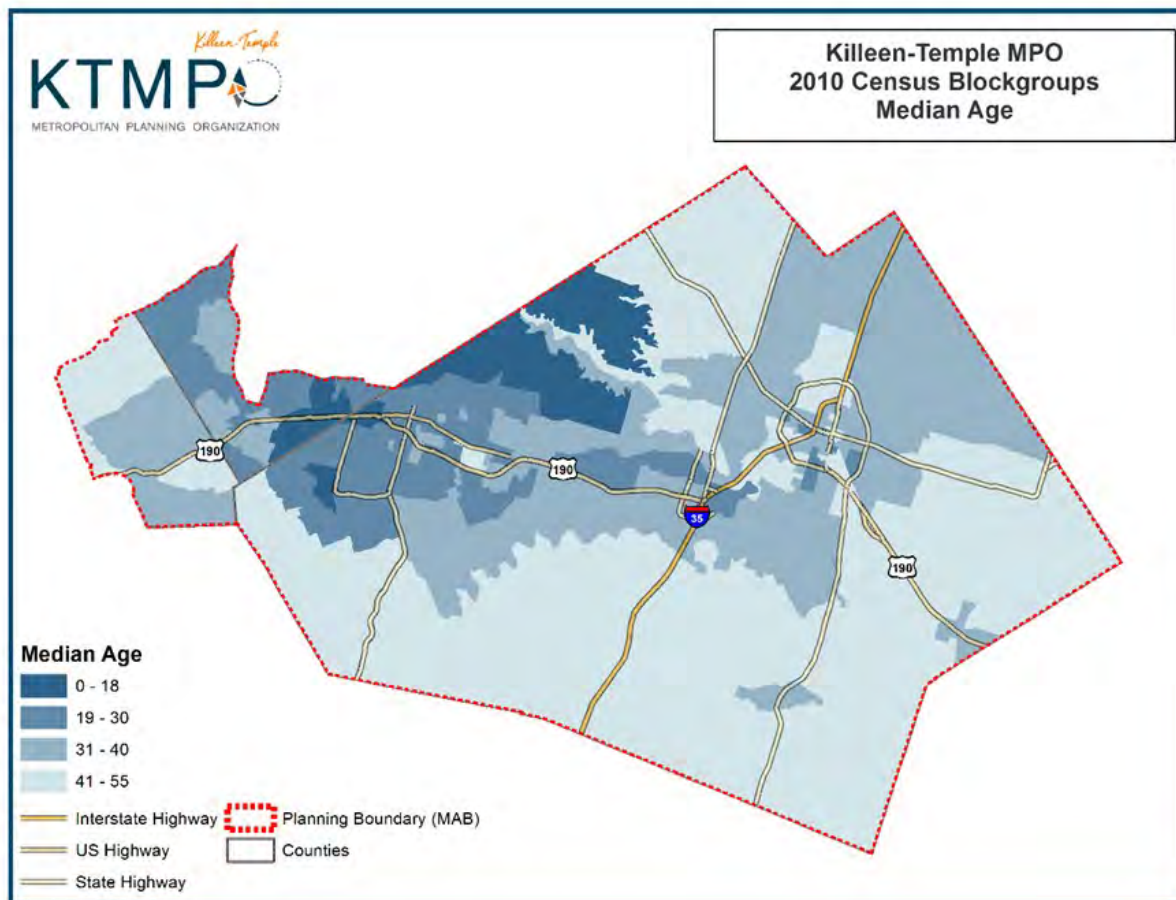
## AGE

Median age is significantly younger in the urbanized areas, compared to the rest of the planning boundary. This shows the effect of Fort Hood on the surrounding area. Killeen has the lowest average median age of the KTMPO planning boundary, followed by Copperas Cove: both cities are adjacent to the installation. As will be shown in our safety chapter, a younger population carries a higher risk for traffic accidents, and has different driving habits than older age groups.

**Exhibit 3.7: Median Age**

City Name	Mean Median Age	Lowest Median Age	Highest Median Age
Belton	35.3	21.3	49
Copperas Cove	30.7	18	43.3
Harker Heights	32.9	24.5	52.9
Temple	36.7	22.6	53.3
Killeen	28.8	17.5	52.9
Non-UZA areas	40.5	26.7	52.6
All block groups in KTMPO	32.4	20.1	53.3

**Exhibit 3.8: Median Age Across Region**



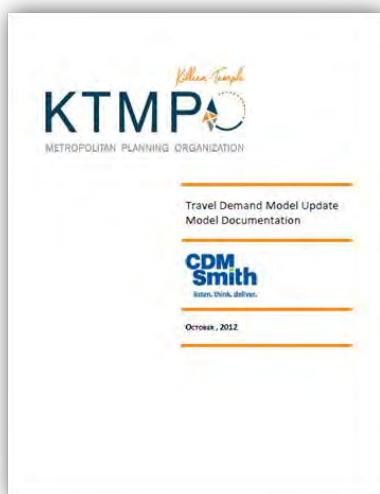
## POPULATION PROJECTIONS

In 2011, KTMPO hired a consultant (CDM Smith) to assist in developing demographic and network data for inclusion in the updated Travel Demand Model. This work included updating the Traffic Analysis Zones (TAZ), TAZ-level demographics, and the modeled roadway network for the years 2010 and 2040. The initial step in developing demographic data for the study area was to establish future demographic “control totals”. The consultant team reviewed the following data sources, and met with local planners to discuss local population projections:

- City of Belton: Comprehensive Plan Update, August 2006
- City of Copperas Cove: 2007 Comprehensive Plan Update, May 2007
- Fort Hood: Long Range Component, Real Property Master Plan, July 2010
- City of Harker Heights: Comprehensive Plan, January 2007
- City of Killeen: Comprehensive Plan, November 2010
- City of Temple: Comprehensive Plan 2008-2030, May 2008
- Coryell County: Commissioners Court Resolution, May 2012

Based upon documented growth rates in the above data sources, the consulting team developed the 2040 regional population projections shown in Exhibit 3.9 on the following page, thereby establishing the 2040 control total population for the KTMPO planning area at 575,200. These projections were approved by the KTMPO Transportation Planning Policy Board on July 25, 2012. Exhibit 3.10 summarizes the population and households in the KTMPO *Modeled* area which includes a small area in Williamson County.

Employment was split into basic, retail, service, and education sectors. Based on the 2010 base data, total employment to individual employment sector ratio was calculated for each county and the future years were projected to carry forward the same ratio. Exhibit 3.11 summarizes the 2040 employment control totals by County. The population and employment projections were used in the Growth Scenario Planning and Visioning Exercise discussed in the following section. Chapter 4 includes a more detailed discussion of the work done to update KTMPO’s regional travel demand model.



**The complete Travel Demand Model Update/Model Documentation is included in [Appendix I](#).**

Exhibit 3.9: Population Projections (KTMPO Planning Area)

	Population		Absolute Growth	Annual Growth rate
	2010 Census	2040 Projection		
Bell County				
Belton	18,216	36,000	17,784	2.3%
Fort Hood (Partial)	15,233	20,900	5,667	*
Harker Heights	26,700	40,500	13,800	1.4%
Killeen	127,921	200,000	72,079	1.5%
Temple	66,102	105,000	38,898	1.6%
Other Cities	17,191	24,600	7,409	1.2%
Unincorporated Areas	38,872	55,600	16,728	1.2%
Subtotal	310,235	482,600	172,365	1.5%
Coryell County				
Copperas Cove (Partial)	31,460	57,000	25,540	2.0%
Fort Hood (Partial)	14,356	21,500	7,144	*
Unincorporated Areas	3,213	4,600	1,387	1.2%
Subtotal	49,029	83,100	34,071	1.8%
Lampasas County				
Copperas Cove (Partial)	572	800	228	2.0%
Other Cities	1,089	1,600	511	1.2%
Unincorporated Areas	4,957	7,100	2,143	1.2%
Subtotal	6,618	9,500	2,882	1.2%
KTMPO Planning Area Total	365,882	575,200	209,318	1.5%

\*Fort Hood population is expected to remain at 2012 levels.



Exhibit 3.10: 2040 Population and Households (within the KTMP0 Modeled Area)

County*	2040 Population	2040 Households
Bell	481,723	175,828
Coryell	83,977	25,613
Lampasas	9,500	3,509
Williamson**	1,919	287
<b>Total</b>	<b>577,119</b>	<b>205,237</b>

\*County to which TAZ is assigned (some TAZs span multiple counties)

\*\*The population and households of the small area in Williamson County was assumed to remain constant between 2010 and 2040.

Exhibit 3.11: Employment Control Total

County*	Employment		Absolute Growth	Annual Growth rate
	2010	2040 Projection		
Bell	128,623	203,142	74,519	1.54%
Coryell	30,286	44,869	14,583	1.32%
Lampasas	353	525	172	1.33%
Williamson**	256	464	208	2.00%
<b>KTMP0 Model Total</b>	<b>159,518</b>	<b>249,000</b>	<b>89,482</b>	<b>1.50%</b>

\*County to which TAZ is assigned (some TAZs span multiple counties)

\*\*The employment in Williamson County was assumed to grow at 2.0% per year.

## GROWTH SCENARIO PLANNING AND VISIONING EXERCISE

With more than 200,000 new people expected to arrive in the Killeen-Temple area over the next 30 years, planning ahead and creating a long-term strategy to address growth is a top priority of the KTMPO. KTMPO is in the process of updating its Travel Demand Model to a base year of 2010 and future year of 2040. This model will be one of the tools used to help determine what KTMPO's future growth patterns will look like and what roadway improvements will be needed.

To help determine possible and preferred growth patterns for our region, KTMPO contracted Kimley-Horn and Associates, Inc. (KHA) in 2012 to help conduct a region-wide visioning exercise. This exercise included a heavy focus on public involvement along with direct input from local elected officials and entity staff through Community Visioning Workshops. The initial workshop was held October 16, 2012, with an additional workshop held October 17, 2012 primarily for KTMPO Technical Advisory Committee and Transportation Planning Policy Board members.

During the workshops, participants were divided into groups to identify how they see new growth being distributed in the next 25 years. Participants were asked to consider the issues and trade-offs related to placing different land use types throughout the area within the constraints of population and employment projections for the future. The participants were asked the following key questions:

- **What kind of development and growth is preferred in the region?**
- **Where should this growth be located?**

Input from the visioning workshops was analyzed and used to create three growth scenario options which were presented to the public at an open house on November 13, 2012. The public was asked to comment on the options that were presented and to vote for the preferred growth scenario. The options were also posted on the KTMPO website and the survey from the workshop was available for additional public input. KHA then reviewed the public comments and survey results and developed a preferred scenario for population growth and employment growth for the region. The preferred growth scenarios were presented to the KTMPO Transportation Planning Policy Board at their February 20, 2013 meeting and were approved.



### Growth Scenarios Considered:

KHA presented three growth scenarios for consideration during the visioning exercises. These are described below.

Trend Scenario: The trend scenario represents continuation of an emerging suburban development pattern prevalent in the Killeen-Temple Region. New construction is characterized by single-use developments surrounded by low density rural residential home sites. The regional activity centers located at major intersections continue to be the social and economic center of the study area. This land use scenario is the one that is used by TxDOT to project future traffic demand in the region for the year 2040.

The Technical Memorandum from KHA outlining the process and results of the visioning exercise is attached as **Appendix D**.

Scenario 1: Scenario 1 consists of an increased mix of housing types. This scenario includes townhomes, multifamily, single-family subdivisions, and rural residential. These developments are clustered near jobs and infrastructure. Developments largely occur near existing infrastructure with moderate growth that will require additional water and sewer lines. The primary transportation mode will continue to be the automobile; however, due to more centrally located housing and employment, residents will have additional options (i.e., public transit, biking, or walking). Clustered mixed-use developments will serve as centers for small business and entrepreneurs. Some large retail centers will continue to occur.

Scenario 2: Scenario 2 represents an increase of density and a mix of housing. This scenario represents the most dramatic change, in terms of altering land use policies, of the three scenarios. Many new renter and owner-occupied multi-unit buildings and townhomes will be built in the city centers for those who prefer compact low-maintenance residences that are walkable to jobs and commercial areas. While the primary transportation mode will continue to be the automobile, many people will also use an expanded transit system within and between cities. Investment will be made into new walking and biking options. These options will be designed for year-round use. There will also be limited investment in new and widened roadways. Jobs will be centrally located.

### **Preferred Growth Scenario**

Based on feedback from the public workshop, the open house and the survey results, it was concluded that change in the future growth patterns of the region were desired. Although this change was not a dramatic change from the trend, it attempted to embrace certain opportunities of growth that may have been missed. Focusing growth in key centers across the region is important to the community; this is done by investing in the downtowns and the main streets of the Killeen-Temple region. At the same time allowing for economic growth to occur in new suburban areas is also important.

The preferred scenario combines aspects of the Trend and Scenario 1 that were most important to the members of the community. It balances the potential reality of the future while providing opportunities to adjust to changing development patterns and transportation technologies.

Priority Elements of Preferred Scenario:

- Important balance of housing by providing new suburban growth while also increasing the capacity of urban infill opportunities
- Population and employment growth focused around key transportation linkages that includes the road, transit and bicycle networks
- New jobs centers are focused in nodes with existing supportive infrastructure
- Population growth is in closer proximity to job centers

A comparison of the three growth scenarios and the preferred growth scenario is shown in Exhibit 3.12 on the following page.

The results from the indicators summary show a number of unique characteristics when comparing each scenario. For the preferred, the number of acres developed is lower than the trend indicating that some of the new housing and employment growth is being focused within the cities. The number of trips generated is reduced from the trend as a result of the mix of housing being implemented and the increased ability to have mobility choices. This is also seen in the increase of the transit mode share. The results of fewer auto trips will also result in lower air quality emissions relative to the trend scenario. These indicators provide a measure to assist in gauging our policy decisions as we move forward in the region.

KTMPO will incorporate information from the preferred growth scenarios into the Travel Demand Model and will use this input to anticipate future traffic patterns for the year 2040 and plan future road projects in the region.

**Exhibit 3.12: Growth Scenario Comparisons**

<b>INDICATORS For New Growth Only</b>				
	Trend Scenario	Scenario 1	Scenario 2	Preferred
<b>Development Yields</b>				
Households	82,370	82,990	82,910	82,470
Population	207,580	209,140	208,920	207,820
Employment	89,210	89,170	89,360	89,490
Acres Developed	86,300	36,200	25,900	57,300
<b>Transportation</b>				
Total Trips Generated (Daily)	988,000	980,000	995,000	982,000
Auto Trips (Daily)	902,000	767,000	729,000	821,000
Vehicle Miles Traveled (Daily)	8,807,000	7,484,000	7,119,000	8,014,000
Annual Fuel Consumption (gallons)	140,378,000	119,286,000	113,462,000	127,740,000
<b>Air Quality</b>				
CO2 Emissions (tons)	1,286,000	1,093,000	1,039,000	1,170,000
NOx Emissions (tons)	5,320	4,520	4,300	4,840
VOC Emissions (tons)	6,380	5,420	5,160	5,800
<b>Mode Share</b>				
Auto Mode Share	91%	78%	73%	84%
Transit Mode Share	1%	8%	11%	5%
Walk & Bike Mode Share	8%	14%	16%	11%



Exhibit 3.13: Preferred Scenario Population Growth

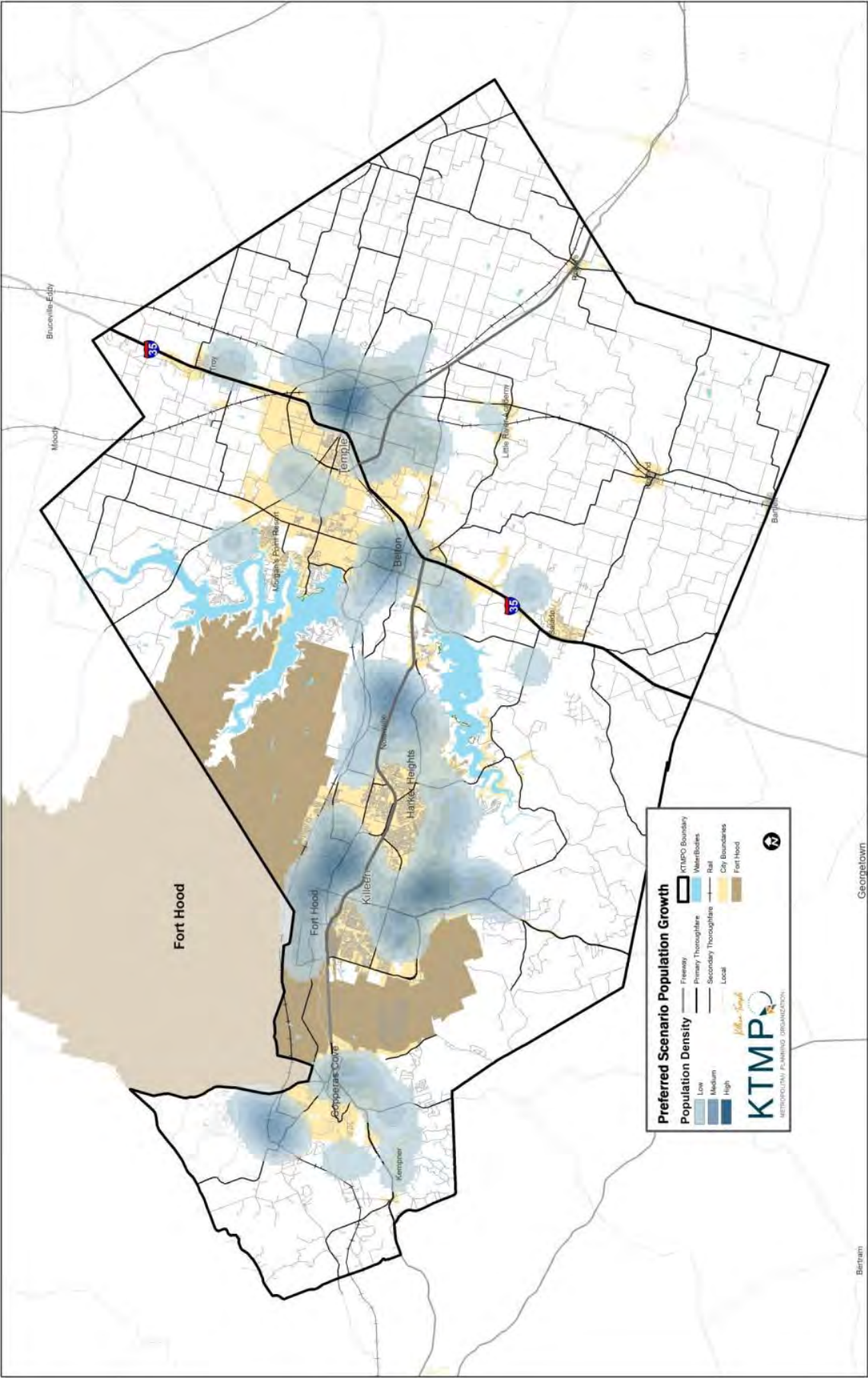
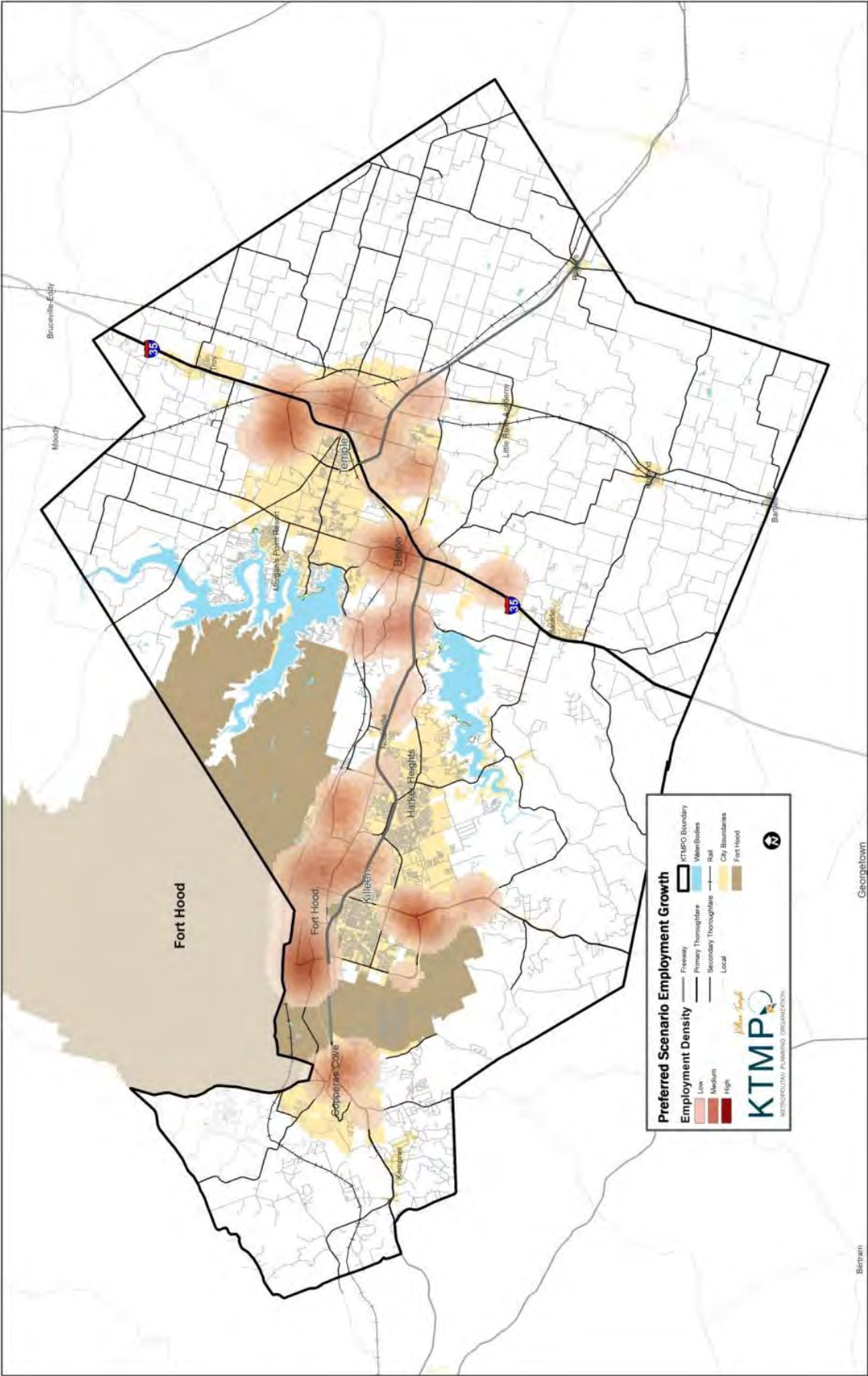




Exhibit 3.14: Preferred Scenario Employment Growth



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# Regional Roadway System



The KTMPPO regional roadway system features 3,700 miles of roadway with 71 miles interstate, 107 miles of US highway and 135 miles of state highway. On average there are approximately 4,500,000 daily vehicle miles traveled. These roadways are vital to business, rural farmers to market, military deployment, manufacturers, health care, recreation, and throughput.

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## REGIONAL FUNCTION OF MAJOR TRANSPORTATION FACILITIES

The Killeen-Temple Metropolitan Planning Organization (KTMO) is situated in Central Texas and benefits greatly from growth economically. Located centrally between Dallas - San Antonio and El Paso – Houston, Central Texas maintains major roadway facilities that are vital to commerce, manufacturing and the military. As stated in the previous chapter, the Central Texas region expects to add another 200,000 in population by 2040 (current MSA population is estimated at 420,375). Growth factors and expected pass-through traffic growth on our roadways will continue to warrant major investments for safe and reliable roadway facilities. These investments are essential to the economy in the state of Texas and the United States national security.

**Exhibit 4.1: KTMO Regional Roadways**



Within our region are nationally known manufacturers of goods, distributors of various products, nationally recognized medical facilities and the largest active duty armored post in the United States Armed Services. Our location allows for the movement of goods, services and the military in an economically viable manner. In 2010, the Milken Institute released its 2010 Best Performing Cities rating. The Killeen – Temple Metropolitan area was considered the best metro area in the nation for overall business climate. In addition, the MSA is one of the smallest in the 2013 Milken study, yet ranks third in the nation in the category of five-year wage and salary growth. CNN Money has listed Temple Texas as the #7 city to launch a business in the country among cities in the demographic. CNN based this ranking primarily on Temple being located on the Canada to Mexico I35 corridor.

As of the 2010 census the Killeen-Temple-Fort Hood metro area is #9 in Texas based on population. Since the census of 2000 the population of Bell County is estimated to have grown 54.9% in 2012. As previously stated these growth factors have a significant impact on the future KTMPO transportation facility needs. With these growth factors come the growth pains of congestion. Current congestion in the west end of the area is significant and has greatly impacted the region's ability to maintain air quality and access to Fort Hood. KTMPO's goal is to maintain safe, reliable, functional and efficient transportation systems for the growing population and growing commerce needs and meet future air quality standards.



Quality of life events have been a local mantra for the KTMPO area for many years and is a large reason for business and the labor force to locate in Central Texas. KTMPO reaps the benefit of having two large US Army Corps of Engineers managed lakes/impoundments. Belton Lake covers 12,300 surface acres and Stillhouse Hollow Lake covers 6,430 acres. These impoundments are critical as water resources and are utilized heavily by recreational users.

Temple is home to the Wildflower festival and Belton has been named as one of the nation's "Top Ten Places to Fly Your Flag on the 4<sup>th</sup> of July". Belton is also home to the Bell County Expo center that brings visitors to the area weekly with events that draw crowds in the thousands.

Fort Hood holds major events annually that draws visitors by the thousands to include a 5 mile animated Christmas light display and one of Texas' premiere 4<sup>th</sup> of July festival and fireworks displays. The City of Killeen is home to Killeen Civic and Conference Center. Killeen hosts many events to include fun runs, the arts and theatre productions to name a few. Copperas Cove holds an annual "Rabbit Festival" with over 20,000 visitors over a 3 day period. Harker Heights hosts the annual "Central Texas Food Wine and Brew Festival".

The entire Central Texas region embraces the military and their families in many efforts of support. Each of the Central Texas communities has a vibrant and very active Chambers of Commerce. All Central Texas communities are dependent on safe, reliable, functional and efficient transportation systems to maintain a high quality of life and to that end this is a KTMPO goal.



The larger cities of the KTMPO region are home to higher education facilities such as Texas A&M University - Central Texas in Killeen; University of Mary Hardin Baylor in Belton; Temple College in Temple; Central Texas College in Killeen. Each of these facilities is experiencing phenomenal growth to meet the demand. Quality of life, central location, and opportunity have played important roles in the sustained growth the KTMPO region experiences. In each of the KTMPO major transportation facilities, users of these facilities consist of business, commuters, school students, recreational users, freight haulers, military and medical personnel.



## THOROUGHFARE PLAN DEVELOPMENT

KTMPO developed a Regional Thoroughfare and Pedestrian/Bicycle Plan in 2008 to create a forward-thinking blueprint for the region's transportation system. The plan consists of two distinct, but related components: a thoroughfare element and a pedestrian/bicycle element. This plan was updated in 2010 to accommodate an expansion in the KTMPO boundary, and again in 2011 to incorporate significant changes in the pedestrian/bicycle element. This chapter focuses on the thoroughfare element. The complete plan is found in **Appendix E**.

The updated plan reflects a continuing collaborative effort among MPO-member jurisdictions, the MPO Technical Advisory Committee, and the MPO Transportation Planning Policy Board. The development of the regional thoroughfare network started with existing local thoroughfare plans from the member jurisdictions. The locally identified classifications were analyzed and then carefully considered from a regional perspective to develop the final regional thoroughfare network. Short and long range planning documents for the MPO region and surrounding counties were reviewed to better understand projects that were currently planned or programmed. Stakeholders were involved in discussions to understand perspectives on growth, transportation, and land use issues. These stakeholders included every municipality in the MPO planning area, Bell County and each surrounding county, Independent School Districts with campuses located within the KTMPO planning area, Fort Hood, and TxDOT.

## TYPICAL CROSS-SECTIONS BY FUNCTIONAL CLASSIFICATION

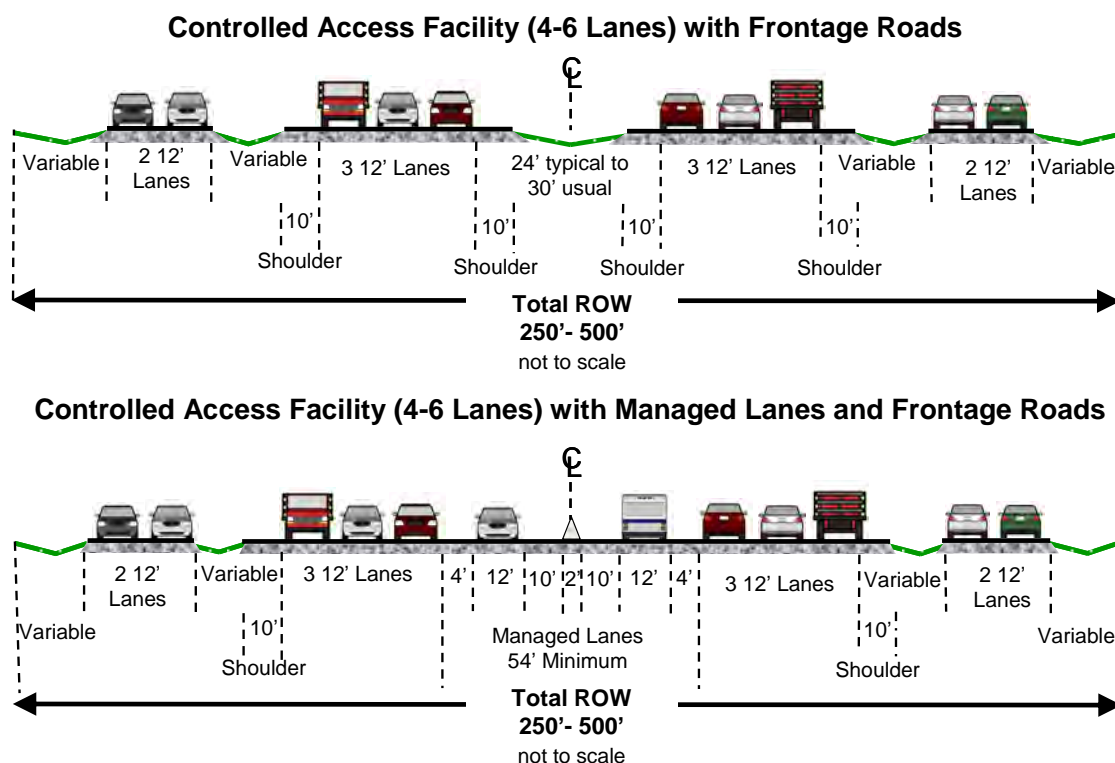
The cross-section designs that follow are taken from the Regional Thoroughfare Plan and are tailored for each classification in the KTMPO planning area. Local comprehensive plans and development codes were examined as a starting point. Cross-sections were then refined so that they could be utilized under various conditions. More details on the development of the typical sections can be found on page 23 of the Regional Thoroughfare and Pedestrian/Bicycle Plan in **Appendix E**. Future regional thoroughfare plans are depicted in Exhibits 4.8 through 4.12.

## Controlled-Access Arterial

Existing controlled-access arterials such as IH 35 and US 190 between Killeen and IH 35 are the facilities at the highest end of the mobility spectrum – with access only at ramp locations. They serve the major centers of activity of a metropolitan area, the highest traffic volume corridors, and the majority of the long distance local trips in and through the region.

Due to recent changes in statewide policy, future controlled-access arterials along new location routes are less likely to include frontage roads. According to the KTMPO regional functional definition from above, controlled-access arterials may need to be able to accommodate express transit service along the mainlanes and local transit service along the frontage roads. Neither bicyclists nor pedestrian accommodation is planned as a general rule, although in some instances frontage roads can accommodate very experienced cyclists. Right of way can vary substantially between 250 feet and 500 feet in width, owing to such factors as presence of frontage roads, locations of interchanges, median treatment, and design exceptions for constrained areas. Typical cross-sections are shown in Exhibit 4.2.

**Exhibit 4.2: Typical Cross-Sections—Controlled-Access Arterials**



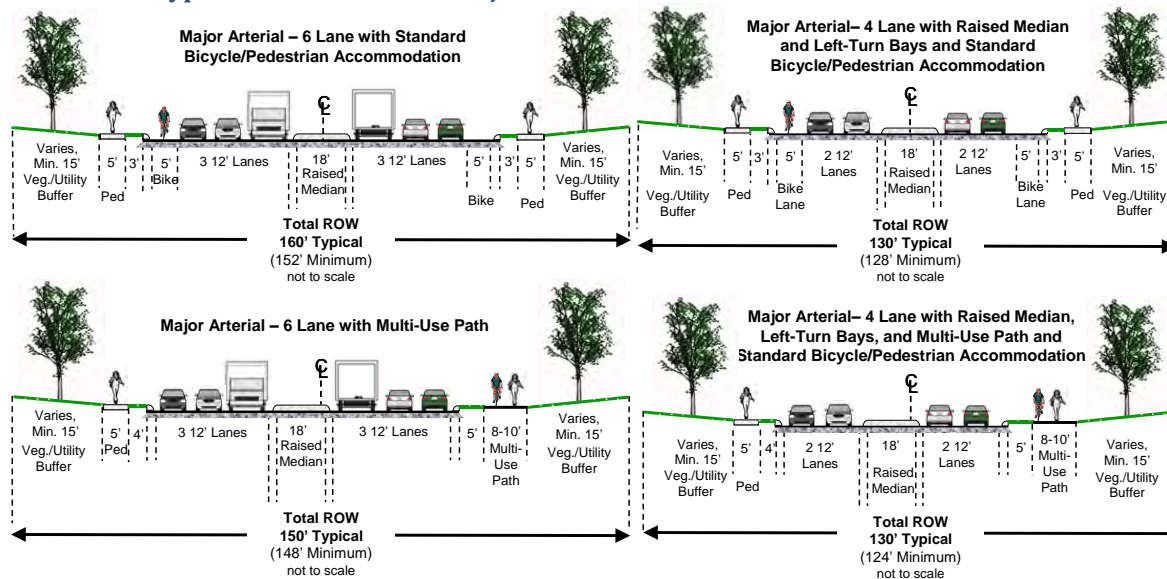
## Major Arterial

Major arterials are the workhorses of a region's transportation system. They complement the controlled-access facilities by providing connectivity within the region and with outlying areas, and also serve traffic from minor collectors and higher-activity, typically non-residential, land uses. Examples of existing facilities that function as major arterials in the KTMPO area include: Loop 121 in Belton, US 190 through Copperas Cove, and SH 36 through Temple. These examples refer to the facility's existing typical cross-section and functional characteristics, not necessarily their long-term future functional role.



Future major arterials will typically need to include between four and six lanes for vehicle traffic. According to the KTMPO regional functional definition, in addition to auto and truck vehicle traffic, major arterials should be able to accommodate express and local transit service, advanced cyclists, and pedestrians as appropriate. Because of the higher volumes anticipated for major arterials, a bicycle lane is provided instead of a shared auto/bicycle outer lane. In areas with higher recreational cyclist traffic or where safety is a concern, a parallel multi-use path may better accommodate cyclists than an on-street bicycle lane.

**Exhibit 4.3: Typical Cross-Sections—Major Arterials**



## Minor Arterial

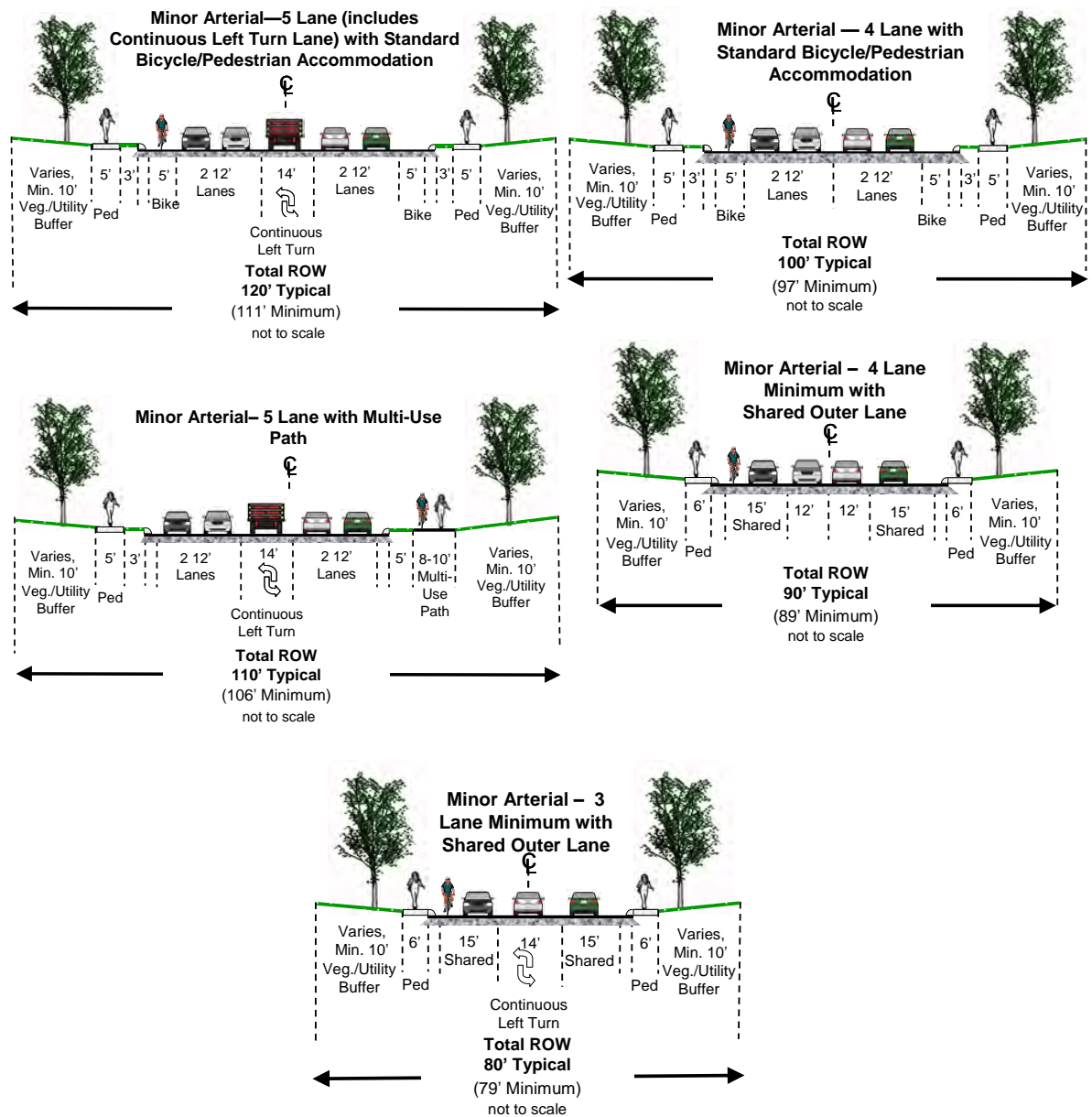
Minor arterials function similarly to major arterials, and yet they do have distinguishing characteristics. They serve trips within and between adjacent neighborhoods and sub-areas, and provide greater access to and from abutting land. Minor arterials are also typically used in industrial areas because of the need to accommodate larger trucks from abutting land uses and the need to more quickly access the longer distance arterial system. Examples of existing facilities that function as minor arterials in the KTMPO area include: Avenue B in Copperas Cove, Elms Road in Killeen, and North 31<sup>st</sup> Street in Temple. These examples refer to the facilities' existing typical cross-section and functional characteristics in 2008, not necessarily their long-term future functional role.

Depending upon their location, future minor arterials may feature typical cross-sections such as:

- four travel lanes with continuous center left-turn lane ("5 lanes") in areas with generally higher volumes and more turning movements;
- four undivided travel lanes (without median or center left-turn lane), which is a typical cross-section application serving industrial areas, or where the right of way is too constrained to include a center left-turn lane; or
- two travel lanes with continuous center left-turn lanes (3 lanes) for areas where right of way is constrained and/or traffic volumes do not merit a larger facility.

According to the KTMPO regional functional definition, in addition to vehicle traffic, minor arterials should be able to accommodate local transit service, advanced and basic cyclists, and pedestrians. A striped bicycle lane is desirable; a shared auto/bicycle outer lane is also suitable, provided it is wide enough and vehicular volumes and speeds are relatively low. In areas with higher recreational cyclist traffic or where safety is a concern, a parallel multi-use path may better accommodate cyclists than an on-street bicycle lane. In such situations, however, it is crucial that proper access to intersection crossings is maintained. A multi-use path on one side of the street can make turning movements to the opposite side of the street unsafe. Land use practices can also create unsafe conditions for multi-use paths alongside streets if there are multiple driveways across the paths with inadequate traffic controls or warning signs for both motorists and bicyclists.

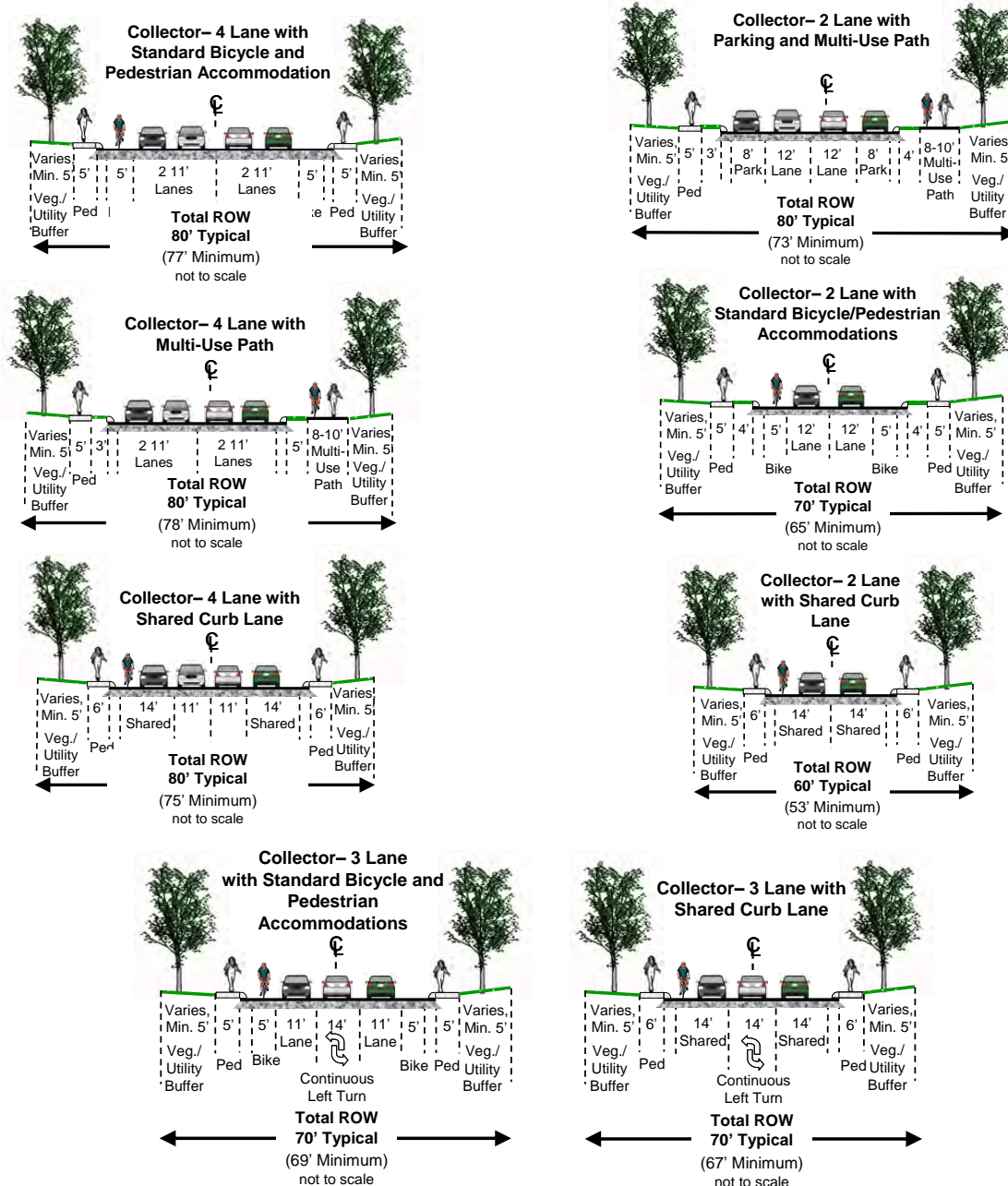
**Exhibit 4.4: Typical Cross-Sections—Minor Arterials**



## Collector

As the name suggests, collectors primarily collect traffic from local streets and distribute it to the surrounding arterial network. They also serve shorter trips within neighborhoods and sub-areas, but they should not generally be longer than two miles to avoid slipping into a minor arterial role by attracting too many longer through trips. Collectors offer high access to both local streets and driveways serving abutting land uses of various intensities. Examples of existing facilities that function as collectors in the KTMPO area include: Harley Drive in Harker Heights, Florence Road in Killeen, and Main Street in Salado. These examples refer to the facilities' existing typical cross-section and functional characteristics in 2008, not necessarily their long-term future functional role. Future collectors will typically not be larger than four lanes for vehicle traffic, with two lanes being much more common. According to the KTMPO regional functional definition, in addition to automobile and truck vehicle traffic, collectors should be able to accommodate local transit service, advanced, basic, and potentially child cyclists, and pedestrians.

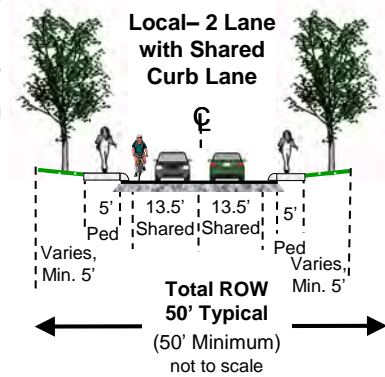
**Exhibit 4.5: Typical Cross-Sections—Collectors**



## Local Street

Because of the regional focus of this plan, local streets are not addressed in any detail. They provide the highest level of access to abutting land uses and their look and character demonstrate the most variation between local jurisdictions, sub-areas, and even neighborhoods. The typical cross-section shown below is provided for perspective only. Because increased bicycling and walking is a regional goal, bicycle and pedestrian accommodations have been included.

**Exhibit 4.6: Typical Cross-Sections—Local Streets**



**Exhibit 4.7: Summary of Typical Cross-Section Characteristics**

Design Element	Controlled-Access Arterial	Major Arterial	Minor Arterial	Collector
<b>Desirable ROW Width</b>	Varies up to 500'	160' (6 lanes)	120' (5 lanes)	80' (4 lanes)
<b>Minimum ROW Width</b>	250'	130' (4 lanes)	80' (3 lanes)	60' (2 lanes)
<b>Typical Pavement Width (BOC to BOC)</b>	Varies substantially	106' (6 lanes) 82' (4 lanes)	75' (5 lanes) 47' (3 lanes)	57' (4 lanes) 31' (2 lanes)
<b>Auto Lane Width</b>	According to TxDOT Design	12'	12'	11' minimum
<b>Median Treatment</b>	According to TxDOT Design	Raised Median desirable (18' desirable)	Continuous Center Left Turn Lane desirable (14' minimum)	Continuous Center Left Turn Lane for high turn-movement areas (14' desirable)
<b>Outside Vegetation/Utility Buffer (minimum)</b>	According to TxDOT Design	15'	10'	5'
<b>Shared Auto/Bike Lane</b>	N/A	N/A	15'	14'
<b>Multi-Use Path</b>	N/A	8' minimum 10' typical 12' desirable for multi-use Additional 2' grated/smooth on both sides 3' horizontal clearance on both sides		
<b>Bike Lane (higher speeds/volumes)</b>	N/A	4' minimum (excluding curb) 5' desirable (excluding curb) 5' minimum in presence of on-street parking 6' maximum (to discourage parking in the bike lane)		
<b>Shoulder Bikeway (rural areas)</b>	N/A	4' minimum 6'-8' standard No more than 8' (to discourage parking in the bike lane)		
<b>Sidewalk Area</b>	N/A	Consider multiple elements: Landscape furniture/car door opening zone: 2' minimum if paved, 4' minimum if landscaped and no other buffer, 3' minimum if landscaped and in presence of bike lane or wider outer shared lane Paved sidewalk: 5'-8' depending on pedestrian volumes Frontage zone: minimum of 1' to a fence or property line, minimum of 2' to storefronts with doors opening onto sidewalk (other considerations also apply, e.g. utilities)		
<b>Paved Sidewalk</b>	N/A	5' minimum; 6' if attached to back of curb with no buffer (landscape strip, bike lane, parking, etc.)		



Exhibit 4.8: Future Regional Thoroughfare (Belton-Salado)

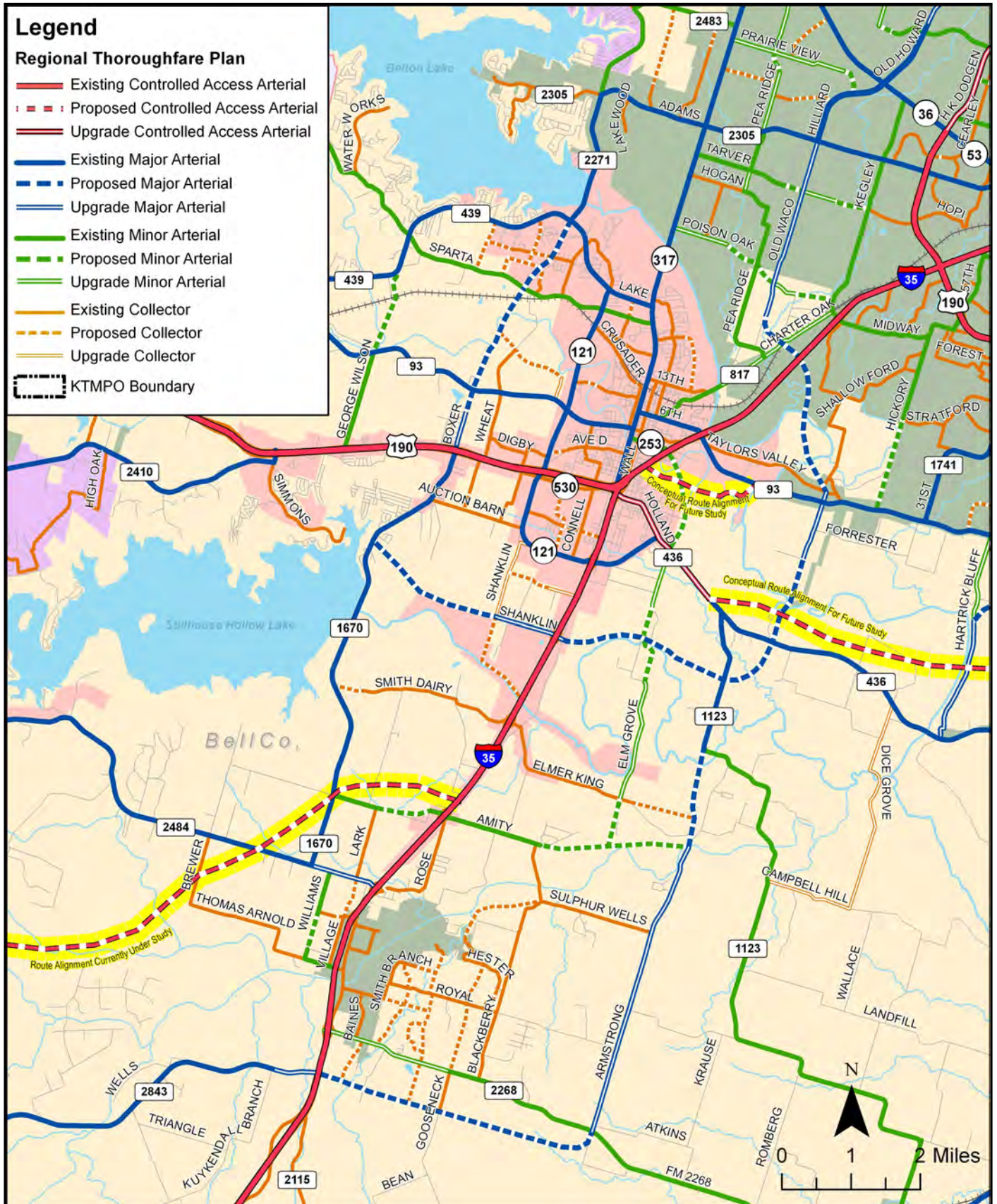




Exhibit 4.9: Future Regional Thoroughfare (Copperas Cove)

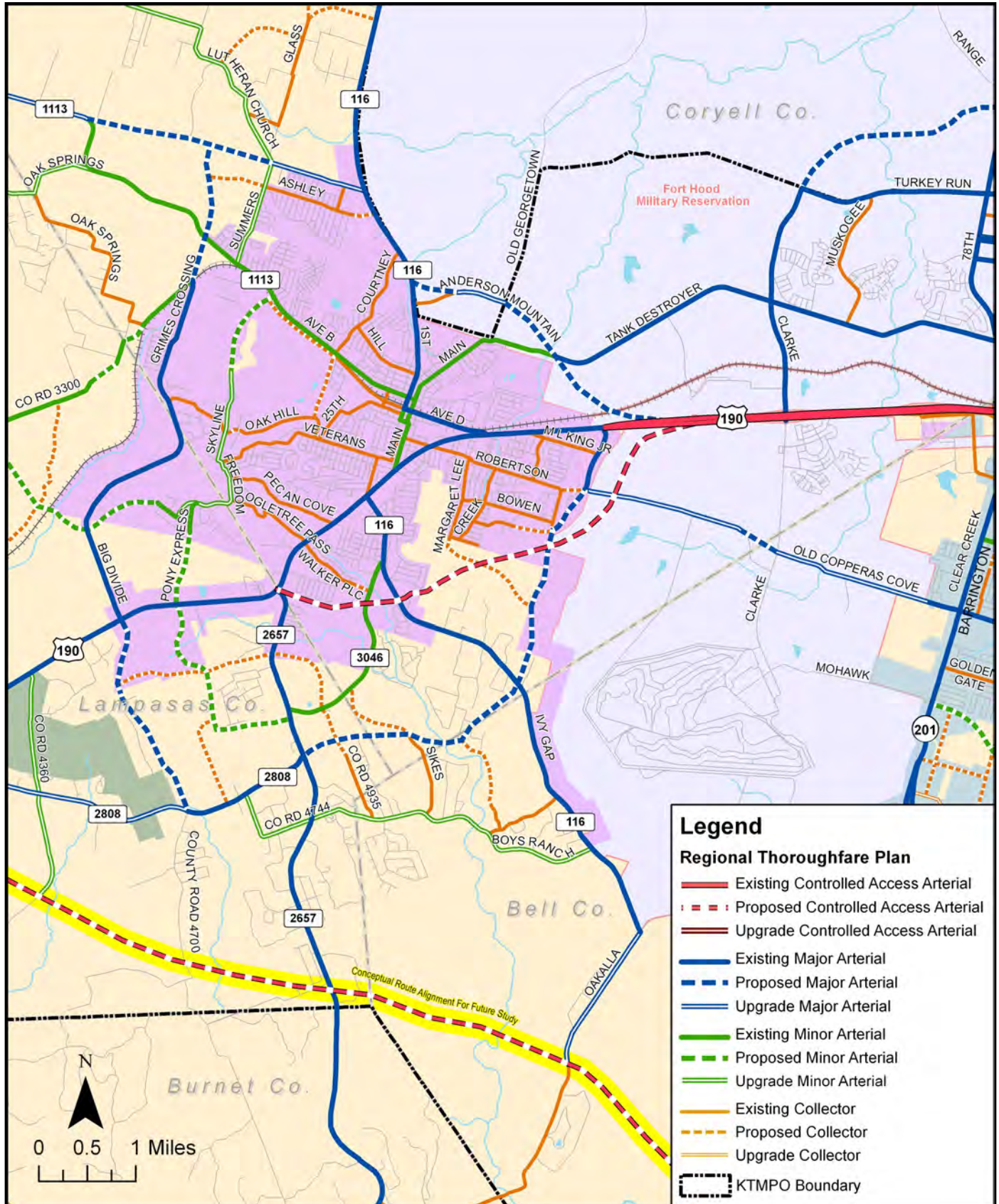




Exhibit 4.10: Future Regional Thoroughfare (Harker Heights)

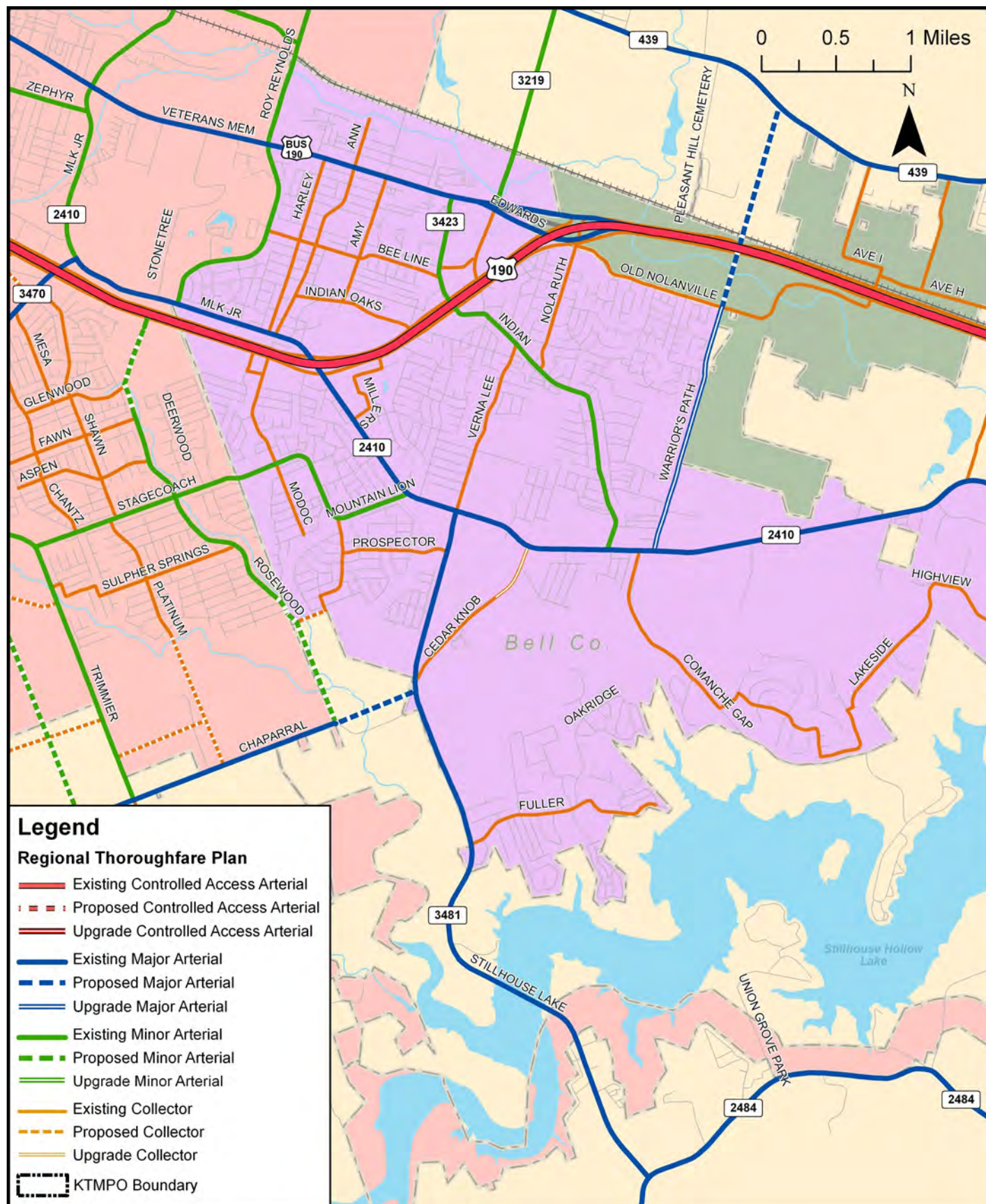
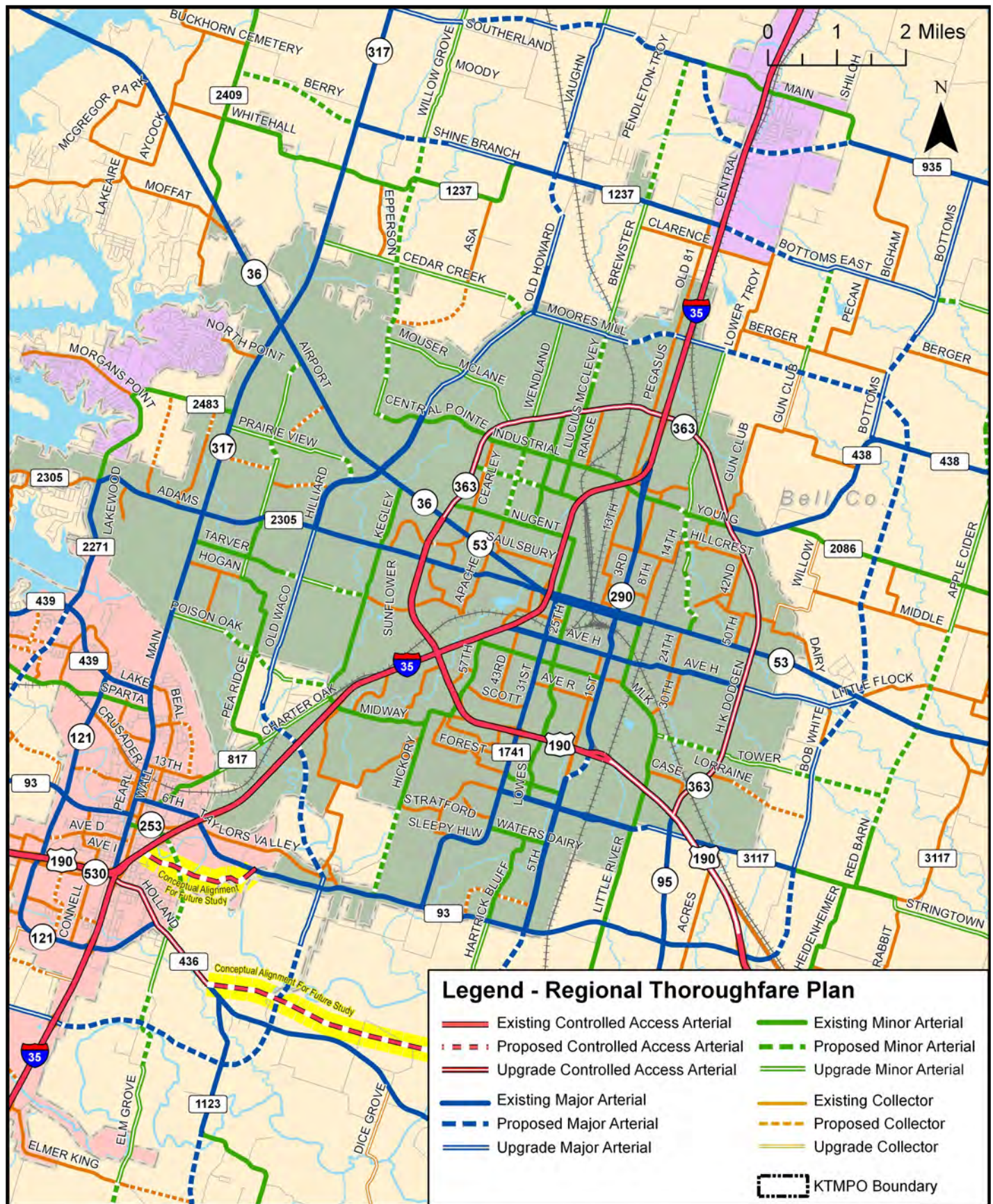








Exhibit 4.12: Future Regional Thoroughfare (Temple)





## THOROUGHFARE PLAN IMPLEMENTATION, FINANCING AND MAINTENANCE

Projects required for the implementation of the Thoroughfare Plan are to be constructed by a variety of implementing agencies, including municipalities, counties, Fort Hood, the Texas Department of Transportation, private developers, and in some cases, public-private partnerships. Municipalities are encouraged, while coordinating more closely with KTMPO, to continue their own sound planning practices as they relate to zoning, subdivision regulations, building setbacks, access control, and visibility standards so that land and roadway development occurs in such a fashion to be consistent with the Thoroughfare Plan. In addition, they are urged to view the network within their jurisdiction as part of a larger regional system.

Traditionally, funding for the various types of roadway projects related to the development of the regional thoroughfare plan is provided via the local general obligation bond programs, the KTMPO's Transportation Improvement Program, developer participation, and in some cases, toll revenue financing. The prioritization processes that are in-place for the development of these funding programs should continue to be followed to ensure that the most needed projects are the ones that are implemented first.

As with any long-range planning document, this Plan is considered a "living" document that responds to changing visions, goals, priorities, and trends of each individual jurisdiction. Alterations to the plan are derived from sound planning practices and are supportive of maintaining mobility of the transportation system in the KTMPO region. As member jurisdictions make changes to their thoroughfare plan through either an incremental update process or through a complete restructuring as part of an updated Comprehensive Plan, notification should be provided to the MPO planning staff so that this regional plan can remain up-to-date. Any modifications to this plan should be such that they are harmonious with local plans and sensitive to the needs and constraints found within a local area. In turn, the local area plan must seriously consider the impact their changes have on the mobility needs of the entire region.

Due to Transportation Management Area (TMA) designation, it is vital that a plan maintenance process is formalized and incorporates consultant suggested processes as recommended:

- The local entity presents the suggested revision to the MPO staff for initial review
- MPO staff reviews the suggested revision in terms of regional connectivity, impacts to future traffic patterns, and compatibility with the existing plan
- Once common understanding between MPO staff and the requesting entity is reached, MPO staff and the requesting entity present the suggested revision to the MPO Technical Advisory Committee
- The MPO Technical Advisory Committee formally considers the proposed change(s) and staff recommendations
- Should the change be considered to be "significant" (e.g., in response to a complete overall of a city Comprehensive Plan), the proposed amendments are presented at a public hearing
- The MPO Technical Advisory Committee recommends approval by the MPO Transportation Planning Policy Board
- The revised Thoroughfare Plan network is adopted by the MPO Transportation Planning Policy Board

This process should be considered to be one element of the continuing, cooperative, and comprehensive transportation planning processes for the KTMPO planning area.

## MAJOR FACILITIES IN THE KTMPO REGION

Below are the major facilities within the KTMPO region and their current state of usage:



### Interstate Highway 35 (IH 35)

As one of the highly recognized Congressional High Priority Corridors, I35 is essential to the movement of goods and services within the state of Texas as well as from Canada to Mexico. Within KTMPO, I35 stretches 36 miles from the Bell County lines north to south. I35 is currently undergoing facility upgrades from the Bell County line to the south to the northern extent of Bell County. Facility upgrades will include: expansion from 4 lanes to 6/8 lanes of traffic, one way service roads, bridge turnarounds, direct-connect bridges and others. Expected completion of these upgrades is fall 2018.

From the state lines of Texas, north to south the counties along I35 are projected to grow over 50% from 2010 to 2040. I35 is currently considered a lifeline for economic vitality. Future needs are far outgrowing the capacity of this facility even after major upgrades that are ongoing. As a result, the State of Texas has organized an I35 Advisory Committee that has developed a plan dated August 2011. The State of Texas I35 Advisory Committee is taking a very holistic approach. This plan addresses future facility upgrades, maintenance and alternative measures (to include high speed rail) to relieve the current congestion as well as the anticipated future congestion challenges.

The 2040 MTP incorporates consideration of projects that would widen this facility (six to eight lanes) from south loop 363 to US 190. The current average daily traffic count along this segment is 85,000. The projected 2040 average daily traffic count is 178,000.



### US Highway 190 (US 190)

Primary use of US190 is military and military support. With approximately 45,000 to 55,000 troops present in Fort Hood, there are approximately 278,000 members of military families and support personnel in the region. As a result of the large growing population, US 190 is undergoing upgrades. Current upgrades include 4 to 6 lane divided highway in the Harker Heights/Killeen area. There are many other strategies to relieve congestion that either need research or are currently undergoing research. Fort Hood is a vital measure of our national security and the ability of troops to deploy in an effective manner is of great importance. US 190 stretches 50 miles from the western portion of the region to the east.



Currently, US 190 junctions with I35 from Belton to Temple approximately 8 miles. Possible future consideration could be placed on relieving the congestion with I35. A connector from Belton to Heidenheimer would allow military and travelers to continue on US190, thereby bypassing I35 and relieving congestion.

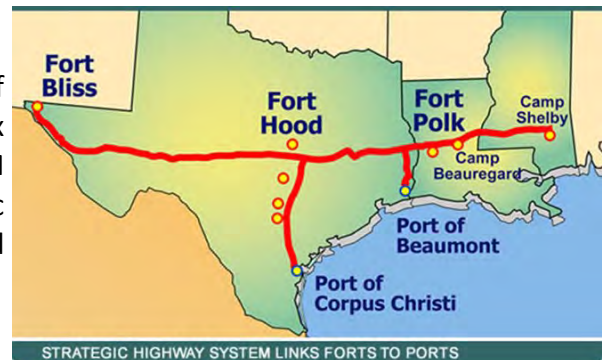
Texas Department of Transportation completed a US190/IH 10 Feasibility Study in August of 2010. The final draft of this study suggested consideration by 2030 for a US190 relief extension bypass from Belton to Heidenheimer.

## POTENTIAL INTERSECTIONS AND ADDITIONAL TRAVEL LANES



A multi-state coalition for transportation improvements (Gulf Coast Strategic Highway Coalition) that includes Texas, Louisiana and Mississippi was formed to pursue the transportation needs of the U.S. Army and National Guard. The results of the “Forts to Ports” study show a corridor from El Paso Texas to Hattiesburg, Mississippi. US Highway 190 was selected as the corridor of choice for point to point delivery of troops and military goods. Local communities along US190 have shown significant need and desire to obtain interstate designation (I14). There appears to be significant regional, state and local support to upgrade and identify this facility as an East/West interstate connector to ports.

The 2040 MTP incorporates consideration of projects that would widen this facility (four to six lane divided freeway and ramp alignments) from FM 2410 to IH 35. The current average daily traffic count along this segment is 36,500. The projected 2040 average daily traffic count is 49,500.



**195**  
TEXAS

### State Highway 195 (SH 195)

SH 195 connects travelers from US190 to IH 35 north of Georgetown, Texas. Historically, this facility has been used for commuters to the Austin area. Whereas the facility continues to be utilized for commuters, in recent years it has become an important artery in the KTMPO roadway system. SH195 is primarily utilized by commuters, students, military and regional airport travelers. SH195 has recently undergone extensive upgrades to accommodate the needs of the public as well as the military as an alternative deployment artery. South of the KTMPO region, SH195 is undergoing an upgrade to a divided four lane highway that should be complete by February 2015.





The 2040 MTP incorporates consideration of projects that would widen this facility (four to six lane freeway with frontage roads) from Stan Schlueter Loop to Chaparral Road. The 2040 MTP also incorporates a grade elevation over the BNSF railroad tracks and Business 190 with widening of the roadway from Rancier Drive to US 190 (six to 10 lanes). The current average daily traffic count along this segment is 19,350. The projected 2040 average daily traffic count is 27,800.



### **State Highway 36 (SH 36)**

This two lane roadway has been used by trucking companies and travelers for many decades as an alternate route from Abilene to Houston. The route alternative is to pass through Fort Worth to Dallas and then to Houston. To the western portion of the KTMPO region, SH36 passes through North Fort Hood just beyond the borders of the KTMPO region. The North Fort



Hood facility is home to the Military Equipment and Training Site which provides equipment for the US Army Reserve and Army National Guard. Fort Hood trains on average 22,000 guardsman annually. As a result, SH36 is often a congested corridor with the movement of these troops. Recently, oilfield activity in West Texas has also increased the usage of this facility.

The 2040 MTP incorporates consideration of projects that would widen this facility (two to four lane divided highway) from SH317 to the Coryell County line. The current average daily traffic count along this segment is 7,600. The projected 2040 average daily traffic count is 11,000.



### **State Highway 201 (SH 201)**

SH201 begins at US190 and ends at SH195. Recently, SH201 has undergone extensive upgrade to accommodate the traffic needs of higher education, the regional airport and the military. Texas A&M University – Central Texas (TAMUCT) has relocated along SH201. The TAMUCT intends to build 1.6 million square feet of educational facilities. The Killeen/Fort Hood Regional Airport is also located on SH201. Future considerations may include extension of SH201 for a direct connection to IH35. A SH201 connection would allow for an alternative route to IH35, thereby relieving congestion and accommodating the future southern growth trends of Copperas Cove, Killeen and Harker Heights. On the northern end of SH201 there are three major businesses that contribute to congestion. Central Texas College, Robert M. Shoemaker High School and Metroplex Hospital are all located close in proximity to US 190.

The 2040 MTP incorporates consideration of projects that would widen this facility (five to six lane divided roadway) from US190 to FM3470. The current average daily traffic count along this segment is 28,000. The projected 2040 average daily traffic count is 31,000.



### **State Highway 317 (SH 317)**

SH317 begins in Belton, Texas and ends at Valley Mills, Texas. This two lane facility is utilized by a vast array of motorist to include commuters, recreational users and freight haulers. Located parallel to I35, motorists utilize this two lane facility at times as an alternative route. SH317 is also located near Lake Belton and many residential areas.

Whereas SH 317 does not have significant impact as a major corridor to a major city, it is a major connector to IH 35, Lake Belton and SH 36. There are many events that take place during the year on Lake Belton and in the Belton/Temple area. Each of the major holidays brings hundreds and sometime thousands to these communities and Lake Belton. Within a 3 mile stretch of SH 317 there are four Belton ISD facilities that compete with commuters, rock quarry truck traffic and recreational users. As a facility, future upgrades are necessary to carry the demand and augment safety issues.

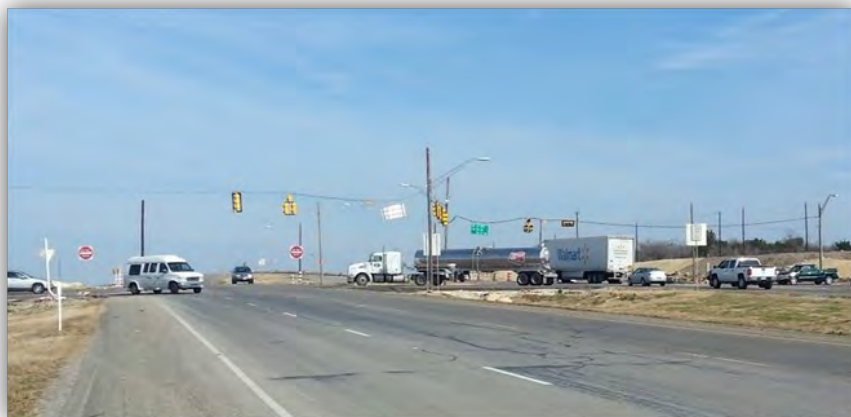
The 2040 MTP incorporates consideration of projects that would widen this facility (four to six lane divided freeway and ramp alignments) from FM 2305 to FM 439. The current average daily traffic count along this segment is 14,000. The projected 2040 average daily traffic count is 17,000.



### Loop 363 Expansion

Loop 363 in Temple continues to experience heavy traffic. Expansion of this corridor over the past 8 years appears to have accommodated traffic volume very well. Increased capacity to 6 lanes with one way frontage roads on the southern portion of the loop has allowed better flow of traffic and easier east/west movement through Temple. The Texas Department of Transportation (TxDOT) completed the project that reconstructed a portion of Loop 363 in Temple from South 57<sup>th</sup> Street to South 5<sup>th</sup> Street in September of 2005. Construction from South 57<sup>th</sup> to SH 36 was completed in 2012 and included an IH 35 overpass and FM 2305 underpass thereby relieving congestion in those areas.

Construction from SH 36 north to North IH 35 is underway which will include 2 to 6 lanes and direct connects from and to I35. This project will eventually improve congestion issues that are present with the industrial complex (Central Pointe) in North Temple. Loop 363 construction is expected to be complete in the Fall of 2014.



The 2040 MTP incorporates consideration of projects that would widen this facility (two to four lane with frontage roads) from IH35 to SH36. The current average daily traffic count along this segment is 6,000. The projected 2040 average daily traffic count is 13,500.

Exhibit 4.13: KTMP's Notable Let Projects (FY2008-FY2012)

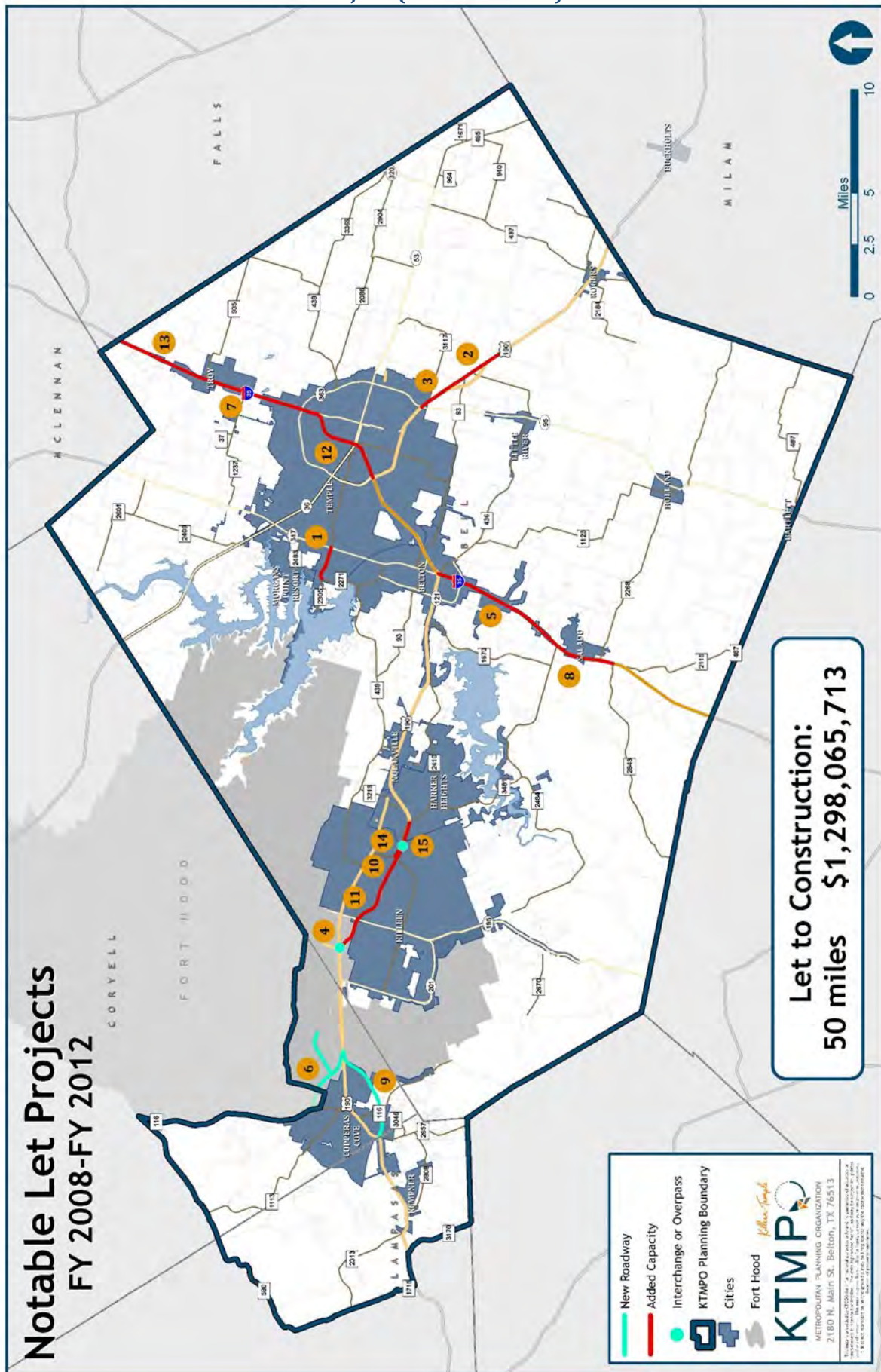




Exhibit 4.14:  
KTMP  
Notable Let  
Projects  
Details  
(FY2008-  
FY2012)

MAP ID	KTMP ID	CSJ	STREET	FROM	TO	PROJECT DESCRIPTION	TOTAL PROJECT COST
1	T15-05	0232-04-010	FM 2305	FM 2271	SH 317	Widen roadway to four lanes with two way left turn lane	8,898,313.00
2	Z15-06a	0185-01-020	US 190	Temple South City Limit	2 miles south of FM 436	Widen roadway to four lanes with depressed median	50,608,484.00
3	Z15-06b	0185-01-026	US 190	SH 95	Temple South City Limit	Widen roadway to four lanes with depressed median	5,235,583.00
4	W30-07	0231-02-050	US 190	At Railroad Rd		Reconstruct major interchange	3,400,617.00
5	T15-06b	0015-06-071	IH 35	Amity Rd	US 190	Widen from 4-6 lanes	148,607,125.00
6	W30-30	3623-01-001	SH 9	US 190	FM 116	Construct 2 lanes of ultimate 4 lane roadway for Copperas Cove NE Relief Route and Tank Destroyer Blvd connection	36,714,098.00
7	T15-06d	0015-04-067	IH 35	North Loop 363	Carpenter's Creek (North Troy)	Reconstruct and widen from 4 to 6 lanes	170,571,399.00
8	T15-06a	0015-07-065	IH 35	FM 2843	FM 2484	Reconstruct and widen from 4 to 6 lanes	102,307,339.00
9	C15-01	0231-18-002	US 190	East of Copperas Cove	.5 mi West of Lampasas County Line	Construct 2 lanes of ultimate 4 lane divided control access roadway for Copperas Cove Relief Route	39,637,024.00
10	W30-27	0231-03-103	US 190	WS Young	FM 2410	Widen from 4 to 6 lane divided freeway, improve frontage rds & ramp alignments	11,354,785.00
11	W30-26	0231-03-107	US 190	SP 172 (at Fort Hood Front Gate)	WS Young	Widen from 4 to 6 lane divided freeway, improve frontage roads & ramp alignments	65,045,253.00
12	T15-06c	0015-14-102	IH 35	South Loop 363	North Loop 363	Reconstruct and widen from 4 to 8 lanes	420,061,249.00
13	T15-06L & 073	0015-04-067	IH 35	Carpenter's Creek (North Troy)	Falls County Line	Reconstruct and widen from 4 to 6 lanes	214,602,100.00
14	H15-02	2304-02-035	FM 2410	FM 3470 (Stan Schlueter)	Roy Reynolds Dr	Widen from 2 to 4 lanes with continuous left turn	3,997,308.00
15	K30-01	0231-03-129	US 190	.2 mi East of FM 3470	.3 mi West of FM 2410	Construct overpass at Rosewood Dr	17,025,036.00



## TRAFFIC VOLUMES

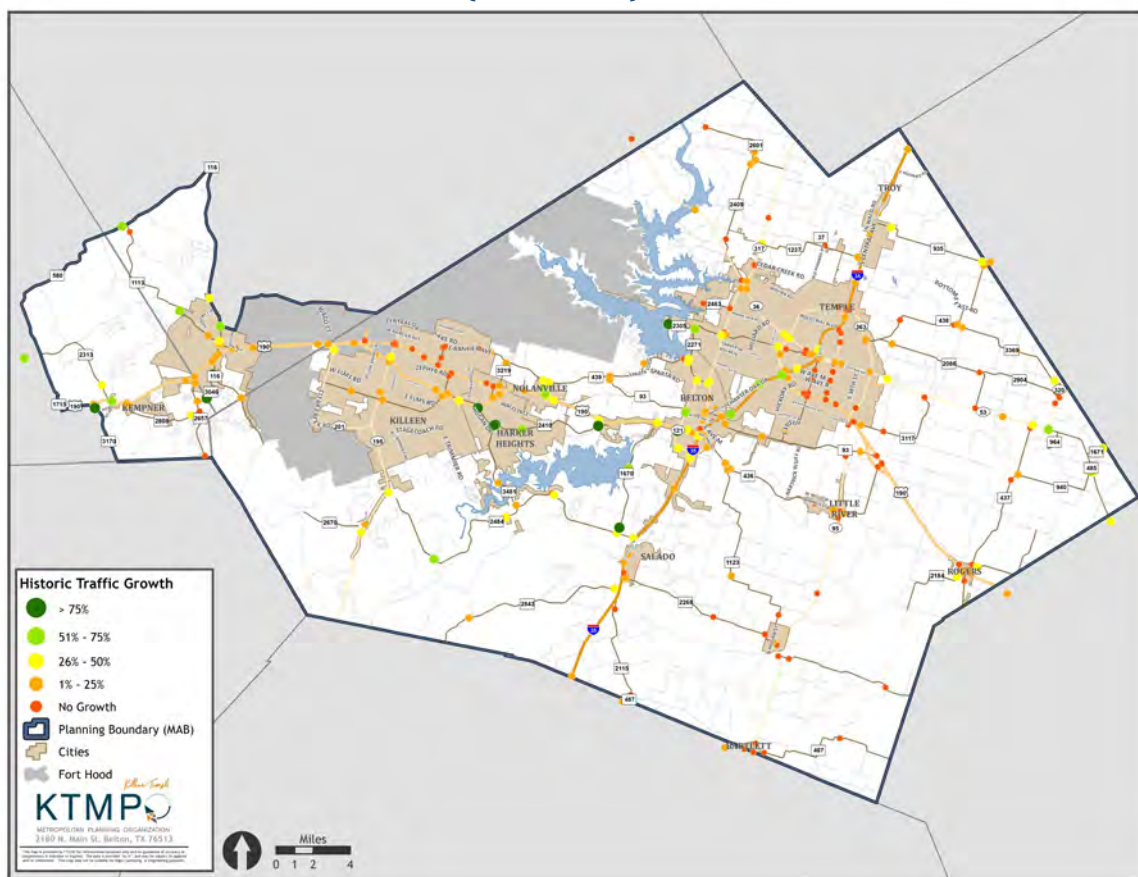
Annual average daily traffic (AADT) volumes for the KTMPO region were obtained from TxDOT. The location with the highest daily traffic volume in 2012 was along I-35 between Midway Drive and US 190, with a volume of 111,000. The following table presents daily traffic volumes at the locations that experienced an increase of 15,000 or more vehicles per day between 2002 and 2012. The most significant growth occurred along I-35 and US 190, which highlights the importance of these roadways.

**Exhibit 4.15: High Traffic Volume Growth Locations**

Roadway	Location	2002	2012	Absolute Growth	Percent Growth
I-35	Between Midway Dr and US 190	73,000	111,000	38,000	52%
I-35	North of FM 93	70,000	106,000	36,000	51%
I-35	Between US 190 and Avenue H	67,000	95,000	28,000	42%
US 190	East of FM 3470	54,000	79,000	25,000	46%
I-35	North of Adams Avenue	59,000	78,000	19,000	32%
US 190	East of Willow Springs Road	77,000	93,000	16,000	21%
I-35	South of SH 121	54,000	70,000	16,000	30%
US 190	West of I-135	32,000	48,000	16,000	50%
US 190	West of FM 1670	39,000	54,000	15,000	38%
I-35	South of US 190	55,000	70,000	15,000	27%

The following map illustrates the high growth locations for traffic in the KTMPO. As seen in the figure, traffic has almost doubled in the Copperas Cove and Harker Heights region.

**Exhibit 4.16: Historic Traffic Growth (2002—2012)**



## TRAVEL DEMAND MODEL

A Travel Demand Model (TDM) is a helpful tool in projecting future traffic demand, and current and forecasted roadway capacity. The latest model for the KTMPO region was developed in 1997 and is being updated to a 2010 version. The model is currently in the process of calibration with an expected delivery date of November, 2014. As indicated in Chapter 3, KTMPO hired a consultant in 2011 to assist in developing demographic and network data for inclusion in the updated TDM. This work involved developing and updating the Traffic Analysis Zone (TAZ) structure, TAZ-level demographics, and the modeled roadway network for the years 2010 and 2040. The final report, *Travel Demand Model Update/Model Documentation*, is included in **Appendix I**. Some elements in the report are discussed below.

### Traffic Analysis Zone Geography

A TAZ is a unit of geography most commonly used in transportation planning models. The zones are constructed by census block information. Typically these blocks are used in transportation models by providing socio-economic data. Most often the critical information is the number of automobiles per household, household income, and employment within these zones. This information helps to further the understanding of trips that are produced and attracted within the zone.

Because of the KTMPO boundary expansion since the last model update, new TAZs were developed to cover the recently expanded planning area. TAZs were generally constructed from 2010 census blocks; however, due to the incompatibility of some TAZs and census blocks, 30 blocks had to be split among TAZs. Additional documentation of this process can be found in **Appendix I**.

2010 population and household data were derived directly from the 2010 US Census at the block level and are shown in Exhibits 4.17 and 4.18. Since some TAZs span county boundaries, there are some TAZs that extend slightly outside of the official MPO planning area. Therefore, a query of the TAZ database will show slightly higher population and household values than the official MPO planning area.

**Exhibit 4.17: 2010 Population and Households (within KTMPO Planning Area)**

County	Population	Households
Bell	310,235	114,035
Coryell	49,029	15,458
Lampasas	6,618	2,441
<b>Total</b>	<b>365,882</b>	<b>131,934</b>

**Exhibit 4.18: 2010 Population and Households (within KTMO Modeled Area)**

County*	2010 Population	2010 Households
Bell	309,901	113,905
Coryell	50,040	15,845
Lampasas	6,039	2,216
Williamson	1,919	287
<b>Total</b>	<b>367,899</b>	<b>132,253</b>

\*County to which TAZ is assigned (some TAZs span multiple counties)

Education employment data was identified for each zone using data provided by KTMO staff and supplemented with additional research by the consultant. For areas outside of Fort Hood, 2010 Texas Workforce Commission (TWC) data was used for basic, retail, and service employment, supplemented by additional research by the consultant. Within Fort Hood, considerations in estimated employment included active duty military employment, active Reserves and temporary duty military, civilian contractors working for the military, traditional civilian employment, and civilian educational employment. Exhibit 4.19 summarizes the 2010 employment trend for the KTMO region.

**Exhibit 4.19: 2010 Employment Totals**

Employment Totals					
Category	Bell	Coryell	Lampasas	Williamson	Total
Basic	23,767	1,640	75	39	25,521
Retail	29,932	3,283	91	96	33,402
Service	53,006	9,501	140	121	62,768
Military	13,091	13,537	0	0	26,628
Education	8,827	2,325	47	0	11,199
<b>Total</b>	<b>128,623</b>	<b>30,286</b>	<b>353</b>	<b>256</b>	<b>159,518</b>

Special Generators are locations that generate a large volume of traffic such as a shopping mall, hospital, college, airport, etc. 2010 special generators were identified as shown in Exhibit 4.20. Most of these locations were included in the 1997 model; those shown in yellow were added to the list.

**Exhibit 4.20: Special Generators**

ID	Name	Type	Units	NumUni10	NumUni40	TotEm10	TotEm40
1	Scott and White et al	Hospital	Beds	636	830	8,640	11,240
2	Veterans Health Care Clinic	Hospital	Beds	297	390	2,437	3,170
3	Wilsonart International (S)	Basic (Manuf)	Emps	393	620	393	510
4	Temple High School	High School	Students	1,938	3,100	247	400
5	McLane Southwest	Basic (Distribution)	Emps	712	930	712	930
6	Tenneco Packaging	Basic (Packaging)	Emps	715	930	715	930
7	Wilsonart International (N)	Basic (Manuf)	Emps	638	830	638	830
8	Walmart Distribution	Basic (Distribution)	Emps	669	870	669	870
9	Kings Daughters Hospital	Hospital	Emps	345	450	345	450
10	McLane Data Systems	Basic/Service	Emps	404	520	404	520
11	Belton HS	High School	Students	2,337	3,500	279	420
12	UMHB	Coll/Univ	Students	3,100	4,650	558	840
13	Temple College West of 1st	Coll/Univ	Students	4,560	5,930	406	530
14	Temple Airport	Airport	Enplanements	39	50	14	20
15	Central Texas College	Coll/Univ	Students	6,250	8,130	1,003	1,300
16	Killeen Mall	Mall	Emps	1,015	1,150	1,015	1,150
17	Metroplex Hospital	Hospital	Beds	245	320	1,081	1,410
18	AEGIS Communications Group	Service	Emps	635	830	635	830
19	Texas A&M Central Texas University	Coll/Univ	Students	2,300	0	201	0
20	Killeen High School	High School	Students	1,927	3,080	246	390
21	Killeen Ellison High School	High School	Students	2,349	3,760	299	480
22	Copperas Cove High School	High School	Students	2,090	3,760	252	450
23	Killeen Munic. Airport - Skylark Field	Airport	Enplanements	0	0	24	40
24	Seton	Hospital	Beds	83	130	0	520
25	Texas A&M New Campus 195/201	Coll/Univ	Students	0	7,500	0	600
26	Killeen Airport	Airport	Enplanements	243,861	390,200	150	240
27	Temple Mall	Mall	Emps	573	700	573	700
28	Temple College East of 1st	Coll/Univ	Students	1,140	1,480	102	130



## Roadway Network

The consultant updated the 2010 roadway network to include the full extent of the expanded boundary and assigned attributes for all defined links. Link attributes were defined for seven categories as shown in Exhibit 4.21. Other fields in the network such as area type, capacity, speed, and time are assigned by TxDOT during the model validation process. The 2010 network is detail coded for higher functional classed facilities as defined by TxDOT. Generally, only links with frontage roads and ramps are shown as separate road links for each direction. It should also be noted that the 2010 network was developed with a centroid and a centroid connector for each traffic analysis zone (TAZ).

**Exhibit 4.21: Network Attributes**

Attribute	Type	Description
Street Name	Objective	Primary street name per local usage
Posted Speed	Average	Posted speed on the majority of the link
Functional Class	Subjective	Roadway type per the standard hierarchical classification system
Facility Type	Objective Referenced	Divided, undivided, or with turn bays
Lanes	Objective	Number of through lanes
Turn Penalty	Referenced	Flag on links with assigned turn penalties
Auxiliary Lane	Objective	Flag for auxiliary lane not counted as a through lane

The 2040 roadway network was built by adding projects to the final 2010 network based upon anticipated growth. This resulted in identification of projects to provide various improvements to existing roads and construction of new roads as shown in Exhibits 4.22 and 4.23.

**Exhibit 4.22: Improvements to Existing Roads by 2040**

Project ID	Road	Limits	Description
	IH 35	FM 2843 to FM 2484	Widen to 6 lanes
H15-01	FM 3423	BU 190 to US 190	Widen to 4 lanes w/ CTL
H15-02	FM 2410	FM 3470 to US 190	Widen to 4 lanes w/ CTL
K15-03	SH 201	Airport to SH 195	Widen to 4 lane divided, w/ overpass at SH 195
T15-06	IH 35	LP 363 N to LP 363 S	Widen to 8 lanes
T15-06	IH 35	SL 363 S to Midway	Ramp reversals and aux lanes
T15-06	IH 35	Bell/Falls C/L to SL 363	Widen to 6 lanes
T15-06m	IH 35	Loop 363 S to Midway	4 ramp reversals, 2 ramp deletions, and aux lane
T25-11	SH 317	FM 2305 to FM 439	Widen to 4 lanes w/ raised median
W25-02	SH 36	Bell/Coryell C/L to SH 317	Widen to 4-lane divided
W30-21	SL 363	IH 35 to Hopi Trail	Widen to 4 lanes divided, SH 36 & Wendland overpass
W30-23	SL 363	At Spur 290	Reconstruct Interchange
W30-27	US 190	Spur 172 to FM 2410	Widen to 6 lanes w/ FR turnarounds at FM 2410
X25-02	FM 2657	US 190 to CR 4744	Widen roadway

**Exhibit 4.23: New Construction Roads by 2040**

Project ID	Road	Limits	Description
	SH 201	SH 195 to IH35	Construct new 4-lane divided roadway
B15-01	W 9th Ave	SL 121 to University Dr	Construct new roadway
B15-02	FM 2271	FM 439 to US 190	Construct 2-lane roadway
C15-01&	US 190	W of FM 2657 to W of Clarke Rd	Construct 4-lane divided roadway
K30-01	CS	FM 2410 to existing Rosewood	Construct 2-lane roadway w/ overpass at US 190
W35-13	SH 9	US 190 to FM 116	Construct 2 lane roadway

**Future Year Control Totals**

As described in Chapter 3, future demographic “control totals” were developed based on documented growth projections from the KTMPO member jurisdictions. Based upon the documented growth rates, 2040 regional population projections were developed, resulting in a 2040 control total population for the KTMPO planning area at 575,200.

Employment was split into basic, retail, service, and education sectors. Based on the 2010 base data, total employment to individual employment sector ratio was calculated for each county and the future years were projected to carry forward the same ratio. This resulted in a 2040 control total employment for the KTMPO planning area at 249,000.

The consultant team met with local representatives to collect and understand information on local growth issues and trends to develop future growth distribution. This involved a three step process as follows:

- Identifying Known Growth between 2010 to 2012
- Identifying Growth from Planned Developments
- Distributing Anticipated Growth

Since 2010 is considered as the base year, it was necessary to identify all developments that were constructed after the base year. This involved using building permit data, orthophotography, review of approved/proposed plats from different jurisdictions, etc. This new construction and preliminary/final site development plans were used to develop population, household, and employment estimates by TAZ for the future year.

After distributing known and proposed developments, the amount of population and employment that is required to reach the previously established control totals was estimated for year 2040. To allocate where this anticipated growth will occur, a suitability analysis was performed separately for cities of Killeen, Temple, Harker Heights, and the rest of Bell County that assigns a composite “attraction” factor for each TAZ.

Suitability analysis is a technique used to categorize locations according to a set of criteria that define an area’s suitability for development. For this analysis, in the KTMPO region a linear relationship was assumed between the development of land and its driving factors. Any change in these development factors will impact future development. The factors assumed to drive future developments are:

- Availability of Developable Land
- Accessibility (Proximity to Major Roads)
- Infrastructure (City Limits)
- Future Development Plans
- Anticipated Growth Areas

The probability of the occurrence of development is calculated based on these independent factors. For each TAZ, a population attraction factor was calculated for different years to distribute the anticipated future growth. In most cases, employment at each special generator site was expected to grow at a rate equivalent to the rate of population growth of the city in which the special generator is located. Basic, retail and service employment sectors were assumed to grow in and around the existing employment areas. It was assumed that if a zone has basic employment, that zone was expected to grow more basic employment. So the remaining number of basic, retail, and service employment was then distributed to each TAZ based on the number of basic, retail, and service employment by sector that TAZ had in year 2010.

Like special generators, education employment at each school was expected to grow at a rate equivalent to the rate of population growth of the city in which the special generator is located. In instances where the location of proposed schools was known, the educational employment of the TAZ was increased by the estimated employment level supported at that school.

The final step was to calculate the total growth each TAZ would experience by year 2040. The growth from planned developments and long term were added together to calculate the future growth. Exhibits 4.24 and 4.25 illustrate the future population and employment growth respectively.



Exhibit 4.24: 2010—2040 Population Distribution

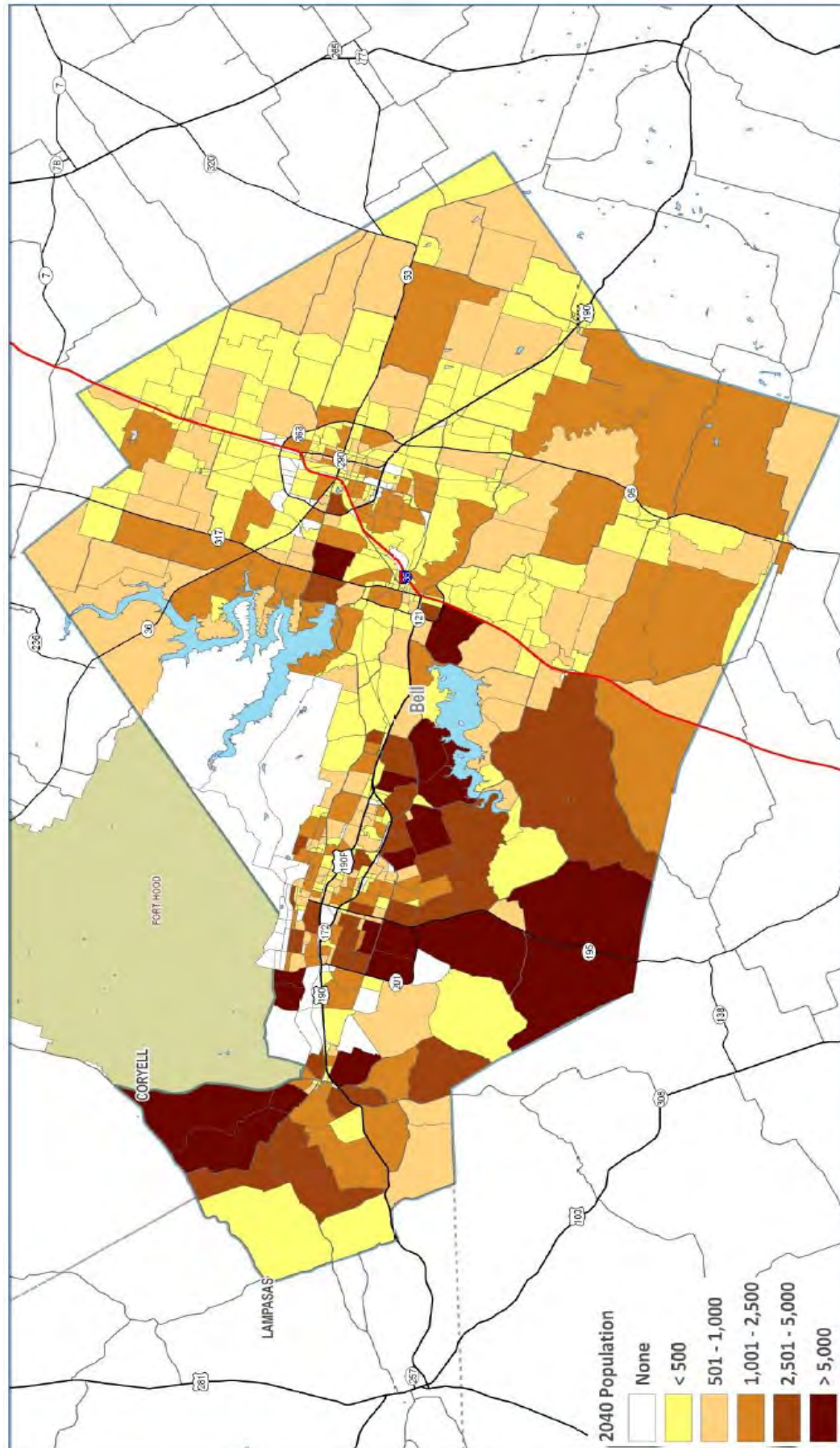
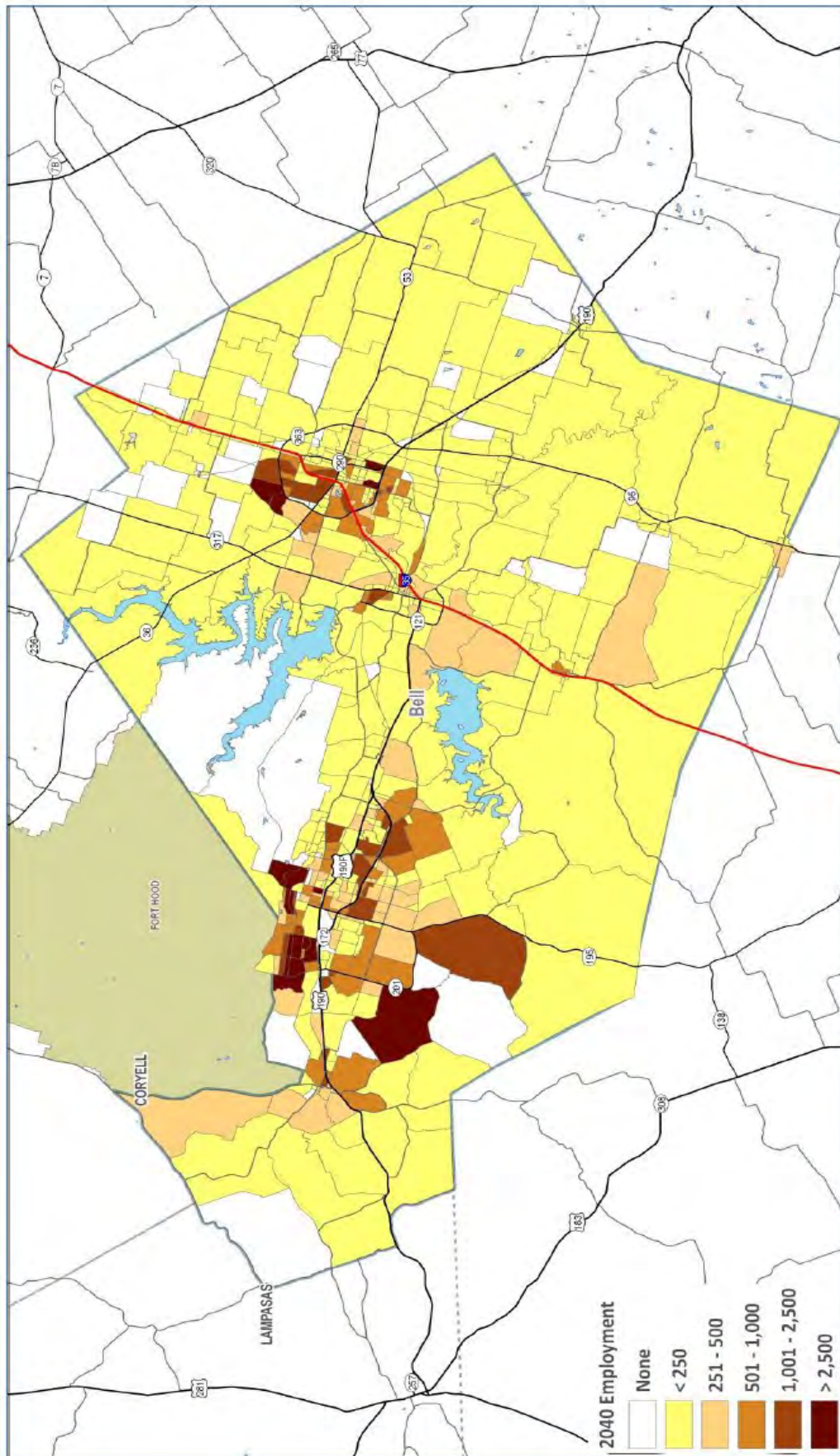


Exhibit 4.25: 2010—2040 Employment Distribution



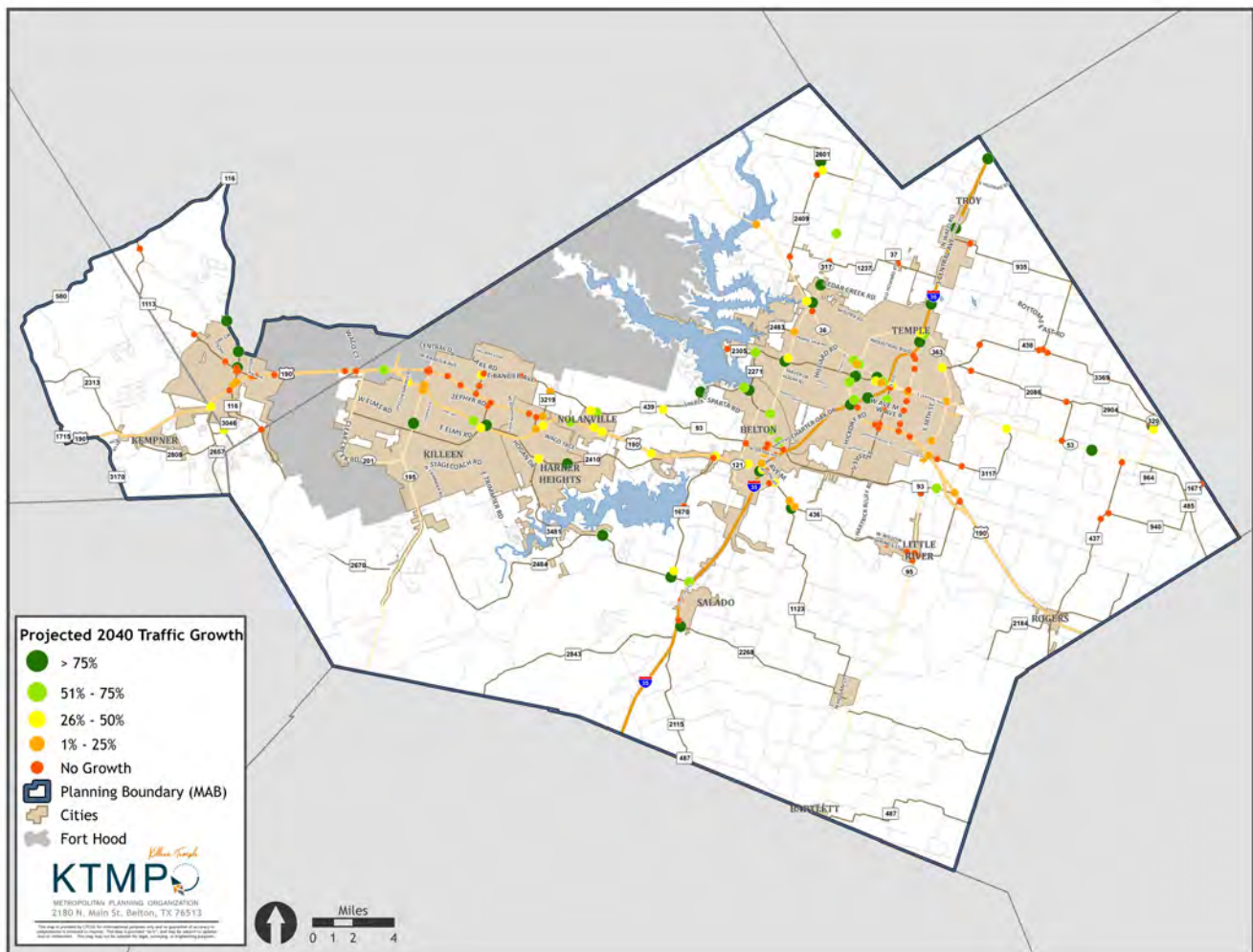


## PROJECTED TRAFFIC DEMAND

Historically, the MPO has used its regional travel demand model, which is developed in partnership with the TxDOT Transportation Planning & Programming Division, to project the future traffic demand. For the 2040 MTP, a newly-validated 2010 model with a 2040 forecast year had been planned to be available in time to replace the old 1997 model with its 2030 forecast. In addition to the update, the 2010 model features an expanded study area, an expanded treatment of Ft. Hood, and an additional employment category for education to improve model precision and accuracy. The updated base year, expanded coverage, and enhancements of the 2010 model make it an obvious choice for the technical tool to be used to generate 2040 traffic projections to support MTP development. As the 2010 model was not available in time to use for the process, historic trend was analyzed to estimate the future traffic demand for the region.

An annual traffic growth rate was calculated for years 1997 and 2009. This annual growth rate was used to develop the 2040 projected traffic from the 2009 urban saturation counts for the KTMPO region. The 1997 traffic counts were chosen, as they can be validated against the existing 1997 travel demand model. The following map illustrates the traffic growth for the KTMPO region. As shown in the map, high traffic growth is expected along US 190, I-35, SH 317, FM 116, and FM 2410.

**Exhibit 4.26: Projected 2040 Traffic Growth**



## TRANSPORTATION SYSTEM MANAGEMENT AND OPERATIONS

Having management and operational strategies in place is crucial if transportation facilities are to function at their peak level of performance. Proper maintenance of facilities and use of Intelligent Transportation Systems (ITS) are key elements in system management and operations. ITS involve the application of advanced information and communication technologies on various transportation elements which ultimately enable users to be better informed and make safer, more coordinated and smarter use of transportation networks.

Transportation facilities generally cross various jurisdictional lines; therefore, it is important for the entities to work cooperatively to ensure a safe and efficient transportation network for the movement of people and goods. Management and operational policies and strategies at various jurisdictional levels are discussed in the following sections.

### State Level

State designated highways in Texas are generally maintained by the Texas Department of Transportation (TxDOT). When these state highways fall within a city's corporate limits, the city and state enter into a Municipal Maintenance Agreement which lays out the responsibilities of both parties to include maintenance of facilities that lie within the right-of-way. TxDOT generally will install, operate, and maintain traffic signals in cities with a population less than 50,000, whereas the city takes on this responsibility if their population is equal to or greater than 50,000. According to TxDOT Waco District officials, most of the Killeen, Temple and Belton area TxDOT maintained roadway traffic signals have been equipped with Video Image Vehicle Detection System (VIVDS) devices. These devices have a large number of detection zones that can be used limitless ways to control intersections and their flow. The benefit of these devices improves delays at intersections for vehicles. Fewer delays at intersections have a positive impact on quality of life and air quality.

TxDOT generally maintains roadways on a seven-year schedule. Signs and striping are reviewed annually, and preventive maintenance is performed on traffic signals and school flashers on an annual basis. Bridges are inspected on a two-year cycle. In Bell County, TxDOT spent approximately \$18 million in maintenance costs for the three year period from 2011 – 2013.

Thanks to increased public awareness, the use of DOT-supplied ITS resources are on the rise in KTMPO. There are currently eight Dynamic Message Signs (DMS) locations along I-35, which is currently undergoing construction, and two along US 190 which are providing drivers with estimated travel times, Amber alerts and other critical emergency statements. When I35 construction is completed (estimated early 2017) there will be 14 dynamic message signs from Troy to south of Salado along the corridor. There are currently three cameras along the I35 corridor that are of public use to citizens and planners to observe traffic flow.

TxDOT's My35 ITS project aims at keeping drivers informed of the congestion situations along the region's primary north-south corridor. In April of 2012, TxDOT installed traffic sensors along I-35 from Salado to Hillsboro in order to collect travel data. DMS technology has been placed along the interstate to give drivers real-time alerts of current conditions. This data is also used on the My35 website, which offers dynamic traffic maps showing real-time lane closures, incidents, and travel times. Traffic cameras in our region can be viewed online for live feed of current conditions.



## County Level

Roads and bridges that are not maintained by TxDOT and are located in the unincorporated areas of a county are maintained by the County Engineers Office. The KTMPO region covers all of Bell County and portions of Coryell and Lampasas Counties. Coryell and Lampasas Counties have Road and Bridge Departments that are responsible for facility maintenance; however, since the vast majority of the KTMPO area lies within Bell County, this section focuses on Bell County's policies and strategies.

Bell County recently adopted a pavement evaluation plan and implemented a commercial database and workflow management system called Cartegraph. Using this system, roads are visually assessed for cracking, rutting, and other deterioration of the paving surface. These observations are collected for segments of the road and given an Overall Condition Index (OCI) which can range from 0 to 99. Road segments OCI less than 70 are considered the highest priority for repair, however, prioritization is not based solely on the OCI. The County Engineer plans for a seven-year lifespan of any road before a Full-Depth Reclamation (FDR) is necessary. The lifespan of the segment may be extended through overlay, seal-coating and other repair techniques, as well as through records of OCI inspections. If the level of wear and tear is minimal, the lifespan may be extended. An inspection may be directed based on calls received from local residents or elected officials, or based on a regular maintenance inspection schedule.



**Longitudinal Cracking**



**Alligator Cracking**

If a segment is selected for repair, a work plan is developed and funds are requested from the budget. After work is complete, the County Engineer conducts a re-inspection. By default, the system assigns an OCI of 95 to a completed seal-coat job, but based on weather, materials, traffic or other factors, the final score may be lower. During the lifecycle of the road, the County Engineer or his staff can view a graph of the road segment's expected deterioration. The final re-inspection is important in guaranteeing that the slope of the deterioration graph is based on accurate, objective data.

This system also allows the County Engineer's Office to manage their road signs – there are over 5,000 signs in the unincorporated areas of Bell County. The Cartegraph system tracks location, type, retro-reflectivity and compliance with various laws and regulations.

Bridges in Bell County are inspected by TxDOT engineers, at a minimum, every two years. This bridge condition data is then provided to the County Engineer who considers it in their overall evaluation plan.

Periodically, the County Engineer staff will generate reports by generating a query based on segment, functional class, location, or OCI, among other characteristics. This allows county officials to quickly assess and prioritize projects, as well as provide a status update on roads and infrastructure to county elected officials.

## City Level

Within a city's jurisdiction, infrastructure that is not maintained by TxDOT is maintained by the city and includes the vast majority of the transportation system. Policy for managing and operating the transportation system varies by city. Following is a summary highlighting a few of the larger cities in the MPO region and their respective policies and strategies for system management and operation.

### **City of Belton:**

Developing a 5-year street maintenance plan that will extend the life of existing transportation facilities. Maintenance and replacement of facilities will be prioritized through a city-wide assessment and condition ranking process.

### **City of Copperas Cove:**

Developing a Street Reconstruction and Maintenance Plan. Currently, Street Dept. conducts variety of routine maintenance procedures to include pothole patching and street repairs, as well as scheduled maintenance procedures to include crack sealing and six-year seal coat program.

### **City of Harker Heights:**

Street maintenance programs are reviewed annually. Pavement condition evaluated on a 5-year schedule; sidewalks are reviewed annually. Traffic counts conducted two times per year. Approximately \$1 Million per year allocated from the General Fund for street maintenance.

### **City of Killeen:**

Conducting a Street Condition assessment that includes the following objectives:

- Street Condition Assessment that will determine an overall network rating; rating will drive maintenance and Capital Improvement Program (CIP) Projects.
- 5 year Maintenance plan to be identified.
- Ratings and 5 Year maintenance plan to justify dedicated funding sources for maintenance and CIP Projects (Street User Fee).
- Nighttime Retro Reflectivity Survey is to be conducted to satisfy Manual on Uniform Traffic Control Devices (MUTCD) mandate.
- Sidewalk assessment and inventory to be conducted for the development of a master plan for maintenance.
- Pavement Markings are to be collected and assessed for the development of a pavement marking master plan/program.
- Red light photo enforcement began in May 2008. Violations dropped 54 percent from June 2008 to June 2009. During this same period, there were 502 fewer accidents citywide than the previous period of 2007-2008. Most intersections along the US190 corridor have been outfitted with a photo enhancement camera.

Implementing the following programs and strategies for Traffic Congestion and Traffic Management:

- **Traffic Management Center:** The City is implementing a new Traffic Management Center (TMC) within the newly constructed Public Works Service Center which will include a new video display wall consisting of eight 55-inch monitors that will allow up to 3 operators to monitor traffic conditions. The City will also be integrating the traffic signal system, tactics, and video management software, into the TMC.
- **Traffic Signal System:** The City is to upgrade the traffic signal system to expand the City's traffic monitoring capabilities. Initially, the traffic signal system will be upgraded along four corridors: W.S. Young, Fort Hood Boulevard, Trimmier Road, and Bunny Trail. Upgrades along these corridors will include ethernet communications employing new radios, new traffic signal controllers, video detection cameras and remote monitoring with traffic sensors.
- **Vantage Vector:** The City will be implementing the newest hybrid vehicle detection sensor, Vector, which uses a combination of radar and video to provide greater detection capabilities. Particularly along high speed corridors, the extended range of the detection zone provides for improved safety of the signalized intersection.
- **Adaptive Signal System:** The City will deploy an adaptive signal system, ACS-Lite, along Stagecoach Road. The initial deployment will be at 5 signalized intersections with the ability for expansion in both signalized intersections and corridors. The adaptive signal system will improve traffic flow along Stagecoach Road by implementing signal timing that can better react to traffic volumes and thereby reduce the number of stops and overall delay at signalized intersections.
- **Travel Time System:** A future project will implement a Travel Time System that will be able to monitor traffic conditions in real time and compare the traffic conditions to historical data to determine if there is problem along key corridors, such as a traffic accident. Not only will the travel time data be available at the City's TMC, but the project is envisioned to display travel time information on the Dynamic Message Signs (DMS) placed at key locations within the City, as well as a website for pre-trip planning.
- The City's maintenance crews perform preventive maintenance on 85 signalized intersections once per month.

#### **City of Temple:**

- City-wide pavement evaluation performed in 2009 on all city-maintained streets; 20% of the streets updated each year, establishing a 5-year evaluation cycle. This enables the development of a maintenance list for crack sealing, seal coating and overlay.
- Crack seal program started in 2010 to seal cracks on city streets. The streets are selected based on information from the pavement evaluation.
- Annual overlay and seal coat programs when funding is available. These streets are selected based on information from the pavement evaluation.



- Capability of reclaiming eligible streets using their asphalt zipper and asphalt overlay machine. Use of the equipment is subject to funding; several streets have been done when funding was available.
- Operate an asphalt truck that patches potholes, street cuts and utility cuts on a daily basis.
- Traffic counts and monitoring of vehicle movements at each signalized intersection. Information used to make timing adjustment and to coordinate timing plan on major corridors.
- Annual traffic signal warrant studies at major intersections to determine the need for new signalized intersections.
- Annual traffic counts on all major roadways (arterials and collectors) in the City.
- Traffic Calming Methods Study Program to address traffic issues presented by citizens and staff.
- Monthly maintenance on all traffic signals in the City.
- Sidewalk cracks are repaired as needed and trails are maintained every two weeks.

#### **Fort Hood:**

In 2009, Fort Hood implemented a system called the Phantom Express to expedite entry onto the facility. This system expedites vehicle movement onto Fort Hood during peak traffic hours in the morning. In general, vehicles entering Fort Hood must stop and each passenger in the vehicle must present identification for physical inspection by security guards. This delayed process creates a bottleneck to traffic entering from US 190, especially the heavily used entrances at Clear Creek and the main gate.

With the Phantom Express system, after verifying insurance, registration, driver's license and Department of Defense identification, the driver is issued a Radio Frequency Identification (RFID) tag to be placed inside their windshield, similar to certain highway tolling systems. For security reasons, there is a secondary check at the entry point. As the vehicle approaches the Access Control Point, a traffic light flashes to indicate the RFID tag has been recognized. At the gate, the driver must present a second ID card to an electronic reader. Once that card has been verified electronically, the gate opens and the vehicle proceeds. During periods of increased security posture, a Personal Identification Number (PIN) may be used to further verify access to the installation.

Phantom Express tags are available to all Active Duty military service-members and dependents, retirees, and Department of Defense or Department of the Army civilian employees. Eventually, all Access Control Points on Fort Hood are expected to be automated, speeding entry to the installation.

### **KTMPO Regional Level:**

KTMPO lists the regional TxDOT maintenance projects under group “Control Section Job” (CSJ) numbers in each updated TIP. Through information obtained from our TxDOT partner it appears there is an estimated roadway maintenance investment of \$ 57.6 million in the KTMPO region 2015-2018 TIP.

Increased activity in the area of ITS is motivated in part by an increased focus on homeland security. ITS can play a role in the rapid mass evacuation of people in urban centers after large casualty events such as a natural disaster or threat. Much of the infrastructure planning involved with ITS parallels the need for homeland security systems. As such, KTMPO has coordinated with CTCOG’s Homeland Security and other emergency service grants. Contacts at the municipal and county level for these efforts have been made. CTCOG is also coordinating with Department of Public Safety, the Texas Statewide Interoperability Channel Plan, a narrowband and cross-band plan utilized for emergency services in the region.

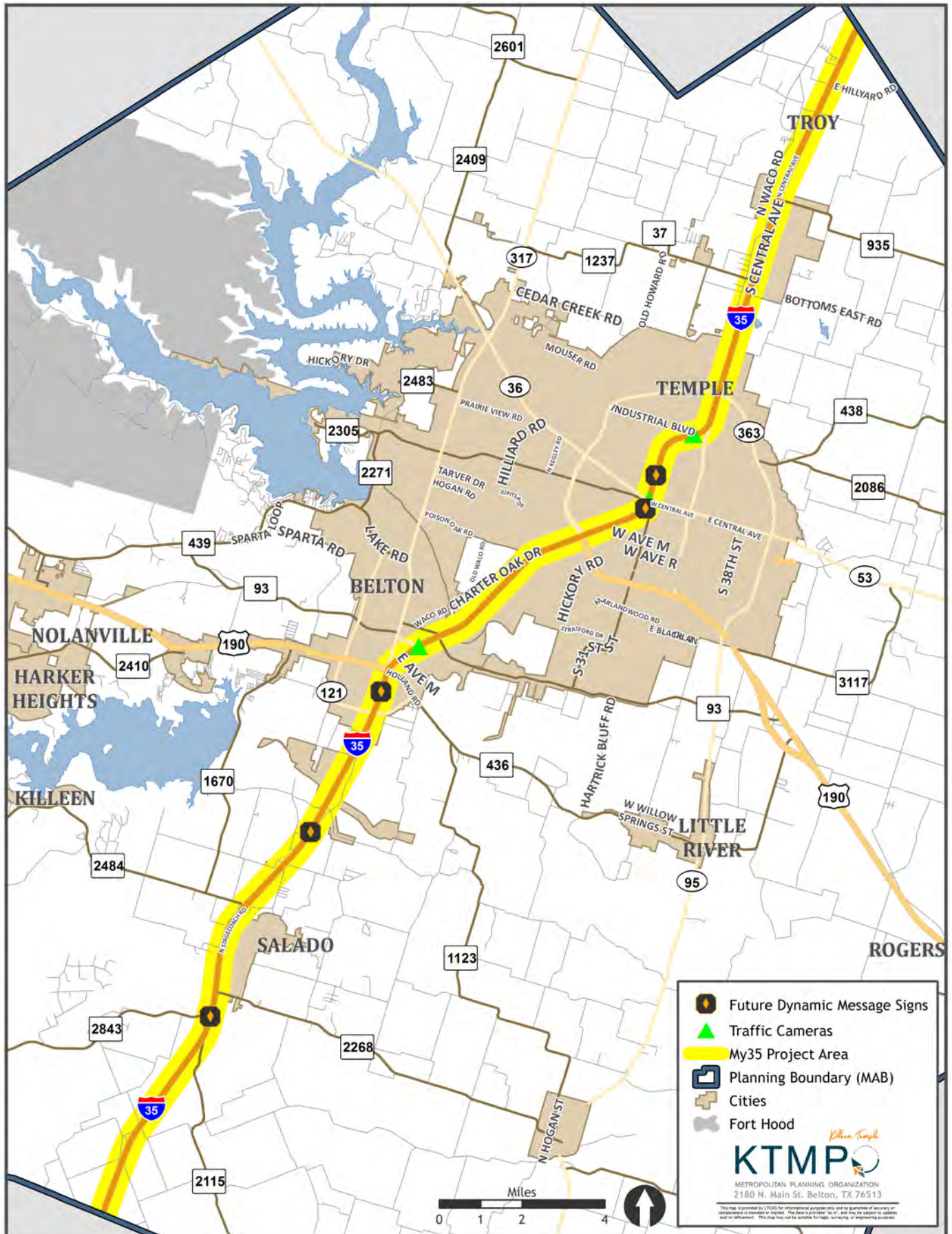
KTMPO began collecting base data for our region in 2012 by way of recording travel times during peak and off-peak hours by MP3 recording. Through this method, the driver reports road conditions, congestion, movement and relevant attributes while travelling the corridor. Upon receipt at the KTMPO offices, the reported time is checked and audible features such as crossing of pavement textures and driver verbal input are documented by correlation of aerial photography and enterprise GIS data.

In the future, KTMPO anticipates additional inputs, such as real-time GPS tracking utilizing existing resources and staff mobile phones with GIS applications installed. This will better track lane movements and speed progression through given segments. KTMPO also plans to coordinate with contracted transportation consultants in implementing guidelines in this regard.

The use of global positioning system (GPS) source data collected by private companies may soon be available to MPOs via TxDOT and FHWA. The data is collected from GPS fixtures on large trucks and on other vehicles by cell phones that have activated mapping and GPS services and depicts travel delays on major roadways. The MPOs may use this data to compare with other collected data; however, in some areas this may be the only data that is available.

Exploring regional and local ITS resources through interoperability, increasing ITS awareness and implementing new traffic surveillance technologies should prove to be a good return on investment. More specifically, signal timing/coordination in the region’s cities could benefit the congestion management aspect of regional mobility. KTMPO will continue to seek ITS methods to implement in order to improve the efficiency of the regional transportation system. Innovative services which promote alternate means of transportation and encourage drivers to make more informed transportation decisions feed a congestion management strategy. KTMPO continues to collect and analyze travel time data on selected roadways identified in the Congestion Management Process.

Exhibit 4.27: Intelligent Transportation Systems Along I35 Corridor





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# Public Transportation



Public transportation creates opportunities for employment, education, recreation, shopping, social activities, community involvement, and cultural activities for a region's population. For many, public transit is an amenity used on occasion; however, for those with limited transportation means, public transportation may be a necessity. **Public transit contributes to the economic health of a region and is a fundamental element of an enhanced quality of life.** It is also a means to reduce traffic congestion and improve a region's air quality.

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In May 2013, KTMPO held a series of workshops to solicit public input regarding transportation planning in the KTMPO region. Public transit was one of the topics. Approximately 50 people participated and were asked to divide funding among various types of transportation projects. The resulting feedback indicated support for transit projects at a level of approximately 9% of available funding. Congestion was the top contender at 27%. Transit projects are considered a strategy for relieving congestion and therefore, public support for transit projects may actually be higher once the correlation between congestion and transit becomes more evident.

## REGIONAL TRANSIT POLICIES

Transit objectives identified in previous MTPs continue to be applicable for this next planning cycle. KTMPO continues to promote expanded bus services to address efficient mobility and increase the transportation options available to all Central Texas residents. The objectives below outline the transit policies desired within the KTMPO planning region through the year 2040 and support MTP goals to provide increased accessibility, mobility, and travel options; enhance economic vitality; and improve the safety and reliability of the region's transportation system. These objectives also support the goals identified in the Regionally Coordinated Transportation Plan which is discussed later in this chapter.

### Objectives

- Designate and develop priority transit corridors to include facilities such as transit terminals, park & ride lots, and a regional multi-modal facility.
- Create innovative multimodal transportation strategies supportive of mass transit and other alternative modes of transportation such as carpooling, bicycling, and walking.
- Develop a comprehensive program of transit improvements designed to encourage additional ridership for existing facilities.
- Implement increased use of Intelligent Transportation System (ITS) technology within the existing system which increase the ease of using the transit system, provide additional safety and security measures for drivers and riders, and provide more reliable information for analyzing the current system.

The following sections generally describe the operations and facility plans for transit services within the KTMPO planning region. This includes a summary of current services and identifies regional needs for future development.

## PUBLIC TRANSPORTATION PROVIDERS

Public Transportation resources in the KTMPO region include rail service, bus service (private and public), and taxi service. In updating the Regionally Coordinated Transportation Plan (RCTP) all of these resources were considered and an inventory of vehicles was compiled. Inventory information presented in this section is taken from the RCTP. Rail service is discussed Chapter 7. Private bus and taxi service, along with vanpool/rideshare options, are briefly discussed in this chapter with the bulk of the chapter focusing on the region's public transit system—The HOP. KTMPO recognizes the diversity of the region and the need to provide a variety of transportation options for the public, and as such, will seek to inform the public of these options through various media, including the KTMPO website.



## Private Intercity Transit Service

There are two providers of private intercity service in the region available to limited areas in Bell County. Greyhound Lines, Inc. provides charter bus service and scheduled service across the continental United States and has a station in Temple. Arrow Trailways of Texas provides charter bus and tour service to the continental United States. Scheduled service is provided as a connector to the Greyhound bus line to the Temple/Killeen area as well as Waco, Austin, and Houston. Arrow Trailways operates two stations in the KTMPO region—one in Temple and one in Killeen. Connector service to the Greyhound bus line is provided at the Temple station. Arrow Trailways operates a fleet of 17 buses and 2 vans (2011 inventory).

## Taxi Service

Taxi service is available in Bell County and portions of Coryell County. Twelve providers have been identified in this region with 11 serving areas of Bell County and one serving the Copperas Cove area in Coryell County. The number of vehicles has been estimated at approximately 60 (2011 inventory).

## Vanpool/Rideshare

Vanpool and ridesharing programs are other options for travel within the KTMPO region. These programs are generally implemented by private companies or groups of individuals seeking to coordinate their travel needs with others having the same need. An example of such a program is the RideShare Program offered through Enterprise Rent-A-Car. They provide vehicles as well as a vanpool coordinator to assist in determining start date, pick-up time, and number of pick-up points along the way. They also offer a ride-matching program to assist individuals in locating existing vanpools or creating new ones.

## HCTD

Hill Country Transit District (HCTD) operates The HOP which is the only regional public transit system in the KTMPO region. HCTD provides service to a nine-county area as follows: Bell, Coryell, Hamilton, Lampasas, Llano, Mason, Milam, Mills, and San Saba. The HOP provides urban, paratransit and rural service. Rural service is provided to all nine counties and includes door to door demand response public transportation. Urban service includes fixed route and complementary paratransit service. HCTD operates a fleet of 167 buses, including 27 fixed route buses and 140 paratransit buses.



## HCTD SERVICE

### Urban

HCTD operates two Urban Divisions—the Temple Urban Division which includes the cities of Temple and Belton, and the Killeen Urban Division which includes the cities of Killeen, Copperas Cove and Harker Heights. Fourteen fixed routes are provided within the Killeen and Temple urbanized areas.

### Special Transit Service (STS)

Section 223 of the Americans with Disabilities Act of 1990 (ADA) requires public entities operating non-commuter fixed route transportation services to also provide complementary paratransit service for individuals unable to use the fixed route system. The HOP Special Transit Service (also referred to as Complementary Paratransit Service or Paratransit Service) is provided to those individuals with disabilities that are unable to use the regular HOP services for their trip needs.

### Rural Transit

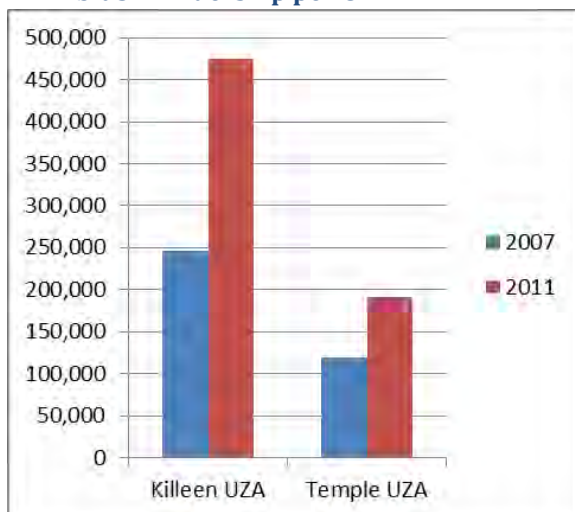
Hill Country Transit District provides transit services to a broad range of individuals within rural portions of the KTMPO region on a demand-responsive basis. HCTD provides transportation services across nine counties, and provides approximately 200,000 one-way trips annually within the KTMPO region. Destinations for passengers using these services include Health and Human services agencies, day care centers, public schools, medical facilities and pharmacies, dialysis centers, senior nutrition sites, employment sites, and shopping and retail establishments.

## HCTD SERVICE ROUTES AND RIDERSHIP

### System Wide

HCTD provides fixed route and complementary paratransit service in both the Killeen and Temple urbanized areas. HCTD fixed routes include five routes in Killeen, one route in Copperas Cove, one route connecting Killeen and Copperas Cove, one route in Harker Heights, one route connecting Killeen and Harker Heights, one route in Belton, three routes in Temple, and one route connecting Harker Heights, Nolanville, Belton, and Temple. See **Appendix F** for route maps and schedules.

**Exhibit 5.2: Ridership per UZA**



**Exhibit 5.1: HCTD Fixed Routes**

HCTD Route Location	Number of Fixed Routes
<b>Killeen UZA</b>	
Killeen	5
Copperas Cove	1
Harker Heights	1
<b>Temple UZA</b>	
Temple	3
Belton	1
<b>Connectors</b>	
Killeen—Copperas Cove	1
Killeen—Harker Heights	1
Harker Heights—Nolanville—Belton—Temple	1

HCTD has seen significant increases in ridership over the last few years. From calendar year 2007 to 2011, total ridership in the Killeen area increased from 246,638 to 475,210, an increase of approximately 93%. During the same period of time, total ridership in the Temple area increased from 119,200 to 190,495, an increase of approximately 60%.

Numerous factors have contributed to this increase in ridership. HCTD has taken proactive measures to make the HOP successful. HCTD has aggressively worked to:

- improve the service by adjusting and increasing service locations and times;
- purchase new fixed route buses; and
- install more passenger shelters.

HCTD has made efforts to ensure access to transportation for people residing in areas identified as Environmental Justice Communities of Concern (EJ). EJ Communities of Concern are areas containing a higher percentage of low income or minority groups. These areas are selected based on higher percentages of minorities or low-income households. Based on a sample of 2013 ridership data collected across the MPO region and at different times of the year, we have identified some key facts about how people use public transit in these areas (see graphic at right). The City of Killeen shows the most access in terms of EJ communities, with 48% of the EJ areas being within 1/4 mile of a bus stop. Other cities show lower percentages based on their geographic distribution and number of routes.



In addition, the increased cost of fuels has affected the number of people looking for alternate means of transportation. Accordingly, ridership may not increase at the same rate when comparing future calendar years. Nonetheless, with the continued population growth, it is reasonable to expect ridership to continue to increase.

### Killeen UZA

HCTD has seen ridership growth in specific areas of the community. For example, the HCTD route number 100 serves the corridor from downtown Killeen to the western edge of Copperas Cove, with service to Central Texas College (CTC) in both directions of travel. Beginning with the fall semester of 2011, CTC discontinued student bus service, resulting, at least in part, in a significant growth in ridership for the HCTD route. For the period of September through December of 2010, ridership on the route 100 was about 12,700 passengers; during the same period in 2011, ridership on the route was 19,900, an increase of almost 60%. Ridership on Route 100 continues to grow, with 23,400 passengers for the same period in 2012, an increase from 2011 of 18% and an increase from 2010 of 84%. Growth is not as rapid in the last two years, but does continue to grow, with growth in excess of 10% per year considered as significant.

Similarly, HCTD has added fixed routes since the beginning of 2009, including the express route number 200 in the Killeen UZA beginning in April 2009. Not atypical for some new routes, ridership was initially low, with only 472 passengers on route 200 in the first month of service. However, two years later, in April 2011, route 200 carried more than 2,300 passengers, a significant increase in use of public transit service. Route 200 ridership has continued to grow, now maintaining an average above 3,000 per month in 2013. A new route (Route 21) was also started in Killeen in March 2011, which is also significant in that it began service as the result of input from citizens and public employees seeking transit service for new recreational facilities along the new route. This new route provides service to new medical facilities in the Clear Creek area, and provides service to the regional airport and to the new Texas A&M University campus.



## Temple UZA

HCTD has been operating fixed route and ADA complementary paratransit services in the Temple UZA for more than a decade. The Temple UZA fixed routes are described below.

*Temple Route 510:* Operates from downtown Temple, providing service to the Veterans Administration (VA) and Scott & White medical facilities, Temple College, as well as to shopping areas along the S 31st Street corridor.

*Temple Route 520:* Operates from east Temple to the west side of SW HK Dodgen Loop, serving Kings Daughters Hospital medical facilities, and numerous retail establishments, as well as providing direct access for people to VA and Scott & White medical facilities.

*Temple Route 530:* Operates from downtown Temple, serving the northwest side of Temple and returning to the east side of Temple via the W Adams and Avenue H corridors.

*Belton Route 610:* Operates as a loop route, providing service to Sparta Road on the north to the Bell County Expo Center and the Justice Center on the south, serving University of Mary Hardin Baylor in between, as well as providing service to multi-family housing areas in southeast Belton.

*Connector Route 200:* An express connector service that connects the fixed routes operating on the west side of The HOP's service area in Harker Heights, Killeen, and Copperas Cove with service routes in Belton and Temple.

## HCTD ACCOMPLISHMENTS

HCTD successfully completed their FY2011 FTA Triennial Review with no deficiencies. The review examined 24 areas and HCTD was in compliance in all 24 areas of review. HCTD's accomplishments identified in the review include the following:



HCTD uses a variety of software programs to plan and schedule routes and trips for fixed route service and paratransit service; plan for preventive maintenance of their transit fleet; and track vehicle service and repairs. These programs enable HCTD to operate their system with greater efficiency and effectiveness. HCTD also monitors air quality issues and was able to meet alternate fuel requirements through the use of buses powered by Ultra Low Sulfur Diesel (ULSD) fuel.

## HCTD REGIONAL COORDINATION

### Agencies and Municipalities

HCTD coordinates with various Health and Human Services agencies to provide transit services through State service contracts. They have worked diligently to monitor the needs of the region and adjust routes, schedules, and facilities to meet those needs. They have coordinated their planning efforts with counties and cities in the region to enable improved financial planning and preparation for areas undergoing or projected for development.

To stay “connected”, performance data is routinely provided to cities, the HCTD Board of Directors, the Temple Transit Advisory Committee, and other agencies. This data includes number of passengers carried, productivity ratio data, safety information, and related data. HCTD participates regularly with network meetings in which information about ridership, routes, service options, and other information/data is provided. When planning routes and service adjustments, HCTD works closely with planning staff in area cities regarding demographics, projected growth, and new housing, retail, and employment areas. Through this cooperative effort, everyone is aware of the number of people using the transit system and can see which areas of service are most productive in terms of ridership, and a stronger sense of team efforts is realized.

HCTD coordinates with the transit advisory committees of the cities of Temple and Killeen. These advisory committees are very diverse. Temple has a very formal advisory committee known as the Temple Transit Advisory Committee, which meets no less than four to six times annually. This TTAC group receives performance information and in turn makes suggestions regarding service enhancement possibilities. In the city of Killeen, the Killeen Transportation Committee consists of elected city officials, city staff, and economic development people. HCTD does not participate regularly with the Killeen committee, but route changes and other factors that affect the transit system are often brought to the committee. For example, a new fixed route under consideration is presented through a proposed map and timetable with information concerning its integration into the existing system so the Killeen Transportation Committee can support changes, recommend changes, and consider transit needs in other area development.

### KTMPO

KTMPO staff is available to assist HCTD in their planning efforts and were instrumental in the development of their current GIS system. From 2008 to 2010, all mapping and route planning was performed at the KTMPO offices in coordination with transit planners. KTMPO staff used GIS technology to assist HCTD in updating their routes. Staff analyzed mileage, travel times, turning movements and destinations to enhance connectivity across the region with both express and local routes. The result of this planning process was a complete geodatabase of stops, shelters, and routes. After training HCTD staff to use GIS software, KTMPO delivered the geodatabase and related documentation. The mapping data was then used by a contracted graphic designer to produce foldable maps of all routes served by The HOP. The same data was used by HCTD staff to post route maps on their website. HCTD has purchased ESRI software licenses and is now completely self-sufficient at mapping and geographic analysis. A link to The HOP website is provided on both the CTCOG and the KTMPO websites.

KTMPO and HCTD continue to share the vision of improving the mobility of our region's population and work cooperatively to achieve this goal. In 2011, KTMPO and HCTD entered into an Interlocal Agreement for coordinated transportation planning efforts, which included updating the Regionally Coordinated Transportation Plan (RCTP). In 2012, KTMPO signed a resolution designating HCTD as the Designated Recipient of FTA 5307 and 5310 funds for the Killeen UZA, which previously came to HCTD through the KTMPO.

Other cooperative effort between KTMPO and HCTD is evidenced by representation of HCTD on the KTMPO Technical Committee. A voting representative on the KTMPO Policy Board was added in 2013 in compliance with MAP-21 requirements. In addition, KTMPO staff has been working with HCTD to obtain input on the region's transportation needs to update the MTP and develop a congestion management process.

### Regionally Coordinated Transportation Plan

The Regionally Coordinated Transportation Plan (RCTP) is a planning document intended to promote the most efficient use of regional transportation resources. Transit agencies receiving federal dollars are required to develop this plan and update it every 5 years. HCTD operates The HOP which is the only regional public transit system in the nine-county area covered by this RCTP.

Central Texas Council of Governments (CTCOG) entered into an Interlocal Agreement with HCTD for coordinated transportation planning efforts, which included updating the 2006 RCTP for State Planning Region 23. The counties covered by this plan include the seven counties in the CTCOG region—Bell, Coryell, Hamilton, Lampasas, Milam, Mills, and San Saba—plus Llano and Mason Counties. Staffing for this project was provided by KTMPO through the lead agency, CTCOG.



Guidelines for updating this plan were provided by Texas Department of Transportation (TxDOT) to ensure the Plan complies with state legislation relating to Statewide Coordination of Public Transportation. KTMPO staff worked closely with the Central Texas Regional Transportation Advisory Group (CTRTAG), which functioned as the Steering Committee, to update this plan. The Steering Committee approves actions and documents and provided KTMPO staff with guidance and information during the update process.

The RCTP identifies goals and objectives to provide a more efficient system, increase levels of service, increase coverage of service area, meet needs of social service agencies, and reduce air pollution. These goals coincide with the MTP goals.

As part of the Plan update, a needs assessment survey was required to evaluate public transportation inefficiencies and service gaps. A survey was conducted during 2011; however, due to time constraints, the survey was only administered to a group of selected stakeholders and responses were limited. A more comprehensive survey was administered during 2012.



CTCOG entered into an interlocal agreement with Texas A&M University—Central Texas (TAMUCT) to utilize University staff and students to develop and administer the survey, compile and analyze the survey results, and present recommendations to address the needs that were identified in the survey responses. The final survey report was presented to the CTRTAG members in December, 2012 and the RCTP has been revised based upon the survey results. Findings from the survey are summarized in the following excerpt taken from the Needs Assessment Survey of Regional Ground Public Transportation, Final Report, November 2012.

*“Overall, the needs assessment survey findings in this report align with the project’s objectives. The primary focus of the project was to assess the needs of regional ground public transportation throughout the Central Texas region placing an emphasis on participants who are disabled, elderly, or low-income. The overwhelming majority of participants were unemployed or retired, with the largest portion having an annual household income of less than \$15,000. By directing survey efforts toward individuals who are disabled, elderly, or low-income, an overrepresentation of those individuals utilizing public transportation was achieved. The majority of individuals are aware of public transportation in the service area; however, the majority of respondents are not aware of all the services provided by public transportation. The need for more services in terms of hours, days and locations were reported by those utilizing public transportation. Data support the finding that participants know more about their needs than agencies and, as such, the agency version of the survey is recommended for elimination from future projects.”*

The Executive Summary from the 2013 RCTP update is included as **Appendix F** and includes the recommendations to address the survey findings.

A workplan has been adopted and quarterly meetings are held to report back on progress in achieving the Work Plan goals. KTMPO staff will continue to work with the CTRTAG members in this endeavor; however, funding is limited. KTMPO did not apply for FTA funds for FY14 to continue staffing and facilitating the implementation of the RCTP, but has applied for funding for FY15.

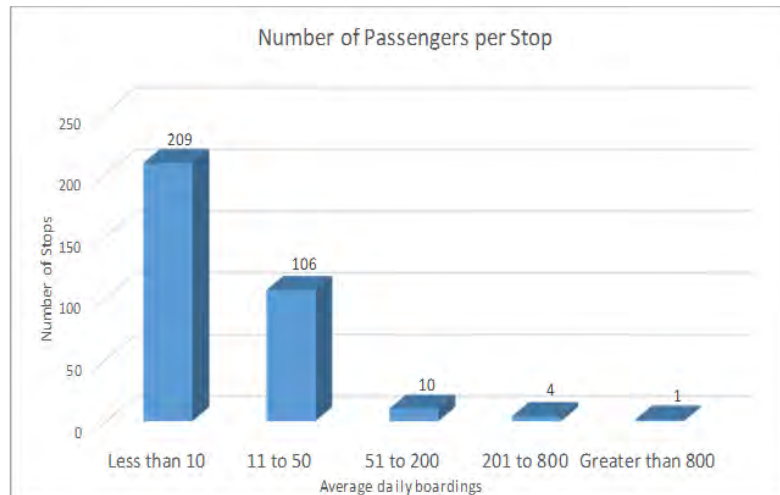
Another task associated with the RCTP update was the adoption of a Limited English Proficiency (LEP) Plan. CTRTAG adopted HCTD’s LEP Plan since their plan covered the same areas as the RCTP and HCTD is the service provider for this area. The LEP Plan was included with the revised RCTP.

### **HCTD ACCESS ANALYSIS**

According to our 2012 Needs Assessment survey, 18% of the respondents indicated that the distance to the nearest bus stop was inconvenient. Distance to nearest bus stop was also perceived to be a barrier to accessing public transportation by 21% of the respondents. The survey did not go into detail regarding where additional bus stops were needed. KTMPO also conducted a survey during our 2013 MTP public workshops that identified factors affecting transit use. Less than a quarter of respondents agreed that bus stops are close to their home. The majority did agree that stops are conveniently located in or near shopping areas, medical facilities or municipal buildings.



**Exhibit 5.3: Passengers per HOP Stop (2013)**



Part of the 2013 ridership analysis mentioned earlier identified that while 36.5% of the Environmental Justice Areas are within 1/4 mile of a *fixed route*. A lesser amount, 29.7% of the same areas, are within 1/4 mile of a *bus stop*. This does not take into account actual walking distance around living or work areas, buildings and fences, or other geographic barriers.

In terms of ridership, most stops see a small number of riders per day, with a few key transfer stations carrying exceptionally high volumes. (See chart above.)

## **HCTD SYSTEM MANAGEMENT AND OPERATIONS**

As the operator of the regional public transit system (The HOP), Hill Country Transit District takes its role in the ownership, operation, and management of facilities and equipment very seriously. Most of the equipment used, ranging from shop tools and equipment to passenger shelters and buses, is expensive to purchase, and proper maintenance can increase the safe, dependable, and useable life of each piece of equipment. Only through proper maintenance can the equipment be dependable enough to ensure the safe transportation of The HOP passengers.

HCTD carefully plans the replacement of all equipment. Even the service life of passenger shelters has been identified and an on-going amenity program has been established whereby each bus stop and shelter is cleaned and inspected regularly. Each bus has a specific service life that is used to determine when and if major components, such as engines and transmissions, are deemed worthwhile for replacement. Service life may therefore be extended, provided the equipment can continue to be used safely, comfortably, and efficiently.

HCTD utilizes a professionally designed software program known as Fleet Pro to track each piece of equipment used by The HOP. This software includes detailed preventive maintenance schedules for each piece of equipment, transit amenity, shop tool, and vehicle to ensure all equipment is safe, well maintained, attractive, and dependable. Through such attention to detail in HCTD's management programs, the performance of the existing transportation facilities is always at its peak, thereby ensuring reliability so people can depend on the transit system as an alternate transportation mode, thereby helping to relieve traffic congestion. Each bus is periodically serviced in accordance with the specifications of the original equipment manufacturer. The fluid levels of each bus are checked daily with fluids added as needed, and noted loss of fluids leading to a mechanical inspection to correct any problems.

As each vehicle ages, it becomes subject to review for potential replacement in accordance with a fleet replacement schedule. HCTD includes all equipment in such a review, including its operations facility. HCTD and the communities it serves were fortunate enough to realize the completion of a new central operations facility in Belton in early 2013. In planning the facility, HCTD considered anticipated growth of the transit system and developed a construction plan that supports the service operations for a full 25 years. This ensures the facility can continue to support the safe mobility of people via an alternate transportation mode that helps relieve traffic congestion and reduce harmful emissions.

## HCTD FUNDING

Prior to 2010 Census data, the Killeen and Temple UZAs have been separate, each with a population of 50,000 to 199,999 based on 2000 Census data. The release of 2010 Census data confirmed that the Killeen and Temple UZAs still do not touch and will remain separate; however, the Killeen UZA went over the 199,999 population threshold at 217,630, moving up to the next category which is 200,000 to 999,999, thereby becoming a Transportation Management Area (TMA). The Temple UZA has grown to 90,390 and as such has not changed categories with regard to population. With the designation to TMA status, changes to transit funding also occur.

It is important to note that federal funds may only be awarded if the receiving entity is complying with the “Buy America” program. Federal funds may not be obligated unless steel, iron, and manufactured products used in FTA funded projects are produced in the US. To comply with this requirement, HCTD conducts a pre-award and a post-award delivery audit of purchases of rolling stock to verify that Buy America provisions are met. Funding sources are discussed below.

## FTA Funded Programs

a) Job Access and Reverse Commute: The JARC Program (5316) was established to help provide welfare recipients and low-income persons access to and from jobs and activities related to employment. Operators of public transportation services are eligible sub-recipients. Funds may be used to finance capital, planning, and operating expenses. Local matching funds are required.



Hill Country Transit District (HCTD) does not currently participate in the JARC Program. These funds may be helpful in expanding the current transit system when conventional transit services are reduced or non-existent, i.e. during late night or weekend times if related to employment (shift work). Recently, JARC funds have been folded into the 5307 (Urbanized Area Formula) Program.

b) New Freedom: The New Freedom Program (5317) is intended to assist individuals with disabilities seeking integration into the work force and full participation in society, beyond the requirements of the Americans with Disabilities Act (ADA). Operators of public transportation services are eligible sub-recipients. Funds may be used to finance capital and operating expenses. Local matching funds are required.



HCTD received 5317 funds for FY2010. New Freedom funds were used for the installation of 149 passenger shelters in the urban area. These shelters are useful in helping persons with disabilities more easily access HCTD transit services. The New Freedom Program has recently been incorporated into the 5310 Program.

c) Elderly Individuals and Individuals with Disabilities: The 5310 Program is intended to improve mobility for elderly individuals and individuals with disabilities. Funds are authorized for public transportation capital projects planned, designed and carried out to meet the special transportation needs of this group. The program requires coordination with other Federally-assisted programs and services.



HCTD currently receives 5310 funds. The 5310 funds are used to purchase capital equipment (ADA accessible buses and related items such as communication and surveillance equipment) to expand services to elderly and disabled individuals to help them access medical services, including dialysis centers, senior nutrition sites, and other destinations that will help keep them independent and aid in quality of life. These funds are also used for preventive maintenance of vehicles purchased with 5310 funds.

d) Urbanized Area Formula Program: The 5307 Program makes Federal resources available to urbanized areas and to Governors for transit capital and operating assistance in urbanized areas and for transportation related planning. Funding is made available to designated recipients that must be public bodies with the legal authority to receive and dispense Federal funds. An urbanized area is an incorporated area with a population of 50,000 or more per the US Census. A transportation management area is an urbanized area with a population of 200,000 or over. The Governor or Governor's designee is the designated recipient for urbanized areas between 50,000 and 200,000. For urbanized areas with 200,000 in population and over, funds are apportioned and flow directly to a designated recipient selected locally to apply for and receive Federal funds. Matching funds are required.



HCTD currently receives 5307 funds for the urbanized areas of Killeen and Temple. The 5307 funds are used in the Killeen and Temple urbanized areas to provide fixed route and complementary ADA paratransit transportation services.

The 5307 funds for a UZA with a population of 50,000 to 199,999 may be used for both capital projects (at an 80/20 federal/local match) and operating projects (at a 50/50 federal/local match). Section 5307 apportionments are based on population and population density.

The 5307 funds for a UZA with a population of 200,000 to 999,999 may only be used for capital projects including preventive maintenance, at an 80/20 federal/local share. Use of funds for operating assistance is not allowed in this category, unless there is specific statutory language allowing this. Section 5307 apportionments are based on vehicle revenue miles, passenger miles traveled, operating costs, population, and population density.

With the Killeen UZA becoming a TMA, HCTD will no longer be able to use all of its 5307 funds for operating expenses within this UZA. MAP-21 permits a portion of 5307 funds to be used for operating expenses if fewer than 100 buses are used in fixed route service during peak hours—HCTD falls under this criteria. HCTD will only be eligible for Section 5307 Operating Assistance Special Rule Operator Cap funds beginning with the Federal Fiscal Year (FFY) 2013 apportionment. The FFY 2012 Killeen UZA Federal Section 5307 annual apportionment is \$2,639,273. These funds are projected to cover operating expenses through September 2014. The Killeen UZA FFY 2013 apportionment under the Section 5307 Operating Assistance Special Rule Operator Cap is \$1,642,815.

e) Surface Transportation Program—Metropolitan Mobility (STPMM): KTMPO became eligible to receive STPMM funds in FY 2012-2013 due to its designation as a TMA. KTMPO has an allocation of \$3,213,210.36 in STPMM or Category 7 funds for FY 2012-2013. It is expected that a similar amount will be allocated to KTMPO for FY2013-2014. To use these funds, a minimum of a 20% match is required. Category 7 funds do not have to be obligated during the fiscal year for which they are allocated, but may rollover to the next year and be combined with following fiscal year funding. Up to three years of funding may be combined if so desired. The KTMPO Policy Board approved the dissemination of funds with 90% for roadway projects and 10% for transit projects. As such, HCTD will receive approximately \$640,000 for two combined fiscal years and will use these funds to purchase two replacement buses for the fixed route service in the Temple UZA.

## HCTD FUTURE GROWTH AND NEEDS

Ridership statistics form the basis for the belief that the use of public transit services in central Texas as provided by HCTD will continue to grow. Since 2004, HCTD has searched for property and/or facilities to serve the transit system as a single, centralized operational facility in the heart of the urban service areas. As a result, in 2010 HCTD purchased a 15 acre site and constructed a new facility that was completed in 2012.

The intent in planning for the facility's use was that the facility would serve HCTD for the next 25 years, and that it could do so with little or no significant construction work after occupancy for at least 10 or 12 years. Therefore, HCTD used ridership data and route changes from the previous years to predict the number of vehicles and employees needed to meet public transit service demand past the next decade. The service history reviewed resulted in a plan that provided for a growth in fleet size and support staff of 50% within that decade.

Over calendar years 2009-2011, HCTD added an average of one new fixed route annually. A new route was implemented in 2013 to meet the growing transportation needs associated with the construction of the new Texas A&M campus in southwest Killeen. Other areas HCTD has been asked to consider as potential route growth include the city of Copperas Cove, and potential fixed route service into and connecting with Fort Hood.

The service needs estimates contained herein are based on information from the Hill Country Transit District and the MPO. The following estimates were developed for future transit activities, services, and expenditures.

## Population

The 2010 Census indicates the population of the HCTD Urban service area (Killeen and Temple Urbanized Areas) is approximately 308,000. According to KTMPO estimates, the 2040 population at a zero migration rate is projected to be approximately 519,000. Based on straight-line calculations, the population for 2020 is estimated at 378,000 and 448,000 for year 2030. See table below.

**Exhibit 5.4: Population Projections - Base Year 2010 at 308,000 Population**

Migration Rate	Year 2020	Year 2030	Year 2040
Zero	378,000	448,000	519,000
½ 2000 – 2010 rate	413,000	518,000	622,000
2000 – 2010 rate	450,000	592,000	733,000

Source: Texas State Data Center, updated 2012 projections



Other factors in estimating future needs include:

- Extended hours of service (late evening),
- Increased Saturday service,
- Increased service during peak hours,
- Expanded service area,
- Service frequency.

## Service

HCTD predicts for the year 2030 that Fixed Route Service (FRS) fleet size will increase to 58 buses, and that the number of annual FRS passengers will increase to more than 1.5 million. Also by 2030, it is predicted that Special Transit Service (STS) will continue to carry both STS-eligible passengers and other passengers who fall under one or more other programs whereby an annual total of about 200,000 STS passengers will be carried using an STS fleet of 90 vehicles.

For the year 2040, HCTD predicts that Fixed Route Service (FRS) fleet size will increase to 76 buses, and that the number of annual FRS passengers will increase to almost 1.9 million. Also by 2040, it is predicted that Special Transit Service (STS) will continue to carry both STS-eligible passengers and other passengers who fall under one or more other programs whereby an annual total of about 240,000 STS passengers will be carried using an STS fleet of about 108 vehicles.

## Geographic Direction of Growth

The geographic direction of growth for the fixed route service plan will follow the growth pattern of the region as projected by KTMPO. This growth will be as follows:

- Service in and to Troy, Little River/Academy, and Salado will be provided via route “connectors” and limited circulator service within each of these areas.
- Service in the Temple area will be expanded further south, following the growth toward and along the north of Highway 93. Service in Temple will also be expanded to provide service in a northern corridor (along North 3rd Street) and a western corridor (along West Adams) as the population density in these areas increase.
- Service will be expanded into the Morgan’s Point Resort area using both “connectors” and circulator service approaches.
- “Connector” service into Belton will continue, and service in Belton will be expanded to include a circulator service.
- Service in the Killeen UZA, which includes the cities of Killeen, Nolanville, Harker Heights, and Copperas Cove will be expanded in areas of increasingly geographic growth, especially to the south, north, and west of Copperas Cove and to the south of Killeen.
- Service along the 190 corridor will take on more of a linear transit corridor from which circulators and feeder routes can operate.

## Funding Projections

Funding projections through 2040 were developed by analyzing characteristics such as population, annual service hours, passengers served, and other operational data for both the fixed route and special transit service. Cost estimates will increase at a curve through 2040. Detailed operating cost estimates are provided in **Appendix F**.

Based on the funding projections developed, transit in the KTMPO area will have to secure additional sources of funding to maintain and expand current services provided. According to the funding projection of \$288,836,978, there will be a \$93,238,697 shortfall. Fares collected for services provided are one source of funding, but they will probably not be sufficient to cover the shortfall.

### **Capital and Special Projects**

As part of these estimates, Hill Country Transit District projects that it will perform ongoing purchases of replacement and expansion rolling stock, and passenger shelters and benches. Future projects could include Park and Ride facilities (Killeen and Temple) with parking lots and waiting shelters, curb cuts and sidewalks at major bus stops and transfer points, public education, and marketing.

A table listing HCTD special capital projects is provided in **Appendix F**. These projects are discussed in more detail below.

### **Vehicle Monitoring Systems (surveillance systems)**

HCTD currently has security cameras aboard each fixed route bus. Through enhanced technology, specific cameras, methods of recording events, and quality of systems have improved, and HCTD expects future systems to also improve. The vast majority of the smaller fleet vehicles employed by HCTD are not currently equipped with such systems, but future procurements will likely include new vehicles that are equipped with these security features. The systems typically include 4 to 6 cameras that are placed strategically in the vehicle so the majority of activity on the bus can be recorded. This system protects the safety and integrity of the transit system, its employees, and passengers. Recordings from camera systems may be viewed when there are allegations of passenger injury or of driver misconduct. Recordings are also valuable tools in accident investigations and as training aids. These systems can be quite sophisticated, and may even include the ability for viewing through the “eye of the camera” remotely, whereby supervisors or even law enforcement officers can view activities on the bus as they happen, adding an extra layer of safety and security for drivers and passengers.

### **Transfer Center Kiosks**

HCTD has been very successful in its efforts to improve the quality and quantity of passenger amenities at bus stops. Recent efforts have focused on passenger shelters; about 30% of HCTD bus stops are now equipped with such shelters. In coordination with cities in which urban transit service is provided, additional shelters have been installed at specific locations serving multiple transit routes as transfer centers. Planning activities involving HCTD representatives and area cities often include discussion about hike and bike trails, parks, sidewalks, and bus stops with general areas being targeted as potential sites for transit centers that can be equipped to provide covered bus stops, covered bus transfer sites, and other modes of transportation such as bicycles and perhaps even taxi cabs. As these general areas become more specific, transfer centers may be better equipped to include covered waiting passenger areas with kiosks that can serve as informational areas that may be as simple as postings for route and schedule information, to vending machines for fare media.

## **Upgraded Vehicle-to-Dispatch Communications System**

During the last decade, communication between vehicles and dispatchers has leaped from simple two-way radio systems (still in use, but in a more supplemental role) to Mobile Data Terminals (MDT) whereby each bus is equipped with a computer (MDT) so the driver can record passenger count and fare collection information which is automatically downloaded for data collection by HCTD. These MDTs also serve as a means of communication between drivers and dispatchers through computer-generated manifests, directional information, and passenger manifest information. Technological developments are constantly evaluated by HCTD as new and improved methods are being sought that offer improved communication, hopefully at a lower operating cost, but at least from the perspective of operating effectiveness and efficiency.

## **Transfer Center Security Systems**

As specific Transfer Centers are identified and enhanced, facility development should include methods for keeping both the facilities and the users of the facilities secure. The technology already available includes methods for monitoring the areas through the use of cameras which can be viewed live from a central dispatch point. Any problems, such as misconduct by passengers, can result in the prompt dispatching of law enforcement for the security of law-abiding passengers and for the protection of the facilities. This type of project may be tied into future projects related to building new transfer center amenities, or may be stand alone projects to enhance existing centers.

## **Electronic Fare Payment Smart Cards**

There are multiple methods for using technology related to the use of smart cards. The term “smart card” may be used to identify a specific technological application, but is often used in a more general manner. For the purpose of this discussion, the more general definition is applied. HCTD plans to explore technology available for fare payment. Such technology may include the use of fare boxes designed to accept “smart cards” and perhaps, in turn, dispense transfers that can be “read” for the “smart card” technology. The general approach is to explore options and determine a suitable option that is affordable, realistic, and suitable for the present needs of the transit system that can also be expanded as the system grows. The technology may also be incorporated in a system that includes methods for counting passengers and collecting other transit data related to passenger boarding, alighting, and use of specific boarding points.

## **Regional Multi-Modal Transportation Facility**

HCTD currently uses several hundred specific geographic locations designated as fixed route bus stop points. Some of these sites are marked with nothing more than a pole with a bus stop sign, while other locations include passenger shelters. Some such sites have been designed and constructed with sidewalks and large hard-surface areas whereby several buses can serve the location simultaneously. The prospect of a regional multi-modal transportation facility is exciting for an urban area in particular as it can be used to serve various forms of transportation and can actually encourage the use of multi-modal forms. A site specific location equipped with an adequate hard-surface area, as well as street designs to accommodate either street use or easy ingress/egress, may be suitable for access for fixed route buses, paratransit buses, taxi cabs, and inter-city bus service, not to mention expansion of the area to serve as a park-and-ride facility.

Buses with bicycle racks, and free-standing bicycle racks at the facility can add another mode of transportation. An area with hike and bike trails may be suitable for the addition of a multi-modal transit facility, thereby adding still another mode of transportation.

As an urban area grows, faster, higher capacity public transit modes, such as rail systems, may be employed. Along a rail corridor, specific locations may be selected whereby fixed route bus service may feed the rail line. Some of these locations may be suitable for a multi-modal transportation facility, and the addition of retail space can add to the usefulness and positive economic impact of the facility. Such a facility could be developed into a large area, especially if it is to also serve as a park and ride for personal automobiles, and the retail space available could include day care centers, ATM and vending machines, coffee or fast food businesses, deli style eateries, and similar businesses suitable for a fast paced environment. Such retail spaces may even include dry cleaners, income tax services, and movie theaters. All of these businesses require customers to succeed, and multiple modes of transportation coming together at one location can provide a larger and more diverse group of customers. Businesses suitable for people who can stop along their paths of travel can be very successful.





# Bicycle & Pedestrian



The walking and biking trails in the Killeen-Temple Metropolitan area encompass Bell, Coryell, and Lampasas counties. **Central Texas has a multitude of trails that already exist and are being used on a regular basis.** Future planned development of the trails will connect the cities of Killeen, Harker Heights, Copperas Cove, Temple, Belton, Nolanville, and Salado into a 123 mile network of multi-use trails in which users include commuters, walkers, joggers, bikers, horseback riders, roller bladers, bird watchers, and other outdoor activity seekers.

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## REGIONAL THOROUGHFARE AND PEDESTRIAN/BICYCLE PLAN

### Development Process

The MPO developed a Regional Thoroughfare and Pedestrian/Bicycle Plan as one of the key elements of its transportation planning process in order to create a forward-thinking blueprint for the transportation system in the region. This “advance planning” tool provides a vision for the future regional transportation system that is required for the continued mobility and prosperity of the region well into the future. More specifically, it defines the roadway, bicycle, and pedestrian facilities needed to serve both existing and long-term future development.



**The complete Regional Thoroughfare and Pedestrian/Bicycle Plan is found in Appendix E.**

For organizational purposes, the plan is comprised of two distinct, but related components: a thoroughfare element and a pedestrian/bicycle element. These two elements are similar in that they both establish a long-term vision for the mobility needs of the region. However, they differ in terms of the level of detail regarding the specific transportation recommendations required to realize the full transportation network. The original version of this plan was adopted by the MPO Transportation Planning Policy Board on October 22, 2008. However, in 2009, the MPO more than doubled the geographic extent of its planning boundary by expanding to cover all of Bell County and additional portions of Coryell and Lampasas Counties. Therefore, the MPO embarked on an effort in October 2010 to update the original Regional Thoroughfare and Pedestrian/Bicycle Plan to not only include its expanded jurisdictional area, but also incorporate recently updated local plans. The primary focus of the 2010 update was to incorporate the significant efforts made by MPO member jurisdictions in the realm of bicycle facility planning, especially in the cities of Belton, Killeen, and Temple.

### Regional Coordination

In order to facilitate the creation of the pedestrian/bicycle portion of the plan, a pedestrian/bicycle advisory committee was established. This committee consisted of representatives of each of the cities and counties within the MPO, the Hill Country Transit District, TxDOT and citizen stakeholders. KTMPO had hopes to utilize this advisory committee for continual plan oversight, but the committee dissolved due to waning interest. The MPO is using the planner roundtables to reconnect with the municipalities. Historically, municipalities have shown the ability to draw citizen-based interest groups. This will facilitate KTMPO to reestablish public interest and possibly create a new advisory group.

The updated pedestrian/bicycle plan reflects a continuing collaborative effort among MPO-member jurisdictions, the MPO Technical Advisory Committee, and the MPO Transportation Planning Policy Board. The project utilized a substantial amount of existing information from the MPO's GIS database; project schematics and other planning documents from both Fort Hood and TxDOT; and the formal Comprehensive Plans, Thoroughfare Plans, and Master Trail Plans adopted by the cities of Belton, Copperas Cove, Harker Heights, Killeen, Temple, and the Village of Salado. Significant efforts were made during the development, review, and refinement of the plan to include the technical expertise, public input, and political leadership within the KTMPO planning area. All local government agencies were contacted to gather their insight as to the long-term needs for their communities and to refresh the planning assumptions that were made during the development of their latest plans. A careful review by the MPO Technical Advisory Committee ensured participation of a wide cross-section of local government technical staff.

Public involvement for the original version of the plan included public meetings at five locations around the region to receive comment from the general public. For the 2011 update, two public open house meetings were conducted, on January 25, 2011 in Temple and on January 27, 2011 in Killeen. All feedback was reviewed and incorporated into the final plan as necessary. The updated plan culminated in the adoption by the MPO Transportation Planning Policy Board on February 16, 2011.

### Relationship to Other Planning Documents

The regional thoroughfare element of the plan is primarily a map that provides a vision for the ultimate roadway build-out for major roadway facilities. Similarly, the recommended bicycle accommodations presented in the plan represent an ideal network of non-motorized transportation routes. As such, the recommendations pertaining to future thoroughfares and bicycle accommodations contained herein should not be construed as a commitment by any MPO-member jurisdiction to fund or construct any facility, in any particular location, at any particular time. Other planning and programming documents, such as this Metropolitan Transportation Plan, the Transportation Improvement Program, and various county and city capital improvement programs, will specify individual projects that, over time, will accumulate to define the ultimate build-out of the transportation network presented in this plan. In other words, the thoroughfare plan simply creates a master guide for the development of the regional transportation system and helps guide the MPO in the identification of projects for its next MTP.

Both elements of the thoroughfare/pedestrian plan explicitly support many of the **MPO's goals** stated in the Mobility 2035 Metropolitan Transportation Plan which was in place when the Regional Thoroughfare and Pedestrian/Bicycle Plan was developed, namely:

- **Accessibility and Mobility** – The plan improves access to goods, jobs, services, housing and other destinations within the region and beyond by defining a cohesive, interconnected, regional transportation system.
- **Travel Options** – By developing a long-range planning document that considers both motorized and non-motorized transportation, the plan defines a transportation system characterized by an interconnected, hierarchical network of roadways and bicycle and pedestrian facilities, thereby promoting transportation alternatives.
- **Economic Vitality** – The plan enhances the economic vitality of the region by efficiently and effectively connecting people to jobs, goods, and services. In addition, a robust regional bicycle network can bring significant economic benefits to the region.
- **Equity** – The plan addresses the future needs in all parts of the region in a balanced fashion, thereby assuring that impacts of transportation projects needed to support the development of the plan do not adversely affect particular communities disproportionately.
- **Transportation and Land Use** – The plan seeks to encourage the development of sustainable land use patterns by providing a grid-like framework around which development can occur, while simultaneously improving access to jobs, services, and housing to everyone in the region.
- **Health** – The plan explicitly encourages transportation investments in bicycle and pedestrian facilities to help promote healthy and active lifestyles.

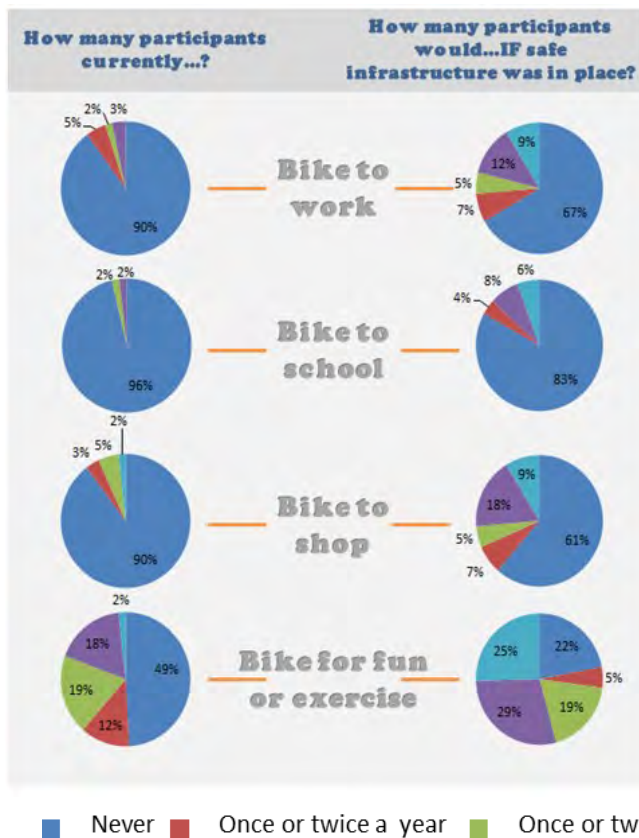
Specific Pedestrian/Bicycle objectives are identified in the 2011 Regional Thoroughfare and Pedestrian/Bicycle Plan, included as **Appendix E**. KTMPO is following the Pedestrian/Bicycle Plan goals and objectives to ensure identified needs are met for the region.



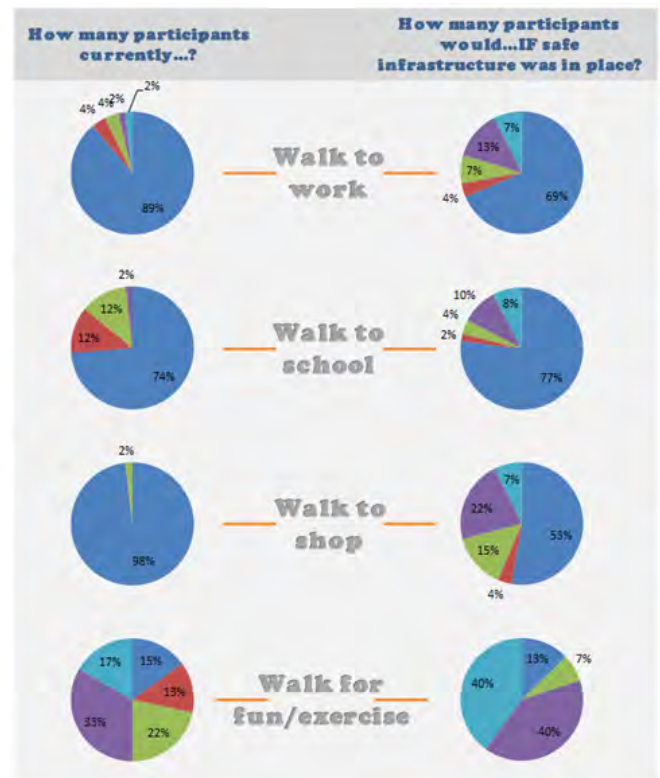
## MTP PUBLIC INVOLVEMENT AND INPUT

As part of the MTP update, public input was solicited through a series of workshops held during the month of May 2013, in the cities of Belton, Copperas Cove, Harker Heights, Killeen, and Temple. Bicycle and pedestrian issues were topics at the workshops and were included in the survey questions. The survey was also posted on the KTMPO website for public participation. The participants were asked the frequency with which they currently bike or walk to work, school, shopping, and for fun or exercise, and were then asked the same questions contingent upon a safe infrastructure being in place to accommodate these modes of travel. The responses are shown in Exhibits 6.1 and 6.2 below. For both bike and pedestrian travel, there was a notable increase in the likelihood of using these modes of travel if safe infrastructure was provided. On average, 26% more people would use a bicycle as their mode of transportation to their destinations if there were bike lanes or marked routes available, while 16% more people would walk if sidewalks, trails, or pedestrian bridges were available close to destination.

**Exhibit 6.1: Public Bicycling Frequency**

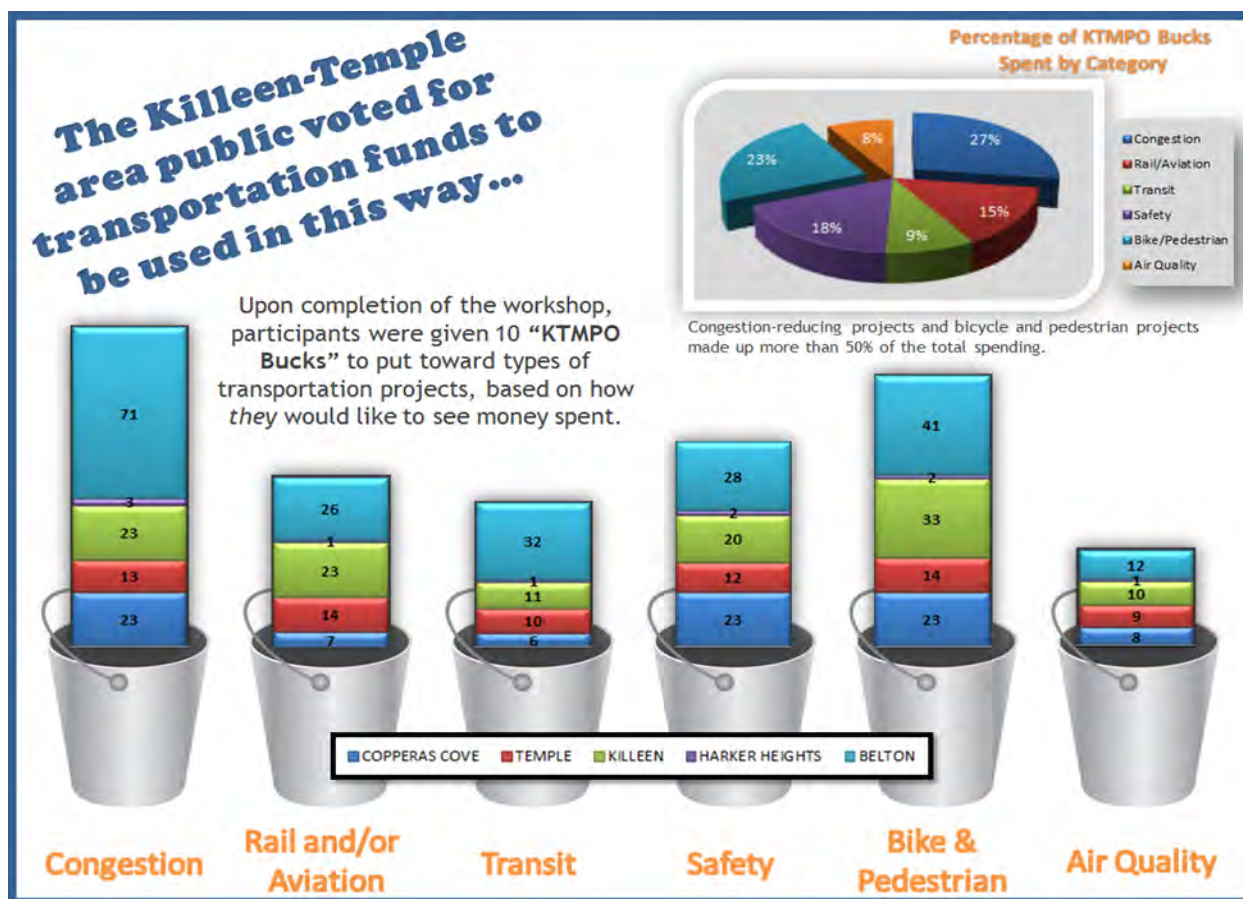


**Exhibit 6.2: Public Walking Frequency**



The workshop participants were also asked to prioritize funding among various transportation topics that included congestion, rail and/or aviation, transit, safety, bike and pedestrian, and air quality. This exercise confirmed that bicycle and pedestrian facilities are a priority to the KTMPO public, as shown in Exhibit 6.3. The participants indicated the highest support for congestion-reducing projects at 27% followed closely by bike/pedestrian projects at 23%. The two combined make up 50% of the funding allocation and are closely related as bike/pedestrian projects are a means of reducing congestion.

Exhibit 6.3: Public Prioritization of Funding



## BICYCLE AND PEDESTRIAN NETWORK

The short distances Americans travel for many of their daily trips make bicycling and walking a highly viable transportation mode. Nearly 40% of all trips are under two miles, a distance easily accomplished by bicycle or on foot by a reasonably physically fit adult or child. In addition, 80% of all trips people take are not for commuting to work, but are for other purposes, many of which do not necessarily demand a car to accomplish. However, while there is potential for many more people to bicycle and walk for transportation, the lack of a safe, direct and usable bicycle and pedestrian network often makes it difficult. Not unlike many regions across the state, and indeed the country, the Killeen-Temple region faces the challenge of a less than complete bicycle/pedestrian network. However, as will be discussed, many of the cities within the region are making significant strides toward improvement.













### Existing Network

A bicycle is legally recognized by the State of Texas (and many other states) as a vehicle, with all the rights and responsibilities for roadway use that are also provided to motor vehicles. As such, cyclists can legally ride on any roadway in the region (except controlled access highways such as the Interstate 35 main lanes). However, certain roadways are more “bikeable” than others. Local and collector streets are suitable for use by most adult bicycle riders, as long as traffic volumes are not high and speeds are less than 35 miles per hour. Arterial streets typically carry higher traffic volumes with speeds of 35 to 45 miles per hour, and are used by only the more skilled and assertive bicyclists. With proper education in bicycle operation and safety, many people could safely bicycle on existing roadways, even those without bicycle accommodations. Rural arterials with shoulders and/or very low traffic volumes attract sports cyclists interested in longer-distance travel with fewer interruptions.

The existing pedestrian system is comprised primarily of the roadside sidewalks that are present throughout the region. While many of the older, core urban areas in the region have extensive sidewalk systems, recent patchwork development and a lack of a consistent regional sidewalk development policy has led to many gaps in the sidewalk network. In recent suburban developments, sidewalks are constructed only along the frontage of the development, with the subsequent gaps left to be filled in when the adjacent parcels are developed. While this sidewalk development policy is perhaps cost-effective, it has the unfortunate result of leaving the full potential of walking as a viable transportation option unrealized.

KTMPO has inventoried the existing bicycle and pedestrian data including sidewalks, bicycle routes and lanes, roadways with shoulders, and trails to provide a more complete picture of the state of non-motorized mobility in the region, as shown in Exhibits 6.6 through 6.10. Some significant bicycle and pedestrian facilities as identified in the Regional Thoroughfare and Bicycle/Pedestrian Plan are featured below in Exhibit 6.4.

**Exhibit 6.4: Significant Bicycle and Pedestrian Facilities**

	<b>Belton</b> - 1.4 mile long concrete multi-use trail along Nolan Creek		<b>Temple</b> - 2.5 mile asphalt multi-use side path along the north side of FM 2305
	<b>Copperas Cove</b> - 2.1 mile long concrete side path along the north side of FM 1113 (Avenue B)		<b>Temple</b> - 2.1 mile concrete trail along creek west of 5th Street
	<b>Copperas Cove</b> - 1.6 miles of trails within City Park South		<b>Temple</b> - 2.1 mile long concrete multi-use loop trail in Lions Park
	<b>Fort Hood</b> - Over 40 miles of recreational trails around the base, which includes over 15 miles of trails on the south side of Lake Belton		<b>Temple</b> - 1.8 mile long concrete multi-use trail in James Wilson Park
	<b>Fort Hood</b> - Nearly 13 miles of on-street striped bicycle lanes along Clear Creek Road, Tank Destroyer Boulevard, Hell-On-Wheels Avenue, and Old Ironsides Avenue		<b>Temple</b> - 1.3 mile concrete trail along Pepper Creek
	<b>Killeen</b> - 1.9 mile concrete multi-use trail in the Killeen Community Center Park		<b>Temple</b> - 0.6 mile designated bicycle route along Midway Dr



In an effort to quantify the extent of coverage of the regional sidewalk system, a “Sidewalk/Roadway” ratio was calculated for each jurisdiction within the KTMPO planning area. This ratio was calculated by first dividing the length of sidewalks along arterials, collectors, and frontage roads by twice the length of arterials and collectors, plus the length of frontage roads, then by multiplying by 100.

In theory, the maximum sidewalk/roadway ratio is 100.0%, which would describe an arterial/collector system that has sidewalks on both sides of every roadway, except frontage roads which would have a sidewalk on only one side of the road. The results of this calculation are shown in Exhibit 6.5 below. It should be noted that within these calculations, the crosswalk connecting two sidewalks is considered to be a sidewalk.

**Exhibit 6.5: Summary of Sidewalk Coverage Mileage**

Jurisdiction	Sidewalks (mi.)	Arterial and Collector Roadways (mi.)	Sidewalk/Roadway Ratio
Killeen	103.97	280.76	37.0%
Copperas Cove	26.39	88.79	29.7%
Bartlett	0.52	2.36	22.0%
Fort Hood	28.31	156.55	18.1%
Harker Heights	13.82	77.64	17.8%
Belton	18.38	114.73	16.0%
Temple	49.00	317.05	15.5%
Kempner	0.60	5.38	11.2%
Holland	0.78	8.38	9.3%
Salado	0.81	11.17	7.3%
Rogers	0.44	10.83	4.1%
Nolanville	0.39	17.97	2.2%
Little River/Academy	0.06	12.71	0.5%
Troy	0.04	16.41	0.2%
Morgan's Point Resort	0.00	6.46	0.0%
<b>REGIONAL TOTAL</b>	<b>243.51</b>	<b>1,127.19</b>	<b>21.6%</b>



**Legend:**

- Sidewalks:**
  - ADA (Black line)
  - Non-ADA (Red line)
  - Walk Trail (Green line)
  - Worn Path (Brown line)
- Roadways:**
  - Interstate Highway (Orange line)
  - US Highway (Yellow line)
  - State Highway (Light yellow line)
  - Farm To Market (Light green line)
  - County Road (Light blue line)
  - Streets (Light grey line)
  - Cities (Light blue area)

**Fort Hood to Killeen Segment**

**KTMP**  
Killeen Transportation Management Plan  
2180 N. Main St., Belton, TX 76513



Exhibit 6.7: Bicycle and Pedestrian Network (Copperas Cove)

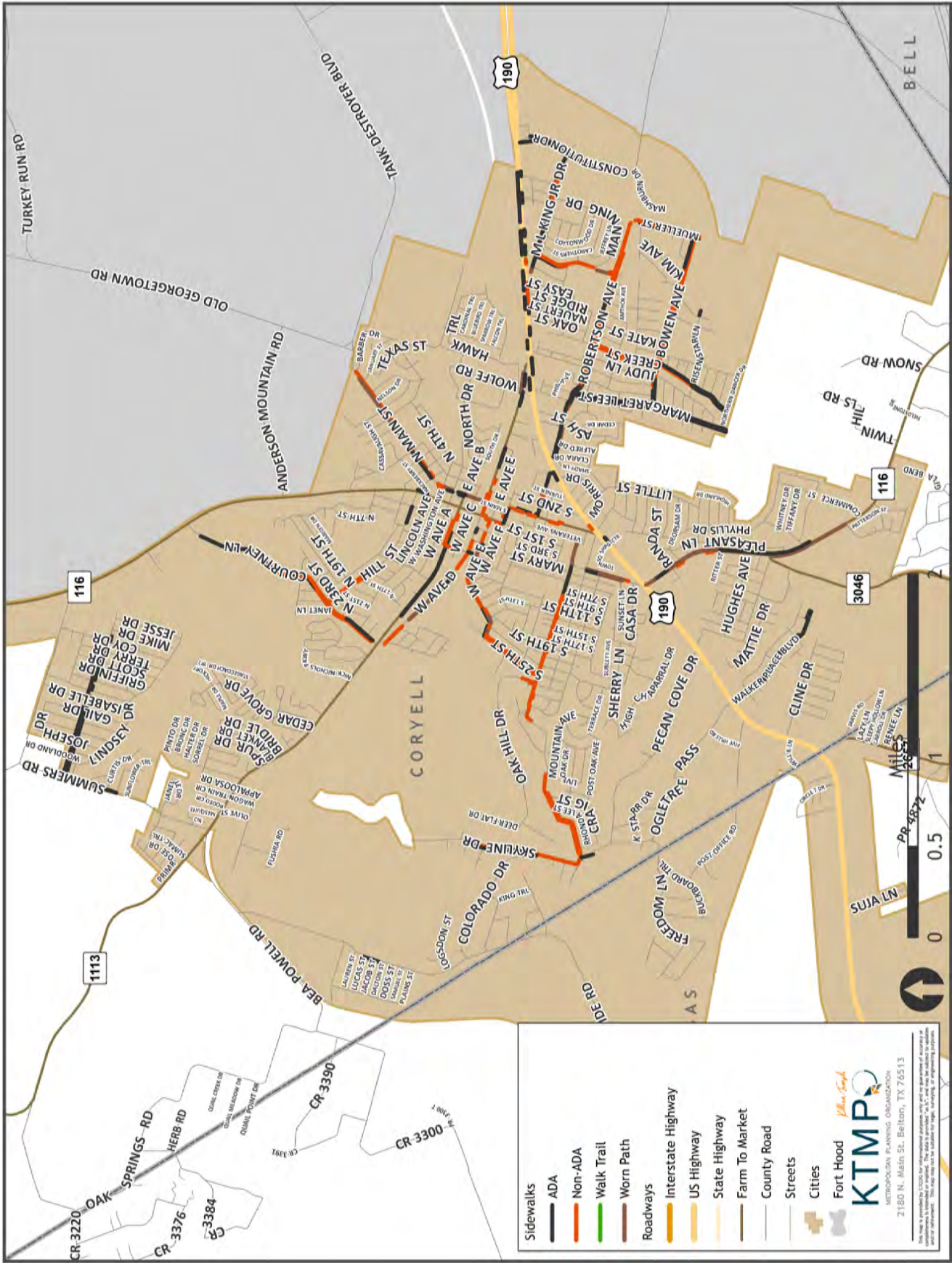




Exhibit 6.8: Bicycle and Pedestrian Network (East Killeen, Harker Heights, and Nolanville)

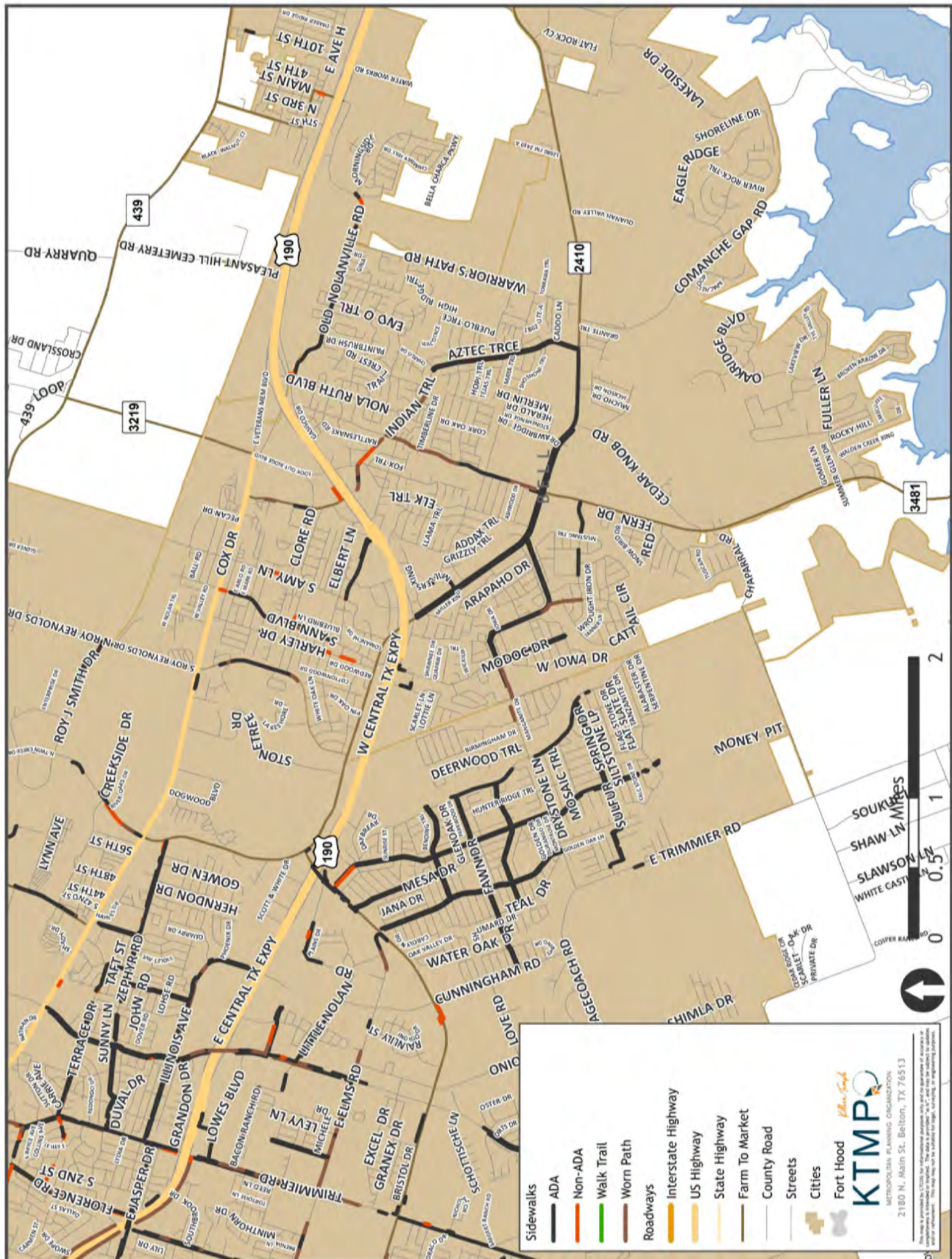
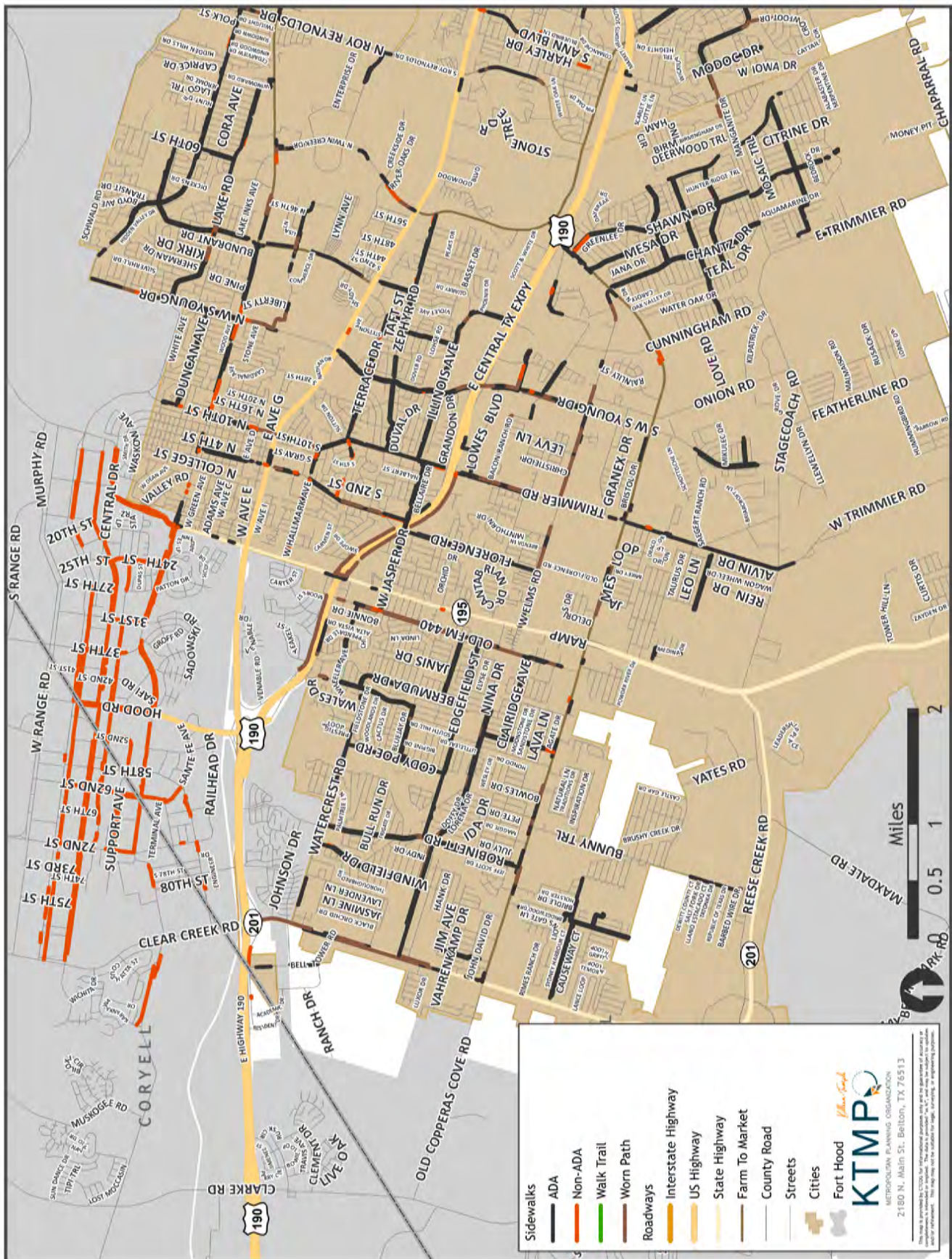
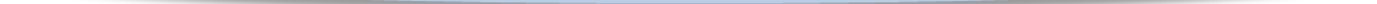




Exhibit 6.9: Bicycle and Pedestrian Network (West Killeen and Fort Hood)







## Local Bicycle and Pedestrian-Related Initiatives

Many of the major cities in the region are diligently working to improve conditions for walking and biking. Policy and strategy for developing, accommodating and coordinating alternative transportation modes varies by city. Following is a summary highlighting a few of the larger cities in the MPO region and their respective policies, strategies, and documents that guide development and/or facilitate use of alternative transportation modes within the region. Future projects are identified in the project listing section of the MTP. Future networks are shown in Exhibits 6.11—6.15 and are identified with project numbers as listed in Appendix C of the Pedestrian/Bicycle Plan.

### City of Belton:

- Updating 2001 Thoroughfare Plan which will include a requirement for sidewalks, hike and bike trails, and bike lanes along certain roadways.
- Subdivision Ordinance requires sidewalks in accordance with the Thoroughfare Plan. Updated Design Standards will also require the installation of sidewalks in accordance with the Thoroughfare Plan.
- City Parks and Recreation Strategic Master Plan contains a Bike and Trail Plan that is consistent with the KTMPO regional Pedestrian/Bicycle Plan with connections to proposed regional trails.

### City of Copperas Cove:

- Parks Open Space Master Plan updated every 4 years.
- Downtown Master Plan updated every 10 years. Goal is to provide a safer more pedestrian-friendly environment.
- Comprehensive Plan--minor updates every 5 years and major updates every 10 years. Thoroughfare Plan portion includes recommended policies to guide transportation planning efforts, some of which focus on the development of trails and pathways for pedestrians, bicycles, and other non-motorized modes of travel.

### City of Harker Heights:

- Proposing to adopt “Designing Walkable Urban Thoroughfares: A Context Sensitive Approach” as part of the FM 2410 Overlay.

### City of Killeen:

- Comprehensive Plan adopted in 2010 contains detailed Mobility Chapter that addresses: 1) Connectivity and Options; 2) Capacity; 3) Safety; 4) Compatibility; and 5) Coordination and Sustainability.
- Hike and Bike Trails Map adopted in conjunction with the Comprehensive Plan depicts a planned trail network across the city.
- Thoroughfare Map revised in 2010 indicates alignment and classification of existing and proposed roadways.

### City of Temple:

- Thoroughfare Plan reviewed and updated annually. The Plan identifies street classification according to capacity and is the guiding policy on where additional capacity is needed to mitigate congestion.
- Master Trails Plan is guiding policy on where hike and bike trails will be located and their respective capacity.
- A Bike Route Master Plan has been proposed for the city’s guiding policy on creating bike lanes and routes with destinations.
- Street design standards consider bike lanes and stakeholder input from The HOP.



Exhibit 6.11: Future Bicycle and Pedestrian Network (Belton-Salado)

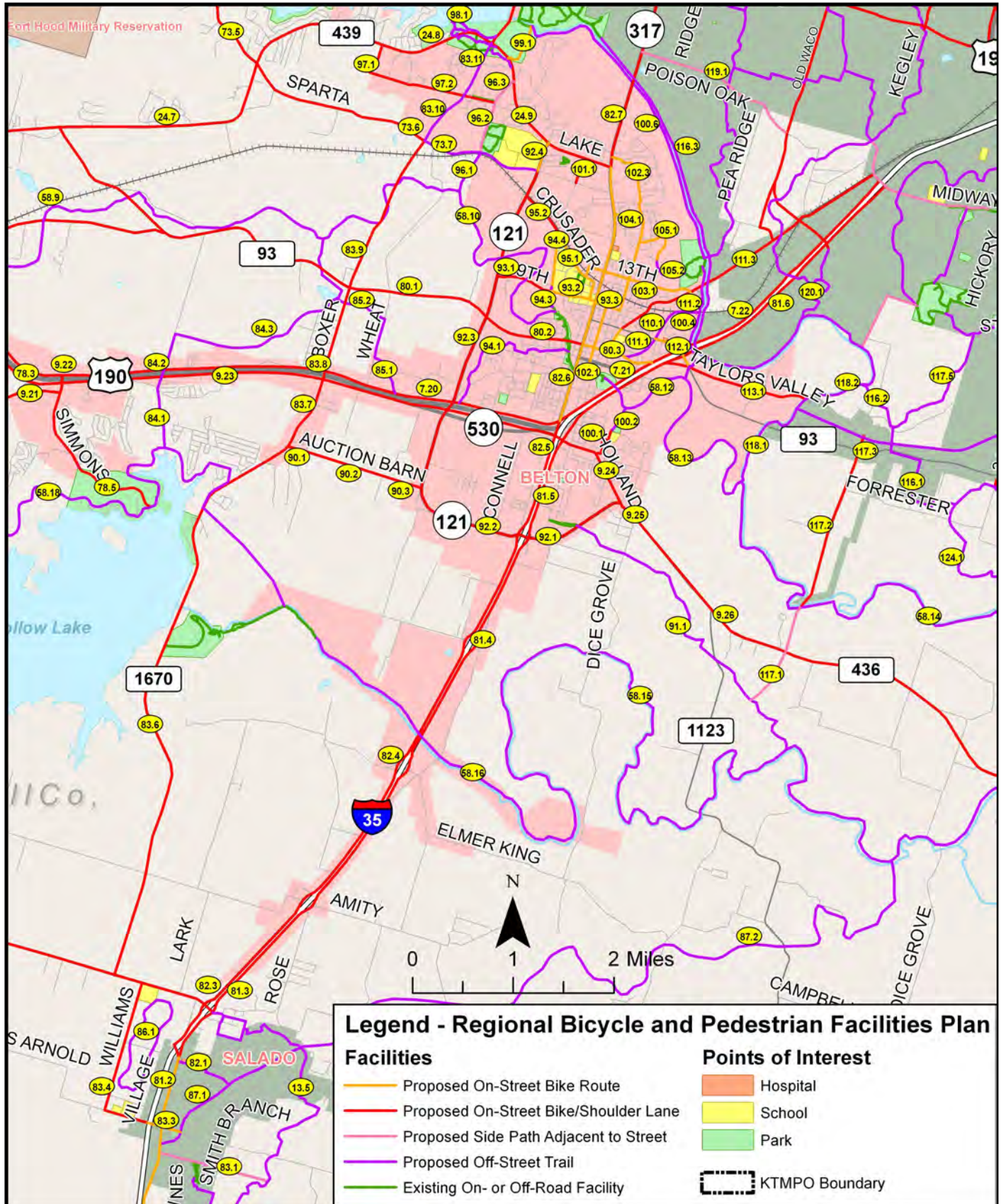




Exhibit 6.12: Future Bicycle and Pedestrian Network (Copperas Cove)

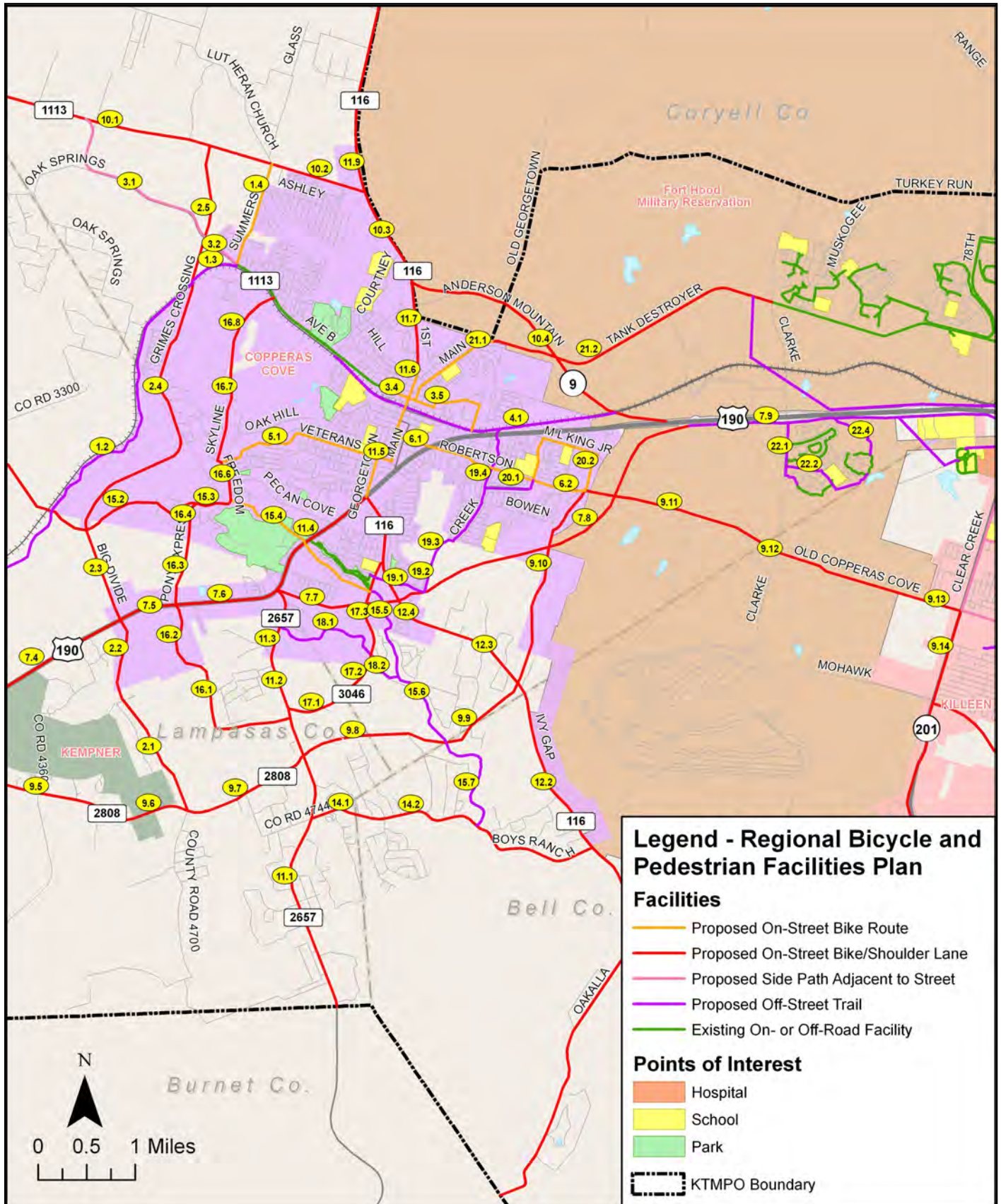
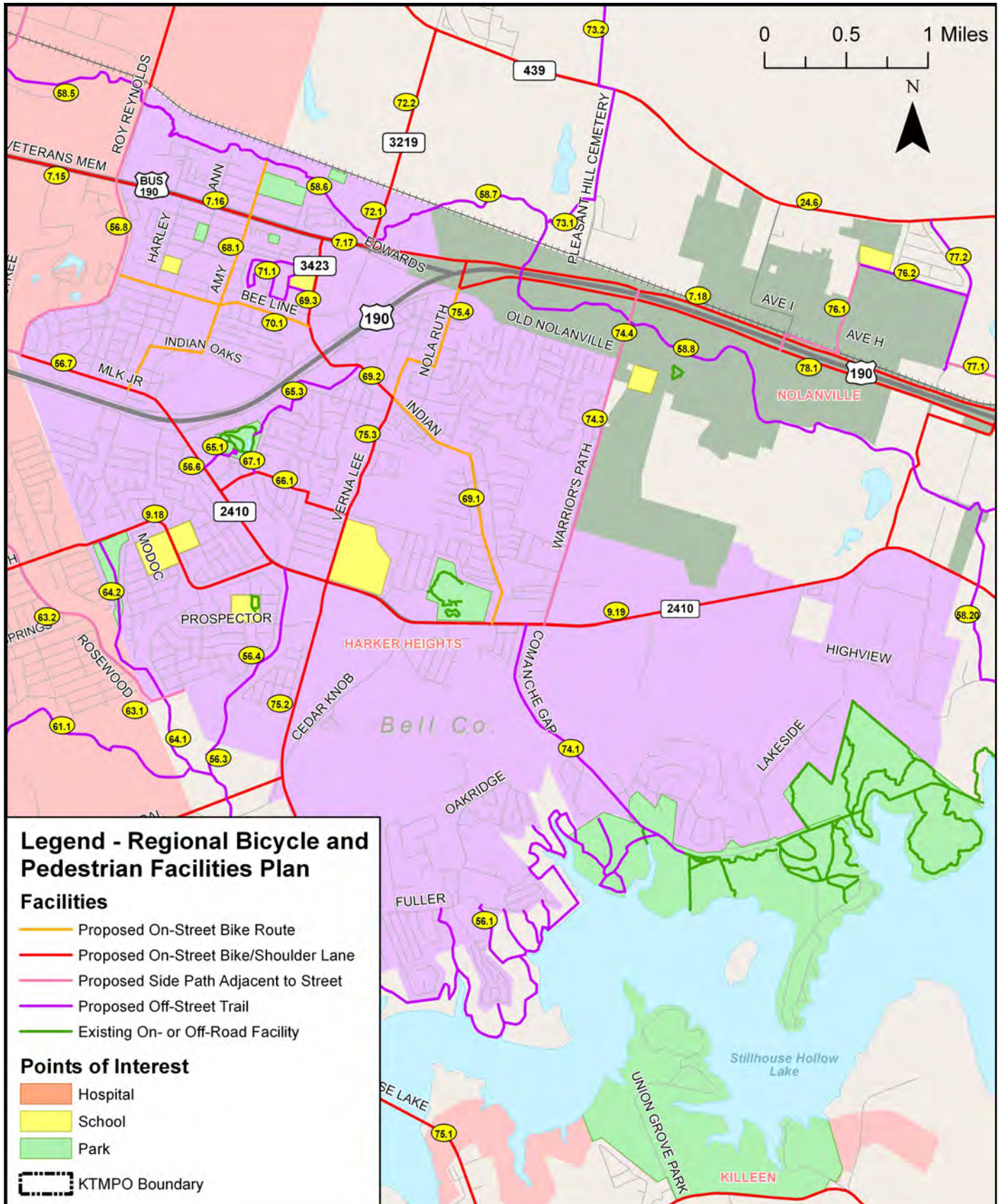




Exhibit 6.13: Future Bicycle and Pedestrian Network (Harker Heights)





### Exhibit 6.14: Future Bicycle and Pedestrian Network (Killeen and Fort Hood)

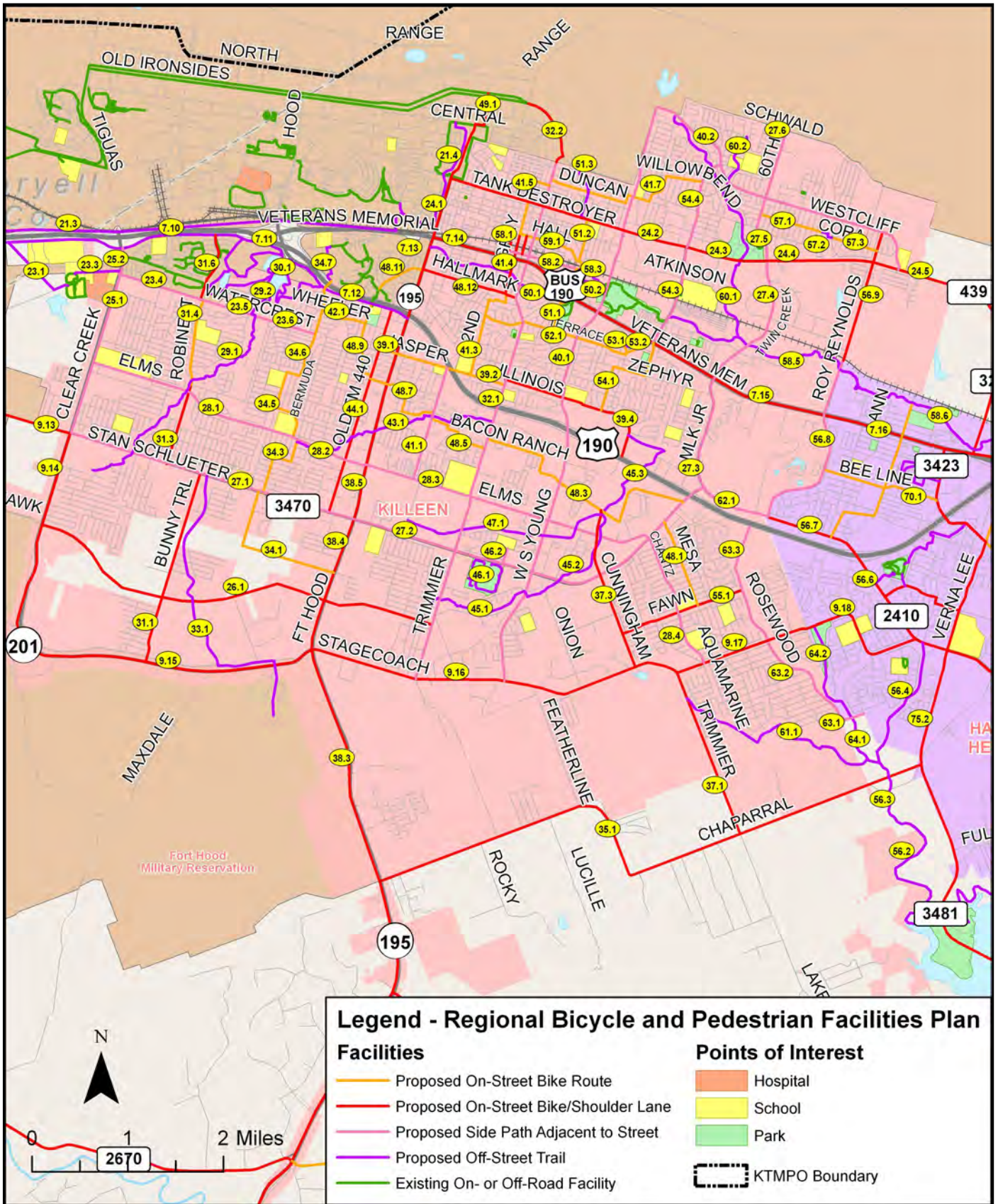
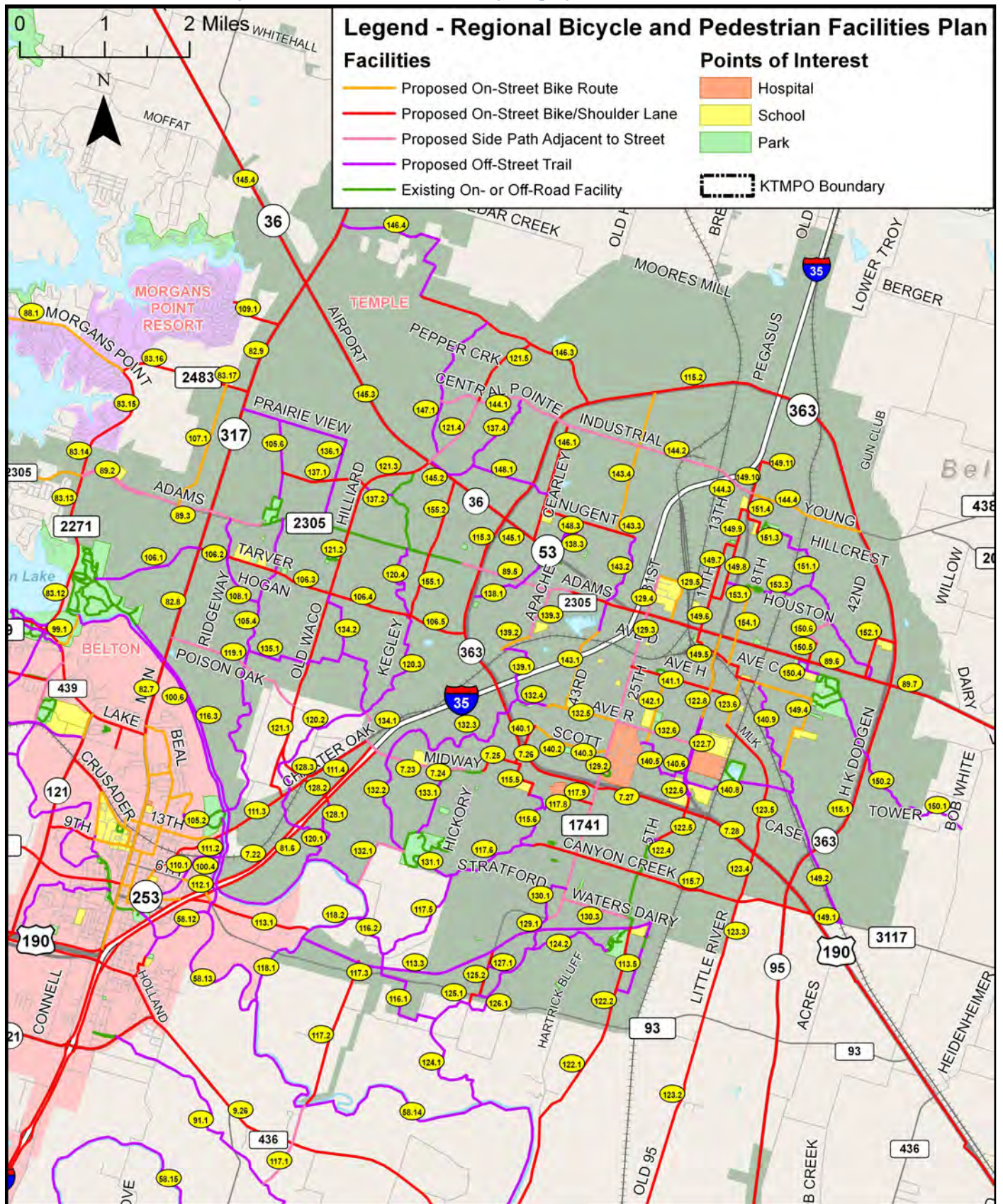




Exhibit 6.15: Future Bicycle and Pedestrian Network (Temple)

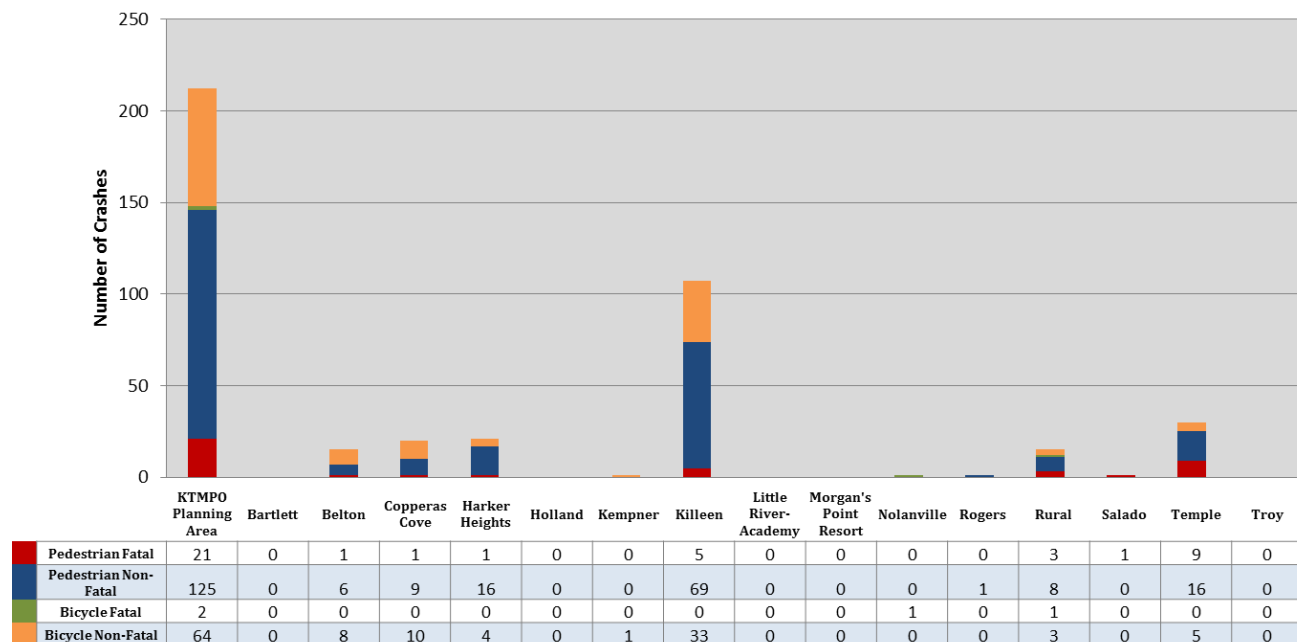


## SAFETY

It can be hazardous for bicyclists and pedestrians to use the car-dominant transportation system when roadway designs do not adequately consider these modes. Even in locations where a sidewalk or space on the roadway for a bicyclist exists, certain conditions can make public infrastructure basically unusable. Lack of pedestrian crossing indicators or lack of traffic control at free right turns can expose a pedestrian to danger, particularly if that person has no safer alternative to crossing at that location. Extremely long block faces or distances between traffic signals can force pedestrians to make unprotected mid-block crossings.

The responses pertaining to bicycle and pedestrian infrastructure gathered from the 2013 public workshops makes evident that safe facilities to bike or walk is a key factor in the use of the bicycle and pedestrian network by the KTMPO public. This may involve the existence of sidewalks or trails, intersection crossing indicators, and appropriate traffic control in the car-dominant transportation system of the KTMPO region. An analysis using TxDOT's Crash Records Information System (CRIS) for the years 2010-2012 was performed for bicycle and pedestrian-related crashes to identify the safety conditions of current facilities. Exhibit 6.16 presents a summary of the number of crashes per entity, categorized by severity, in the KTMPO planning area. Exhibits 6.17 and 6.18 accompany this chart to pinpoint the geographic location and possible trends in bicycle and pedestrian crashes.

**Exhibit 6.16: Bicycle and Pedestrian Crashes by Entity (2010—2012)**

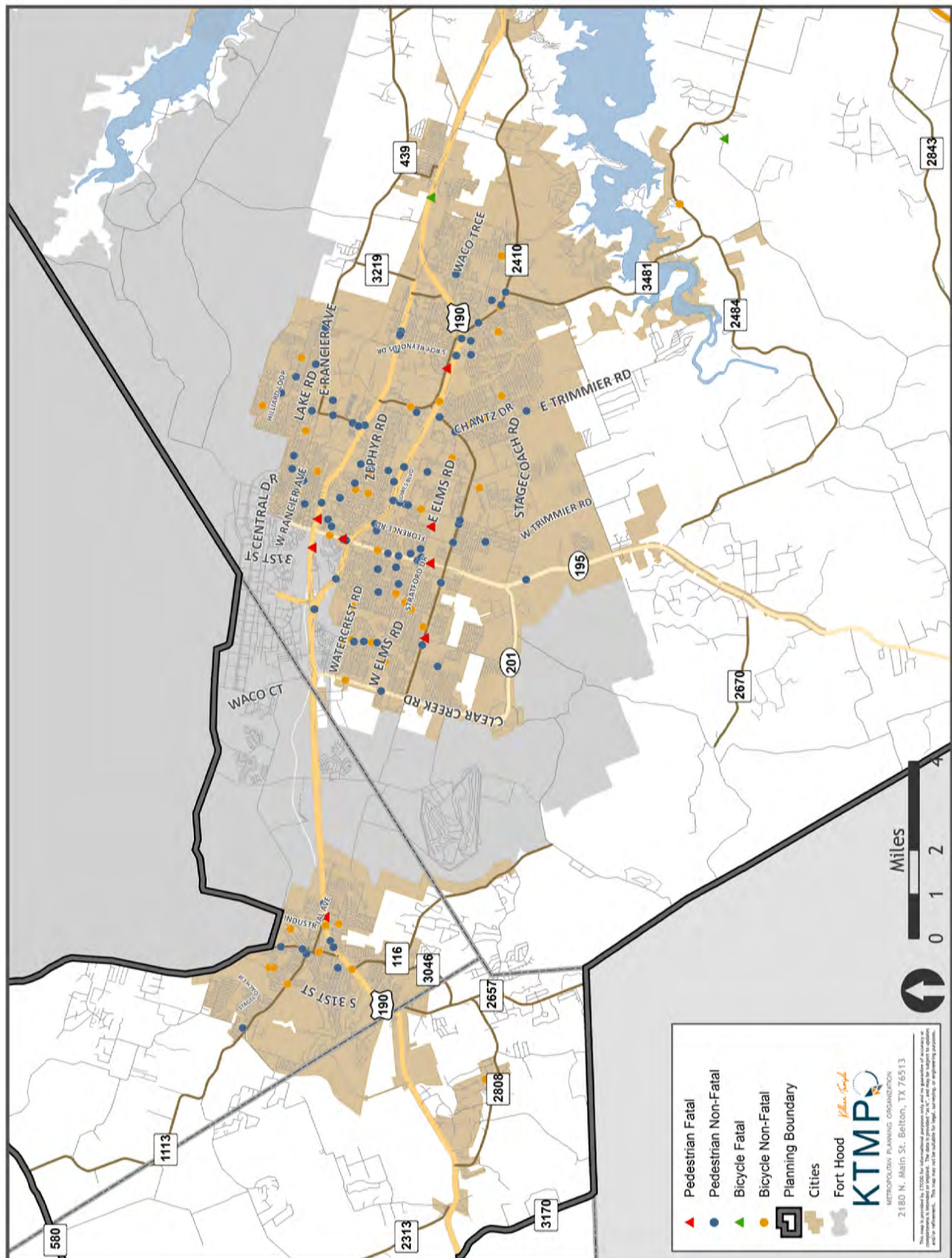


Though each crash is unique and requires a specific analysis, it can be assumed that in locations with reoccurring incidences there is some lack in safe design. Over the three year span of the data used in the analysis, the following locations have been the site of 3 or more crashes with pedestrians or bicyclists:

- SH 195 at/near US 190
- SH 195 at West Elms Rd
- Trimmier Rd from Lowes Blvd to Bacon Ranch Rd
- FM 436 from IH 35 to Muelhouse St
- FM 1741 (31<sup>st</sup> St) at/near Winchester Rd



Exhibit 6.17: Motor Vehicle and Bicycle and Pedestrian Crashes 2010–2012 (West KTMPo Region)





[illegible]

## Americans with Disabilities Act (ADA)

The Americans with Disabilities Act (ADA) created design guidelines to ensure that transportation facilities are constructed to a set of standards that ensures accessibility for the disabled. Sidewalks are one of the most common pieces of transportation infrastructure, yet if not accessible, they can pose great challenges and danger to anyone in a wheelchair or with crutches.

Public entities such as city governments and transit agencies are required to construct facilities in accordance with ADA standards. These standards apply to all new construction; however, the ADA also requires that public entities retrofit any public facility to these standards to ensure equal access. These requirements include sidewalks and curb ramps which must be retrofitted to meet all current standards. Any non-compliant sidewalks or curb ramps must be upgraded to meet current standards whenever any alterations, such as road surfacing, are carried out. ADA requirements are summarized in **Appendix E**.

In the coordination and development of the sidewalk inventory data, bicycle and pedestrian facility ADA compliance was also identified and is displayed in Exhibits 6.6 through 6.10. KTMPO will continue to coordinate with the municipalities to keep this inventory updated and promote improvements and expansion of the sidewalk network through the planner roundtable meetings. Gaps in the network system will be evaluated and considered when opportunities for expansion occur.

## Safe Routes to School

Safe walking and bicycling routes should be established for each elementary and middle school student living within reasonable distance of the school. Students should have a sidewalk to walk on, rather than be forced to walk in the road. They should have designated street crossing locations, preferably enhanced with crosswalks and crossing aids (e.g., signals, crossing guards, pedestrian refuge islands) to make their crossing safer. School speed zones on roadways around the school that must be crossed are typically established for school entry and exit time periods. Having safe walking and bicycling routes to elementary and middle schools is particularly important for low-income families that may not have a vehicle available to take students to and from school.



Administered by the Texas Department of Transportation, the Safe Routes to School program was a federally funded effort to encourage elementary and middle school students to walk and bicycle to school, for their own physical fitness and health, to ease auto traffic congestion and increase student safety at and near schools, to improve neighborhood conditions and to provide transportation options for families without multiple car ownership. Several cities and school districts in the KTMPO region received a grant from TxDOT and the resulting improvements are discussed on the following page.



### Belton

- Alternate transportation route, consisting of sidewalks, crosswalks, and school zone flashers, was constructed from Holland Rd (FM 436) to Miller Heights Elementary in March, 2013.

### Temple:

- Pedestrian/bicycle trail was constructed along Hickory Road from Las Moras Drive to Bonham Middle School in January, 2012.
- Pedestrian/bicycle trail was constructed along FM 2305 from FM 2271 to Lakewood Elementary School in January, 2013.

### Troy:

- Pedestrian/bicycle trail was constructed along West Main Street from the IH 35 frontage road to Mays Middle School. This project provides safe travel for both the middle and elementary school students.

### Safe Routes to Transit

It is critical to provide a network of ADA compliant sidewalks to feed bus stops and transit transfer points so that people can safely access the transit system. Representatives of Hill Country Transit District (the HOP) have stated that “more sidewalks are needed everywhere” in the region. When planning where to add sidewalks, special priority should be given to developing the network feeding key transit routes and bus stops. In addition to the general lack of sidewalks along many routes, hazardous roadway crossings present a significant access barrier and safety issue for citizens. Many multi-lane, high-volume arterials are too wide for some citizens, particularly the elderly, disabled, and children, to cross during a signal timing phase, or traffic control at these intersections favors auto traffic flow rather than pedestrian access and safety.



### Transit Linkages

The ability to link bicycle trips with bus trips provides benefits for both systems—the service area for bus routes may be expanded and the use of bicycles as a travel mode may also grow. Hill Country Transit District has recently installed bicycle racks on each of their 27 fixed route buses; each rack may hold up to two bicycles. Bicycle racks and/or lockers at the bus stops would also be beneficial and would require coordination with municipalities. This is a topic of discussion that will be covered with the planner roundtable meetings.



## FUNDING SOURCES

### Transportation Enhancement Program

The Texas Department of Transportation initiated a statewide competitive “call for projects” for funding under the Transportation Enhancement (TE) Program in September 2012. The TE Program is a federally-funded program derived from a 10% set-aside from the Surface Transportation Program apportionment. The Texas Transportation Commission reviewed each project and authorized 81 projects for funding, with three of these projects in the KTMPO region. Following is a description of the three selected projects:

#### City of Killeen:

The project represents a 10-foot wide multi-use trail along South Nolan Creek from eastern end of Rimes Ranch Road northerly to Watercrest Road.

#### City of Troy:

The project will begin at the northbound access road of IH 35 along Main Street (FM 935) and extend east along Main Street and south to the U.S. Post Office. The trail will allow residents to walk, run, or bike along a contiguous, lighted, ADA compliant route between Mays Elementary School, Troy Middle School, Troy High School, the City’s parks and ball fields, churches, and civic locations such as the U.S. Post Office, and the TxDOT Safe Routes to School project that is also under construction.

#### City of Belton:

The project will extend from Loop 121 to University Boulevard, and to Nolan Creek Hike and Bike Trail Phase Two, currently 60% designed and scheduled to be bid in 2013 and completed in 2014, and Nolan Creek Hike and Bike Trail Phase One, which is completed. This project will provide continuity from IH 35 to Loop 121, providing a corridor for pedestrians and bikers as well as linkages among roads, parks, shopping, schools, churches, senior, student and conventional housing, and the city’s government and financial center.

KTMPO was not considered as a TMA for the 2012 project call since it was just designated as a TMA in July 2012. Entities submitted their projects directly to TxDOT for consideration. This funding category is being replaced with the Transportation Alternatives Program discussed in the following section.

### Transportation Alternatives Program

As a TMA, KTMPO will receive funding through the Transportation Alternatives Program (TAP), or Category 9. TAP funding was authorized under Section 1122 of Moving Ahead for Progress in the 21st Century Act (MAP-21). Section 1122 provides for the reservation of funds apportioned to a State to carry out the TAP. The national total reserved for the TAP is equal to 2 percent of the total amount authorized from the Highway Account of the Highway Trust Fund for Federal-aid highways each fiscal year.

The TAP replaces the funding from pre-MAP-21 programs including the Transportation Enhancement Activities, Recreational Trails Program, and Safe Routes to School Program (SRTS). As such, the TAP provides funding for programs and projects defined as transportation alternatives, including on- and off-road pedestrian and bicycle facilities; infrastructure projects for improving non-driver access to public transportation and enhanced mobility; community improvement activities and environmental mitigation; recreational trail program projects; safe routes to school projects; and projects for planning, designing, or constructing boulevards and other roadways largely in the right-of-way of former Interstate System routes or other divided highways.

Each State's TAP funding is determined by dividing the national total among the States based on each State's proportionate share of FY 2009 Transportation Enhancements funding. Within each State, the amount for TAP is set aside proportionately from the State's National Highway Performance Program (NHPP), Surface Transportation Program (STP), Highway Safety Improvement Program (HSIP), Congestion Mitigation and Air Quality Improvement Program (CMAQ), and Metropolitan Planning apportionments. TAP funds are available for obligation for a period of 3 years after the last day of the fiscal year for which the funds are authorized. For most TAP projects, the Federal share is the same as for the general Federal-aid highway program: 80 percent Federal/20 percent State or local match.

TAP funds are administered by the State Department of Transportation (State DOT) and must be used for eligible projects that are submitted by eligible entities and chosen through a competitive process. TAP does not establish minimum standards or procedures for competitive processes but requires the state or MPO to do so. For urbanized areas with populations over 200,000, the MPO, through a competitive process, is required to select the TAP projects in consultation with the State.

A call for conceptual TAP projects was issued in conjunction with roadway projects for inclusion in the MTP. A total of 30 projects were submitted and are included in the project listing section of the MTP (**Appendix A**). Proposed projects include 13 transit projects for bus replacement for paratransit and fixed

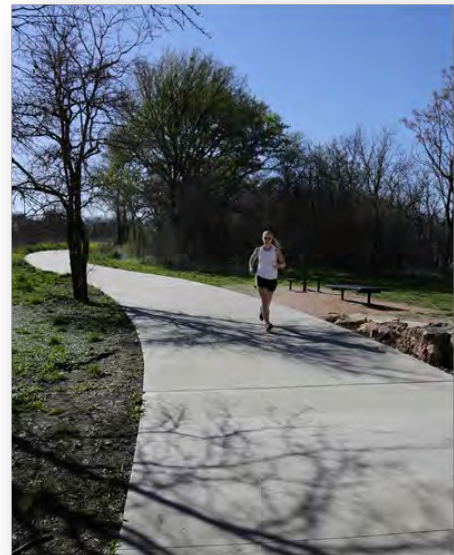
route service over the 25 year planning horizon. Other projects include a trails project for the Village of Salado, and two sidewalk projects for the City of Copperas Cove, one of which includes a pedestrian bridge. The City of Temple submitted 14 projects which include a sidewalk/bicycle route along Central Avenue and Adams, a trail connecting transit stops along 31<sup>st</sup> Street, a trail along an abandoned railroad line connecting Temple and Belton, and several trails connecting to parkland including a trail along the Leon River. Several submitted roadway projects by other entities also incorporate a multi-modal element.

KTMPO staff will be working with the Technical Advisory Committee to establish guidelines for the project nomination and selection process for use of the TAP funds.



## NEXT STEPS—MOVING FORWARD

The 2011 KTMPO Pedestrian/Bicycle Plan identified recommended actions to promote pedestrian and bicycle improvements throughout the KTMPO region. These actions are described in detail in **Appendix E** and are summarized in the following section—Pedestrian/Bicycle Implementation, Programs, and Policies. KTMPO staff will continue working to implement various portions of this action plan during the next five years. Some elements are already in progress and are identified as such below. KTMPO staff are utilizing quarterly round-table discussions with city planners within the KTMPO boundary to promote many of the actions identified in the following sections and to obtain information on programs and efforts being made with regard to these actions.



### Pedestrian/Bicycle Implementation, Programs, and Policies

#### A. Bicycle Programs and Policies

##### **Action Area 1: Organize a Bicycle/Pedestrian Program**

###### **1.1 Establish a Bicycle and Pedestrian Advisory Committee**

The Central Texas Trails Network ([www.centraltexastrails.org](http://www.centraltexastrails.org)) is an advocacy non-profit group of volunteers that worked together in the past to coordinate trail planning with cities, citizens, park departments, the Corps of Engineers, and private agencies to promote trail building in the KTMPO area. Their status as an organization is uncertain at this time. KTMPO staff is seeking to locate groups with interest in bicycle/pedestrian networks and work with these groups to solicit input and promote the establishment of an advisory committee.



###### **1.2 Institutionalize the Role of Bicycle/Pedestrian Program Coordination within Local Government**

An analysis of bicycle and pedestrian crash data for 2005 to 2009 was performed with the 2010 update to the Pedestrian/Bicycle Plan and identified locations of crashes involving pedestrians or bicycles in the KTMPO planning region. This analysis was based on TxDOT CRIS (Crash Records Information System) data. KTMPO continues to receive the CRIS data and will continue the analysis to determine areas needing improvements to protect bicycle riders and pedestrians and coordinate with municipalities to recommend and support solutions.



###### **1.3 Promote Land Use Patterns and Zoning that Encourage Walking and Bicycling to Destinations**

###### **1.4 Accommodate Walking and Bicycling in Urban Design**

###### **1.5 Adopt Street Design Standards that Accommodate Bicycling and Walking**

###### **1.6 Provide Information and Training to Planners, Local Enforcement Officers, Designers, and Other Officials**



## **Action Area 2: Plan and Construct Needed Facilities**

### **2.1 Continue Ongoing Maintenance of Regional Planning Document**

### **2.2 Identify/Coordinate Funding Sources**



Funding through the Transportation Alternatives Program (TAP) will provide a dedicated source of funding for projects such as bicycle/pedestrian improvements.

### **2.3 Construct, Improve, and Maintain Facilities**

### **2.4 Accommodate Bicycle/Transit Joint Use**



HCTD provides a two-position bicycle rack on each of their 27 fixed route buses. Each rack can hold up to two bicycles.

## **Action Area 3: Enforce Laws and Regulations**

### **3.1 Target Areas for Enforcement and of Proper Behaviors**

## **Action Area 4: Educate Bicyclists, Pedestrians, and the Public**

### **4.1 Dissemination of Available Safety and Educational Materials**

## **Action Area 5: Promote Bicycling and Walking**

### **5.1 Prepare and Disseminate Public Information on Bicycle and Pedestrian Routes and Programs**



KTMPO has maps showing existing and proposed bicycle and pedestrian routes and will be developing a guide incorporating this information that will be available for public use. KTMPO is utilizing the planner round-table meetings to coordinate with municipalities to keep this information current.

### **5.2 Participate in National Programs**

### **5.3 Foster the Development of Local Bicycling and Walking Events and Programs**

### **5.4 Adopt Public Policies**

## **B. Bicycle Implementation Strategy**

Following is a set of short-range priorities for implementation of the Action Areas identified above and in the Pedestrian/Bicycle Plan. These tasks should be advanced simultaneously on numerous levels and fronts.

1. The MPO Transportation Planning Policy Board should adopt the Regional Pedestrian/Bicycle Plan and adopt the AASHTO Guides for bicycle and pedestrian facilities as a regional standard.
2. Cities should adopt their portion of the Regional Pedestrian/Bicycle Plan after review and refinement for local conditions.
3. Cities should adopt the regional public right of way design standards for roadway development that accommodate bicycling and walking after review and refinement for local conditions.

4. TxDOT should consider this KTMPO Pedestrian/Bicycle Plan and locally adopted plans in its planning, design, operations and maintenance of transportation corridors.
5. Independent School Districts should prepare or update their Safe Routes to Schools plans. Each ISD should identify the safe access needs of each of its elementary and middle schools and develop a transition plan to improve non-motorized access to each school. Moreover, it may be necessary to include area high schools in Safe Routes to Schools programs - one particular need is for students of Fort Hood families who may not have their own cars due to the transient nature of military living.
6. The MPO and the Hill Country Transit District should develop a regional standard for the provision of sidewalks for access to and from bus stops, and initiate a Safe Routes to Transit inventory of existing needs and a transition plan to improve access to existing transit stops.
7. Each city should formally designate areas within their central core and other appropriate locations as Pedestrian Districts to receive focused attention for the provision of sidewalks, improvements for ADA accessibility, and creation of a pedestrian- and bicycle-friendly community. Annually, each city should re-evaluate the boundaries of the Pedestrian Districts and seek to expand the accommodations and activities within them.
8. Cities should establish a line item in their annual budgets for non-motorized transportation enhancements to their public rights of way. Basic line item categories could include the following: ADA Transition Plan, Bicycle and Pedestrian Crash Reduction, Safe Routes to School, Safe Routes to Transit, Bicycle and Pedestrian Mobility and Safety, Disadvantaged Citizens Mobility Initiative, and Pedestrian District Infrastructure.
9. Local police departments and the Texas Department of Public Safety should analyze high-incidence crash locations involving pedestrians and bicyclists. Mitigation measures to reduce such incidents should be developed and implemented.
10. The MPO should create a Bicycle and Pedestrian Advisory Committee that regularly meets to review the bicycle and pedestrian mobility and safety needs of the region and advises the MPO regarding such issues.

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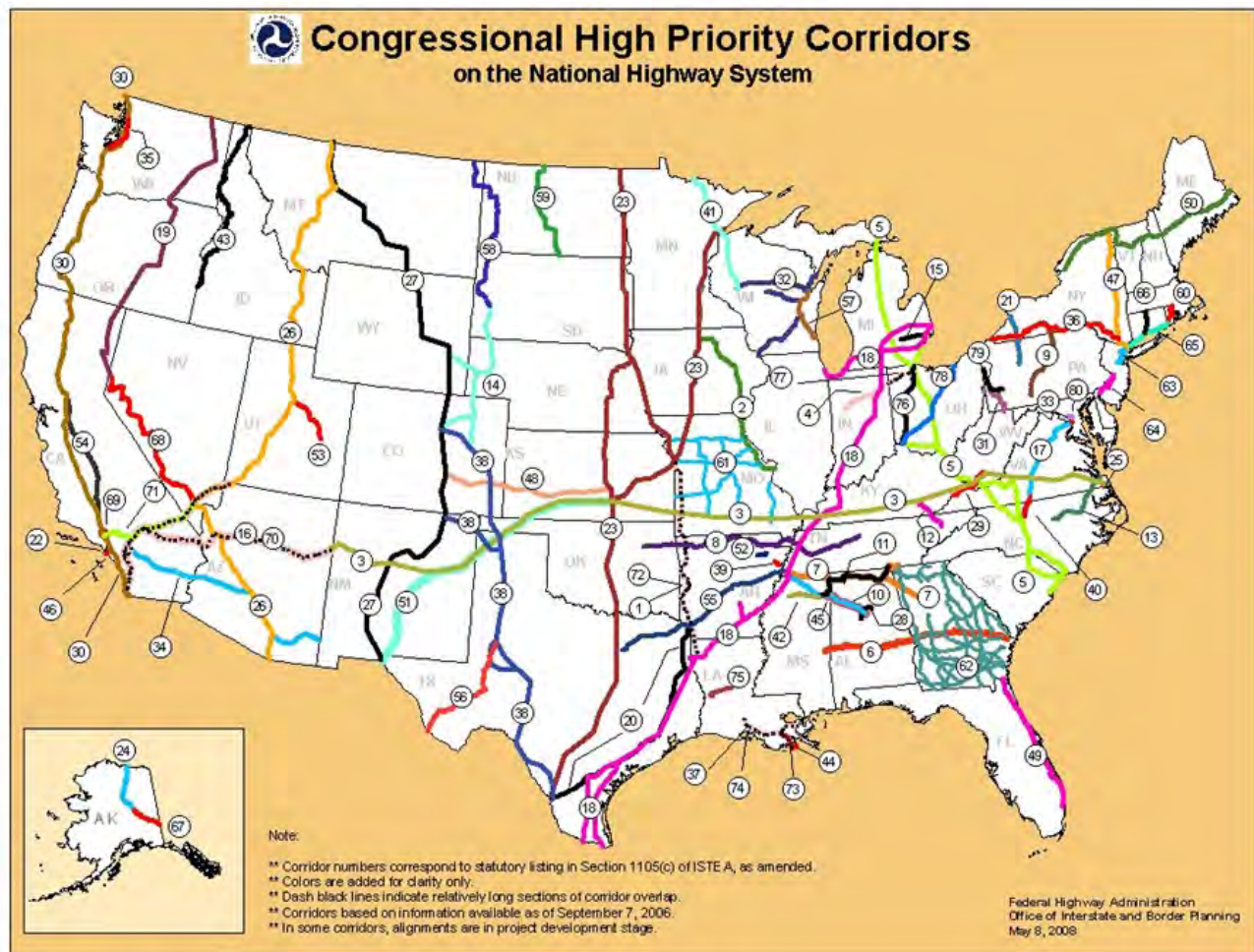
# Multi-Modal Alternatives



The Killeen-Temple metropolitan area has facilities and infrastructure in place to accommodate for **the movement of goods and people through various modes of transportation**. Multi-modal alternatives include rail and trucking for freight and rail, air, motor coach, and local bus transit for the movement of people. The Killeen-Temple Metropolitan Area has been and will continue to be an integral part of freight movement in the state of Texas. Located in Central Texas and on the western leg of the Texas freight triangle (Dallas-San Antonio-Houston), the KTMP area is one of the highest density freight zones in the United States.

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Freight along the IH 35 corridor has increased dramatically due to the North American Free Trade Agreement (NAFTA) from points south of the region originating in Mexico via Laredo and Brownsville. NAFTA has also caused increased port activity resulting in the movement of goods from Corpus Christi, Galveston, Houston, and Beaumont. Central Texas will continue to experience increased cargo movement via truck, rail and air in the foreseeable future. As a major connector for national transportation systems, infrastructure in Central Texas is critical to the effective movement of goods and services. As a truck and rail corridor, KTMPO services the markets that connect Canada, United States & Mexico. This corridor includes the Dallas to Mexico, Dallas to San Antonio, and Dallas to Houston markets.



Although the KTMPO region may serve as a major corridor for international trade, it is also home to the largest active duty armored post in the United States Armed Services—Fort Hood. Fort Hood is home to over 50,000 troops. Troop movements by all multimodal methods of transportation are a key factor in the security and safety of our nation. Based on an ongoing City of Temple logistics study, the KTMPO region is extremely diversified with manufacturing and distribution of many types of goods. The outgoing freight within a fifty mile radius distributed approximately 131 million tons of goods in 2007. It is expected that the same area will distribute approximately 185 million tons of goods by 2040. Pass thru freight from Mexico to Dallas is projected to grow from 5.5 million to 10.8 million tons.



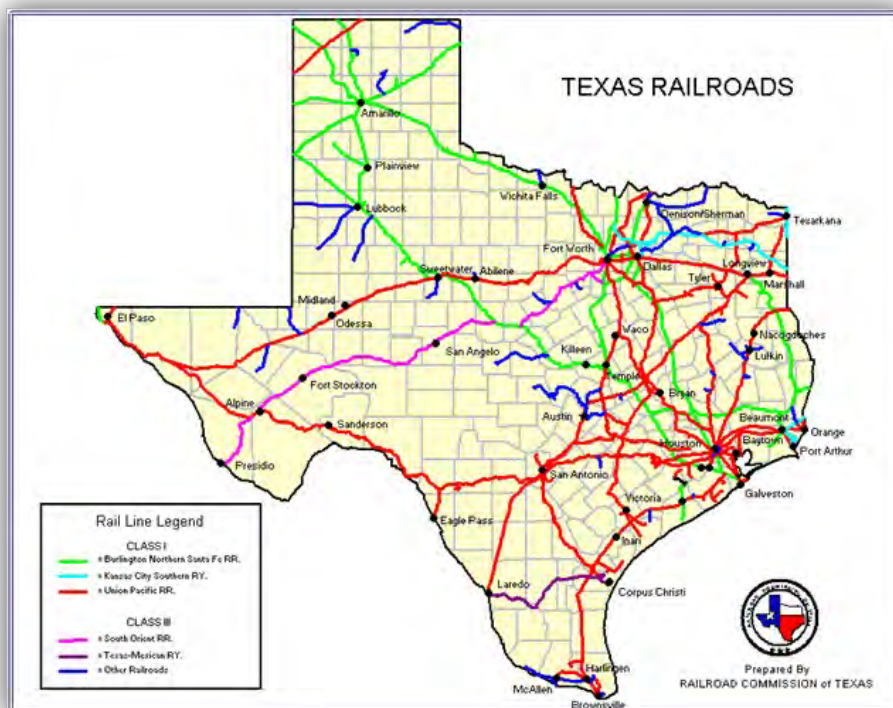
Recent developments in West Texas (Permian Basin and Concho Valley) have revealed significant activity in the oil industry. The Eagle Ford and Cline Shale sites have been classified as scenes from the old “gold rush days”. A recent find in the summer of 2013 referred to as the Spraberry/Wolfcamp field is expected to be the second largest oil field in the world. The Spraberry/Wolfcamp is reported to yield approximately 50 billion barrels of oil. With the increased needs of the oil industry and local manufacturing, rail service is expected to play a major role. Recently, two pipe and tank manufacturers located additional operations in the KTMPO region.

Passenger service continues to expand with the movement of Central Texans for military, business and personal purposes. Focus on national security abroad and area growth are expected to increase the need for passenger service.

## RAIL

The Central Texas area has a vital purpose in the state’s railroad operation. This central proximity allows for north/south and east/west rail corridors. The KTMPO boundaries are served by two “class 1” railroad companies located in Temple. Burlington Northern and Santa Fe (BNSF) and Union Pacific (UP) are the predominant railroad freight carriers for the area. The City of Temple was founded in 1881 by the Gulf, Colorado and Santa Fe Railway Company. Santa Fe needed a town at a major junction point to provide services for railroad equipment and passengers. As a result of this need, a city was developed. Temple hails it’s name from Mr. Benard Moore Temple, a chief engineer who built the tracks for the Gulf Colorado and Santa Fe Railway in the Temple area. From its humble beginnings, Temple has played an important role in supporting the railroads operational needs and continues to operate as a major junction point.

The Temple rail yard performs rail car switching, locomotive fueling and is a strategic point for crew changes. Currently, there is a short-line railroad operation that is providing switching services to specific industries. There are approximately 10 miles of specific industry rail service in the Temple Central Pointe business park.



There is no intermodal facility in the KTMPO region and the nearest intermodal ramps are in Dallas-Fort Worth. Containerized cargo must be offloaded or loaded in Dallas. Interactions with the railroads suggest that the Class 1 companies envision Central Texas as an untapped resource for shipping/receiving cargo. With the continued growth of Central Texas manufacturing industries and oilfield needs, Central Texas is prime for expansion to bulkhead/intermodal services. Bulkhead services are critical in the future to ease the congestion within the KTMPO boundaries.

As with the city of Temple, most of the towns and cities within the KTMPO region have a rich rail history. The present day largest city, Killeen, was developed by the Santa Fe Railway in 1881. The initial 70 block town was named after the assistant general manager of the Santa Fe, Frank P. Killeen. From its beginnings as a regional source of shipping farm goods, Killeen has grown exponentially due to the military locating at Camp Hood (currently recommissioned as Fort Hood). Fort Hood utilizes the rail for deployments of equipment and supplies out of two ports – Corpus Christi and Beaumont.

Farming continues to be served regionally by the use of one grain elevator within the region. The City of Rogers grain elevator has a track capacity of 54 cars and 815,000 bushels. Local farmers utilize this facility for rail shipments of their grain crops.

## AMTRAK

AMTRAK provides passenger train service from the historic Temple train depot. Daily AMTRAK Texas Eagle service is provided from San Antonio to Fort Worth. From Fort Worth passengers can choose to travel to Oklahoma City or Chicago. The Temple AMTRAK station has increased ridership by 7.4% from 2011 to 2013. Total ridership in 2013 was 17,690. The overall national AMTRAK ridership has expanded 27% since 2006 for long distance train routes. AMTRAK has experienced overall growth in 9 of the last 10 years of service.



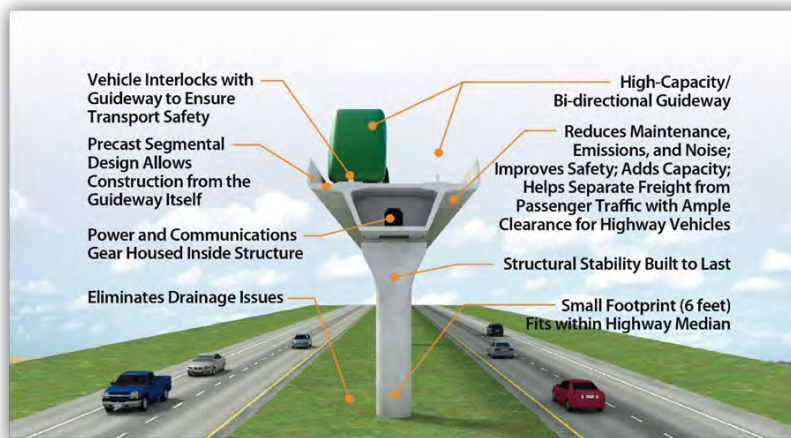
## High-Speed Passenger Rail Studies

From 1997 to 2012, the Dallas-Ft Worth area experienced a 483% growth in annual ridership to 201,996 boardings and alightings. These factors lend to the discussion that the need for passenger rail service is growing. As a result of the increased demand, two studies are underway for high speed rail service by the Texas Department of Transportation—one from Oklahoma City to the border of Texas, and one from Dallas to Houston, which began in 2013. According to a January 2014 statement from the Dallas Business Journal, the Federal Railroad Administration, TxDOT and the Texas Central Railway (a Dallas-based company) have come to an agreement to prepare two environmental studies. These studies will serve to lay the groundwork for high-speed rail between Dallas-Ft Worth and Houston. Total projected cost of the project is \$10 billion. The Texas Central Railway project will offer 90 minute service that covers 240 miles at speeds over 200 mph. The project will require 40 to 100 feet right of way, work with the existing roadways/rail system, have dual tracks, no at-grade crossings, have an electric overhead system and may include one stop between Dallas and Houston. The Texas Central Railway is looking at 7 different alignments and projects to be fully operational by 2021.

TxDOT also began public comment in 2013 on the Texas-Oklahoma Rail Study that stretches over 850 miles from Oklahoma City to Brownsville. TxDOT is holding public input meetings in January and February of 2014 as it reviews and analyzes alternative routes and service levels. All current alignments will pass through the KTMPO region, with a stop in Temple. With the exception of the Dallas-Houston line, the Central Texas region from Dallas to San Antonio has the largest air travel demand in the state. As such, high speed rail could play a significant and immediate role in providing an alternative mode of travel for the Central Texas region. Local transit service is in place throughout the Killeen-Temple region and offers a connection to this future transportation service.

### Freight Shuttle System (FSS)

The Texas Transportation Institute has developed a new freight transportation system referred to as the Freight Shuttle System (FSS). The FSS transporter system would utilize current I35 right of way, specifically the median. It is a raised transport system that would operate from Dallas to San Antonio. This freight shuttle system would have the capacity to handle 17,000 semi truck type containers a day thereby relieving I35 of approximately 9,000 semi trucks traveling on the I35 corridor a day. As reported in the San Antonio Express News, “this proposal bears watching even though it may be years away from construction.” The project would be privately financed, operated and maintained. Currently, there is a signed renewable 3 year agreement for “reservation of right-of-way” between TxDOT and Freight Shuttle International. The agreement allows Freight Shuttle International lease rights along I35 from Dallas to San Antonio for a Freight Shuttle System.



### MOTOR COACH

Passenger service is readily available with two companies—Arrow Trailways and Greyhound Lines Inc. There are two bus depots in the KTMPO area, with one located in Killeen and one in Temple. AMTRAK has partnered with the local motor coach services coordinating daily service from Killeen to the Temple AMTRAK depot. Motor coach services are very flexible with schedules that accommodate most larger cities within the United States. There is also international service available to Canada and Mexico. Local transit service is in place and offering connecting transportation service throughout the Killeen-Temple region.





A special study by Nathan and Associates reported that motor coach services in America/Canada was the “Top People Mover” with 751 million riders in 2007. Inner City and “over the road” transit services exceeded the airline industry by 9% and by 67% more than rail services in 2007. A similar study was conducted in 2010 that reflects a decline of motor coach ridership to 694 million. Despite the recent decline, the motor coach industry continues to be a significant leader in moving people.

## TRUCKING

Trucking is the predominant freight mover for the Central Texas area. Freight passes through daily on the Interstate 35 corridor for points south to Mexico and north to Canada. Further, Central Texas is a connector to the West Texas oilfields via US Highway 190 and State Highway 36. Transportation systems are continuing to be upgraded throughout Central Texas to better accommodate the needs of the trucking community. These upgrades include a 4 to 8 lane expansion on IH 35 from Salado to Troy.



In addition to the “through traffic”, Central Texas moves freight by truck for nationally known distributors such as McLane Food Services, Wilson Art International plastic laminate products, ACER computer products, Wal-Mart Distribution Services and H-E-B Distribution products. There are many other companies that provide goods to market throughout the country that are manufactured and trucked from Central Texas. The list of products shipped from Central Texas is extensive.

Based on the ongoing City of Temple logistics study there is an expectation of strong growth in shipping plastics, machinery, chemicals, food and alcoholic beverages by 2040 in the Central Texas region. These forecasts also suggest a trend that Mexico will be sending heavy quantities of higher value industrial input products for U.S. manufacturing and also finished consumer goods. As stated in the introduction, exports within a 50 mile radius are expected to grow by 42% to 185 million tons.

The Interstate 35 corridor future growth challenges are being addressed through significant expansion and commitment. The Central Texas region expects significant increase with both east to west corridors (US 190, SH 36). Continued support of West Texas oil field operations could have significant impact on these roadways in the near future. Basic infrastructure challenges such as the lack of housing in West Texas is causing oil field support companies to locate manufacturing operations in Central Texas. These factors may increase the truck traffic on the East/West connectors and it is expected to continue rapid growth.



## AIR

### Killeen-Fort Hood Regional Airport

The Killeen-Fort Hood Regional Airport (K-FHRA), located along SH 201, opened in August of 2004. Prior to September 11, 2001, Killeen had outgrown facilities at their municipal airport, Skylark Field. Local support for a new airport was received from 17 different communities within the KTMPO region. More than 60 parcels of land, as well as Fort Hood property, were needed for five miles of roadway (SH 201) that would service the new facility. City officials worked with the US Army and formed a Joint Management Board (JMB). Through the efforts of the Joint Management Board, Federal Highway Administration and the Texas Department of Transportation, all right of way requirements for the State Highway 201 roadway were obtained in less than a year. State Highway 201 construction is complete and servicing Texas A&M – Central Texas as well as the K-FHRA.



K-FHRA is an enterprise fund commercial-service airport, owned by the City of Killeen. Aviation Pros.com touts the Killeen-Fort Hood Regional Airport as a successful “Joint-Use” project. The Joint Management Board created a series of Joint Operating Plans. As a result, in exchange for land use, the city is responsible for runway maintenance and landscape maintenance. The US Army provides rescue and firefighting services for civilian aircraft in exchange for firefighting services by the city for selected military housing.

During the planning phase of the airport project, the tragedy of terrorism/September 11, 2001 attacks occurred. Due to the apparent necessity for airline security, a number of the site plans were abandoned. The JMB worked with Transportation Security Administration/Federal Aviation Administration and planned the very first US airport terminal to be built after 9/11. The new K-FHRA incorporated security features that are present in today’s airports.



The airport leases space to approximately 15 business tenants including airline operators, rental car companies, parking lot, restaurant, bar, gift shop, arcade and other miscellaneous vendors. The Perryman Group (PG) was hired by the City of Killeen to do an Economic Impact Study prior to the start of the project. The PG study forecasted the creation of over 800 new jobs and \$2.8 billion added to the local economy. In 2011 the

Perryman Group reported the economic impact was much greater due to higher population growth than anticipated. The PG report stated the economic impact in 5 years was in fact 4.4 billion. The airport’s direct economic output is approximately \$50 million annually.

The K-FHRA facility has accommodated Air Force One and an extensively modified Boeing 747 carrying the Space Shuttle over the years on many occasions. These facilities are equipped to land any aircraft in the world. There are two 6,000 foot taxiways and a runway that measures 10,000 by 200 feet. The airport terminal has expanded from the initial 10,000 feet of interior space due to growth of airline enplanements. Airline boarding's were 183,000 in 2012. As of October 2013, boardings have risen 6.38% over a 12 month period. The most recent expansions added 1,400 square feet in holding rooms/retail space. An expansion of 800 square feet was added to the second floor common area. An undisclosed amount of square footage was also added for Transportation Security Administration and training areas. Overall, the K-FHRA is located on an 85 acre tract. Other facilities on this tract include Rental Car parking lot, customer parking, an airport maintenance building, and a 45,000 square foot aircraft parking apron. Airport staff operate an aviation/rental car fuel business for additional revenues. Aviation fuel is available for airlines and corporate accounts.

K-FHRA has commercial airline operations through 3 carriers: American, Delta and United. Multiple daily flights are available via regional jets and turbo prop service to Dallas-Fort Worth, Atlanta and Houston. In 2012 there were 43,000 aircraft operations. Local transit service is in place and offering connecting service transportation throughout the Killeen-Temple region. The Airport has recently completed a terminal expansion per its Terminal Area Master Plan and is planning significant taxiway improvements in 2014. Future plans include terminal area improvements, parking and rental car lot improvement, air carrier ramp improvements, corporate aviation facility improvements, and the potential for a second runway.

### **Skylark Field (Airport)**

The existing 180 acre Killeen Municipal Airport remains open after airline service was moved to the Killeen-Fort Hood Regional Airport facility. As a result of the transition, Killeen Municipal Airport was renamed Skylark Field. Skylark Field serves Genesis Aero Flight Academy, Phil Air Medical Air Ambulance Service and the Central Texas College Flight School. Additional operations consist of general aviation and corporate aircraft. The City of Killeen owns and operates Skylark Field.



The terminal is open during normal business hours (8-5) and offers full service jet fuel services. Skylark personnel accommodate some after-hours services and a 24 hour per day self-serve jet refueling station. The Skylark Field runway measures 5,495 x 100 feet. Fifty aircraft are based at this facility and there were 6,570 airport operations by civilian and military aircraft in 2010. Skylark Field has recently received \$4,000,000 from TxDOT for airport improvements identified in the update of the Airport Master Plan. Future plans include commercial land use development, addition of hangars, expansion of the general aviation line-of-business, fixed-base operator improvements, and the addition of pilot/aircraft common-use facilities.

### **Draughon-Miller Central Texas Regional Airport**

Draughon-Miller Central Texas Regional Airport is a modern, award winning aviation facility operated by the city of Temple. Draughon-Miller is a general aviation airport that is certified for air carrier operations. Draughon-Miller also offers a number of services provided by experienced staff as well as contractual agreements to include Airframe Maintenance, Service/Repair, Piston Engine Overhauls, Line Service, Avionics, Flight Training, Pilot Training, and Rental.



Draughon-Miller received the 2008 General Aviation Airport of the Year award at the 2008 Annual Texas Aviation Conference. This award was received due to the airport's efforts to better serve the military. The airport funded an effort to complete a 50,000 square foot hangar facility to enhance the operations of the U.S. Army Aviation and Missile Command operation providing over 200 highly skilled jobs to the City of Temple. In addition to this award, Draughon-Miller has been named one of the best general aviation facilities in the nation in Exxon/Mobil's network of fixed base operators (FBO). The Exxon/Mobile "Premier Spirit Gold Winner" classification reassures the aviation community that they are receiving the highest level of fuel quality and customer service. Winners of this award represent the top 15 percent of Exxon/Mobil's Aviation-branded FBOs in the United States who participated in Premier Spirit.



The airport has completed multiple expansions and improvements to benefit the Central Texas region including: T-hangar taxiway improvements, taxiway/runway improvements, terminal expansion, and renovation. The Draughon-Miller Central Texas Regional Airport continues to play a vital role in the Central Texas area economy and culture.

In November, 2012 the airport received a lease agreement for transient parking services. There are several aircraft from single engine to large multi-million dollar jets landing at the airport conducting business in the Central Texas area every day. For those staying overnight, Draughon-Miller can now offer a 7,590 square foot hangar to protect their investment.

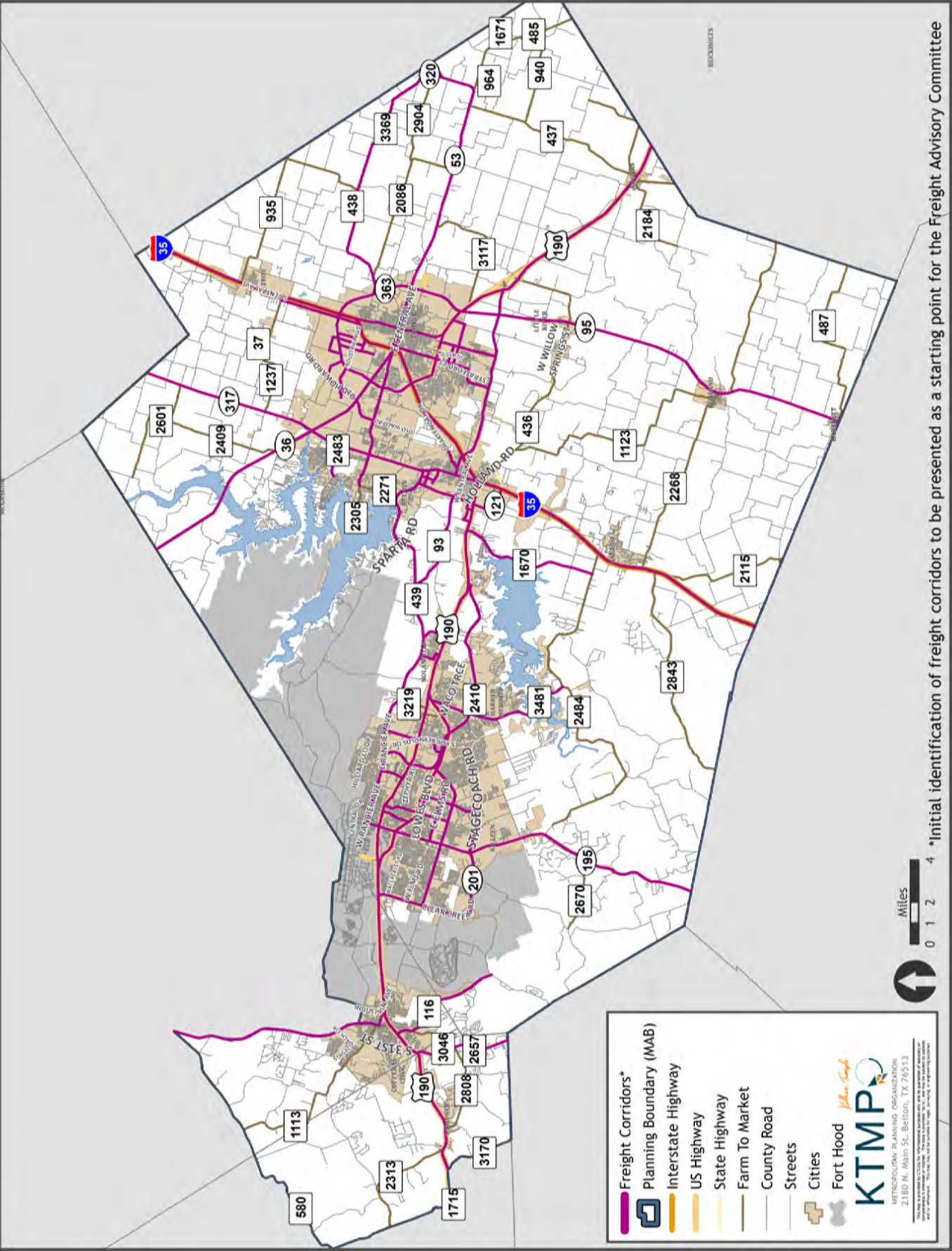
Draughon Miller began as an Army airfield in 1942 and has grown to a total of 922 acres with runway 15/33 measuring 7,000 feet by 150 feet and runway 2/20 measuring 4,740 feet by 100 feet. For the 12 month period ending May 31, 2010, the airport had 48,276 aircraft operations (an average of 132 per day). Draughon Miller has been owned by the City of Temple since the closure of World War II. In 2010 there were 227 aircraft based at the airport. Operations consisted of 85% general aviation and 15% military. There is no future expectation of freight operations for this facility.

## NEXT STEPS

KTMPO staff have been in contact with economic developers, manufacturing managers, airport and motor coach facilities in an effort to identify future Freight Advisory Workgroup members. It is the intent of KTMPO staff to have a workgroup assembled by May 2014. Initial work from the group will be identification of the freight corridors within the region. Exhibit 7.1 depicts the draft freight network that will be discussed with the Freight Advisory Workgroup for further refinement. The needs of the freight community should be communicated through the workgroup to the KTMPO Technical Advisory Committee and the Transportation Planning Policy Board.

The identification of future expansions and descriptions of the trucking, rail and air industry facilities have been discussed in this chapter. KTMPO staff will continue coordination efforts with managers regarding plans to expand their facilities to accommodate projected growth in the KTMPO region.

Exhibit 7.1: Freight Corridors



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# Safety & Security



The Killeen-Temple Metropolitan Planning Organization has a goal to improve the safety of all modes of transportation in the region, which confirms that **maintaining the well-being of the KTMPO public as they travel throughout the region is a priority**. Safety and security programs provide data and insight on areas of concern and offer proactive and reactive ways to ensure the safety of the transportation users.

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According to the Federal Highway Administration's Code of Federal Regulations regarding the development and content of the metropolitan transportation plan:

*The metropolitan transportation plan should include a safety element that incorporates or summarizes the priorities, goals, countermeasures, or projects for the MPA contained in the Strategic Highway Safety Plan required under 23 U.S.C. 148, as well as (as appropriate) emergency relief and disaster preparedness plans and strategies and policies that support homeland security (as appropriate) and safeguard the personal security of all motorized and non-motorized users.*

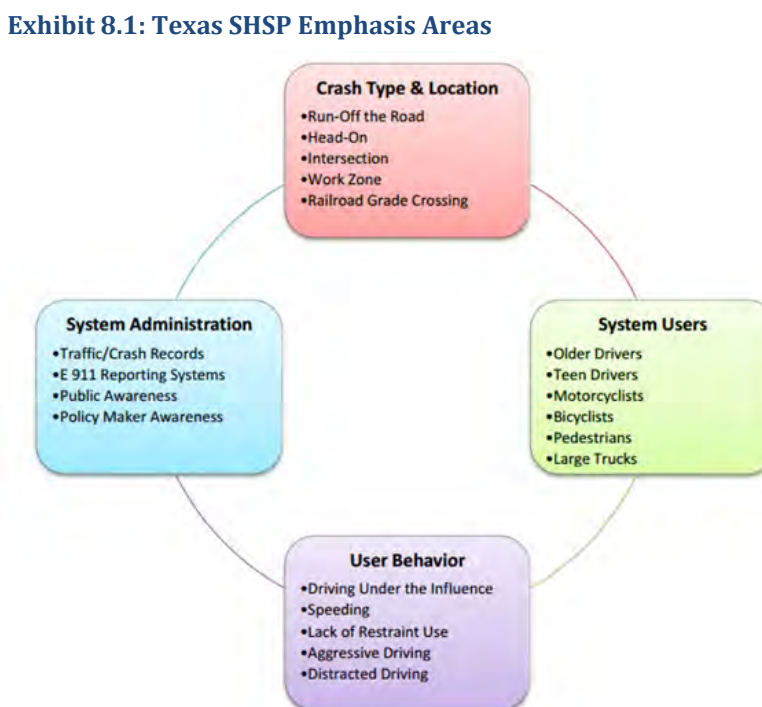
Code of Federal Regulations, Highways, Title 23, sec. 450.322.

The information obtained by safety and security programs should be implemented into every project planning effort and considered during every phase of the process. The awareness of safety issues and security plans that are unique to the Killeen-Temple region will better inform both the decision makers and public in future efforts to maintain the well-being of its citizens.

## SAFETY

The Highway Safety Improvement Program (HSIP), established by SAFETEA-LU in 2005, focuses on reducing traffic fatalities and serious injuries on all public roads. As a major piece of the HSIP, SAFETEA-LU requires all state DOTs to develop a Strategic Highway Safety Plan (SHSP) to identify state safety issues and needs and to guide planning decisions. TxDOT's initial Strategic Highway Safety Plan, approved in 2006, details the crash data analysis, stakeholder surveys, and workshops of safety professionals that were used to assist TxDOT in the identification of special highway safety emphasis areas. Since then, the Texas Strategic Highway Safety Plan: A Report for Progress and Future Objectives was published in September of 2012 as an update to the initial 2006 document, and is the current publication.

KTMPO utilizes the Texas SHSP as a guidebook in the safety analysis of its regional infrastructure. The roadway safety emphasis areas help staff focus analysis on particular crash types and locations, system users, user behaviors, and system administration, as is detailed in Exhibit 8.1 to the right.



Source: Texas Strategic Highway Safety Plan: A Report for Progress and Future Objectives, September 2012, page 3.



## Public Feedback and Awareness

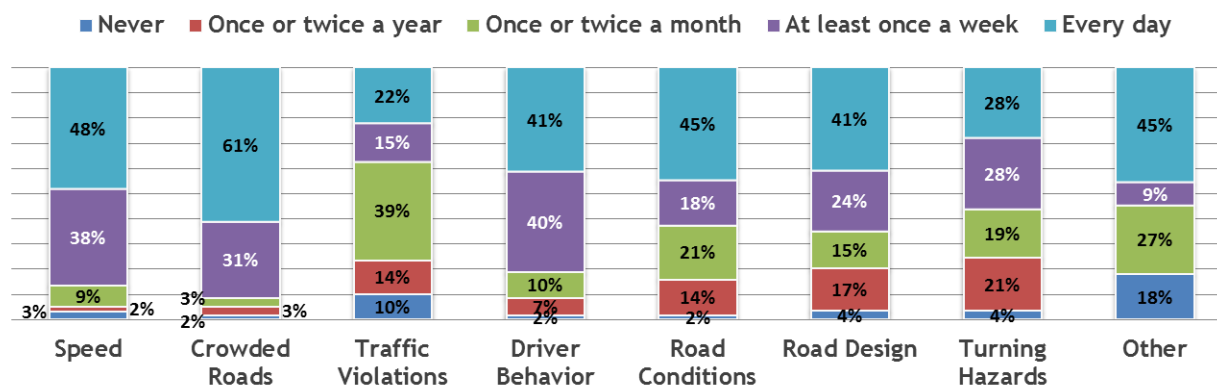
Obtaining data through the public's perception of safety issues ensures that KTMPO properly aligns its planning efforts with the voice of the people. The crash data that is maintained by TxDOT can be verified by the comparison of the technical and perceived data for a more reputable impression of what is happening in the region.

During the MTP public workshops that were held in May 2013, a Safety booth was prepared to facilitate the exchange of information between KTMPO staff and the public. Participants were educated on common safety issues on roadways and provided feedback to staff on observed issues in the KTMPO region. The survey solicited questions regarding the frequency of perceived safety issues (see Exhibit 8.2) and the effectiveness of safety infrastructure, while the maps allowed participants to tell where the safety issues commonly occur (see Exhibits 8.3 and 8.4).



More than 50% of participants said that the stated safety issues (with the exception of traffic violations [37%]) were a recurring problem, being observed at least once a week, and often every day.

**Exhibit 8.2: Public-Perceived Frequency of Safety Issues**



## Current Safety Conditions

KTMPO uses crash data from the Crash Records Information System (CRIS) database, which is maintained by TxDOT. This data comes directly from the CR-3 crash reports that are completed at the time of the incident by local law enforcement for all reported motor vehicle crashes. The most current years of data—2010, 2011, 2012—are being used in the analysis. From TxDOT's CRIS data and annual daily traffic counts (ADTs), a crash rate has been calculated for all projects nominated for inclusion in the project listing.

According to TxDOT's CRIS data, approximately 17,000 motor vehicle crashes occurred within the KTMPO region from 2010-2012. Exhibit 8.5 details the total number of crashes and the number of severe crashes per entity to provide a snapshot of where crashes are occurring in the KTMPO region. Severe crashes include reported fatalities and incapacitating injuries.



Exhibit 8.3: Public-Defined Locations of Safety Issues (East KTMP0 region)

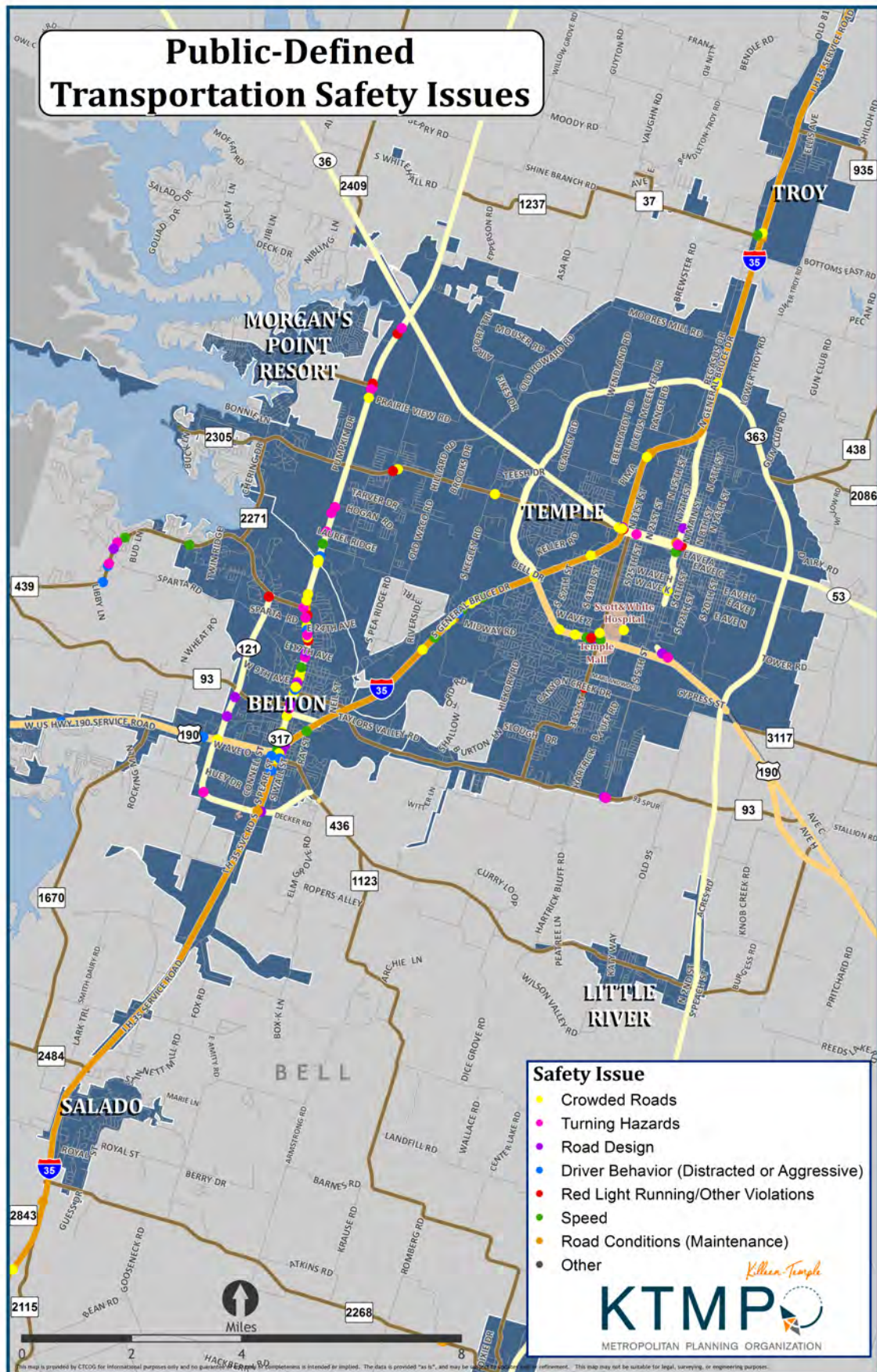
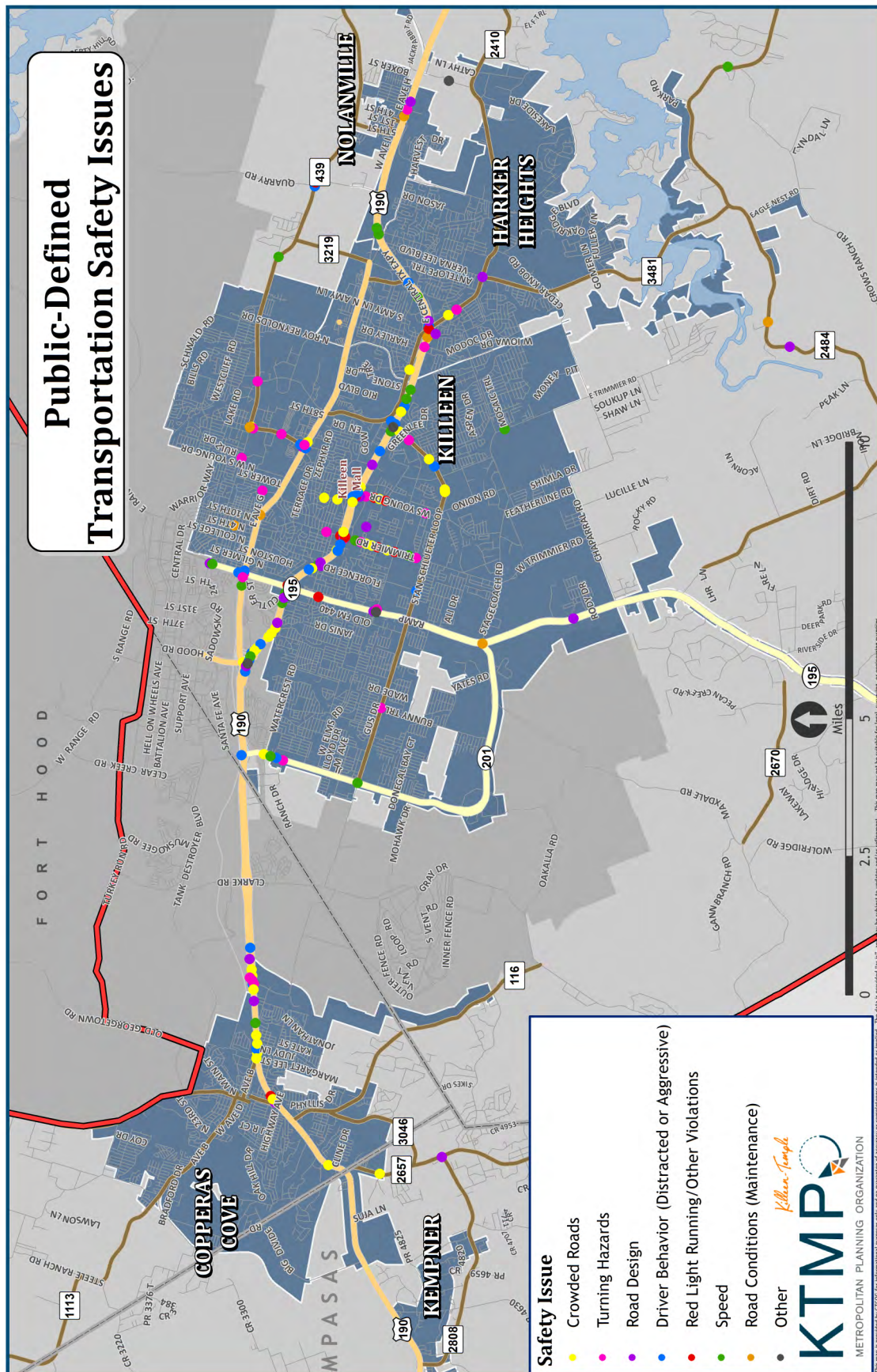





Exhibit 8.4: Public-Defined Locations of Safety Issues (West KTMP0 region)





### Exhibit 8.5: Crashes per Entity

	2010-2012 CRASHES				2010-2012 SEVERE CRASHES			
	2010	2011	2012	2010-2012	2010	2011	2012	2010-2012
	Total	Total	Total	Total	Total	Total	Total	Total
KTMP Planning Area	6,184	5,100	5,802	17,086	236	242	274	752
<b>CITY</b>								
Killeen	2,334	1,901	2,010	6,245	86	96	84	266
Temple	1,241	976	1,197	3,414	42	43	61	146
Copperas Cove	652	511	586	1,749	15	13	9	37
Harker Heights	349	305	373	1,027	10	11	18	39
Belton	502	412	553	1,467	18	18	25	61
Nolanville	63	56	56	175	3	5	5	13
Salado	60	56	73	189	3	1	2	6
Troy	89	96	64	249	1	2	3	6
Holland	10	1	2	13	2	0	0	2
Rogers	16	10	14	40	0	1	2	3
Little River-Academy	4	10	10	24	0	2	0	2
Morgan's Point Resort	6	8	5	19	0	0	0	0
Kempner	12	5	6	23	0	0	0	0
Bartlett	1	1	1	3	0	0	0	0
Rural	845	752	852	2,449	56	50	65	171

The knowledge of the geographic location of a crash is the first step in determining the safety issue at hand. Staff has used the CRIS data to create heat maps showing the concentration of crashes in the region at intersections and along road segments. Further crash rate analysis was completed for intersections and segments with high crash numbers, as detailed in Exhibits 8.6 and 8.7, with corresponding maps in Exhibits 8.8 and 8.9. Furthermore, a comparison of the technical data and the geographic feedback received from the public workshops was completed to verify the safety issue locations provided by the public. Exhibit 8.10 shows the public-identified safety locations in conjunction with the crash density, with correlations identified. Though many of the public-identified safety locations were not confirmed with the technical data, several locations are in line with the identified high crash locations, including: 31st and Central Ave, SH 195 and US 190 Frontage Road, FM 2410 and US 190 Frontage Road, and along particular segments of W. Trimmier Rd. and W.S. Young Dr.

#### Exhibit 8.6: High Crash Intersection Locations

Intersection	City	Crashes (2010-2012)	Crash Rate
31st St and Central Ave	Temple	257	16.19
IH 35 Frontage Road and US 190	Belton	102	9.32
US 190 Frontage and Stan Schlueter	Killeen	196	7.46
US 190 Frontage Road and FM 2410	Harker Heights	173	5.45
SH 195 and US 190 Frontage Road	Killeen	122	4.46
South Loop 363 and IH 35 Frontage Road	Temple	102	2.82

#### Exhibit 8.7: High Crash Roadway Segment\* Locations

Highway or Road Name	City	Crashes (2010-2012)	Crash Rate
Trimmier Rd	Killeen	127	8.63
SH 195	Killeen	168	7.24
WS Young Dr	Killeen	126	7.12
US 190	Killeen	433	6.12
Stan Schlueter (FM 3470)	Killeen	121	5.16
IH 35	Belton	169	2.00
US 190	Killeen	345	1.83



\*See Exhibit 8.9 for segment extents

Exhibit 8.8: High Crash Intersection Locations

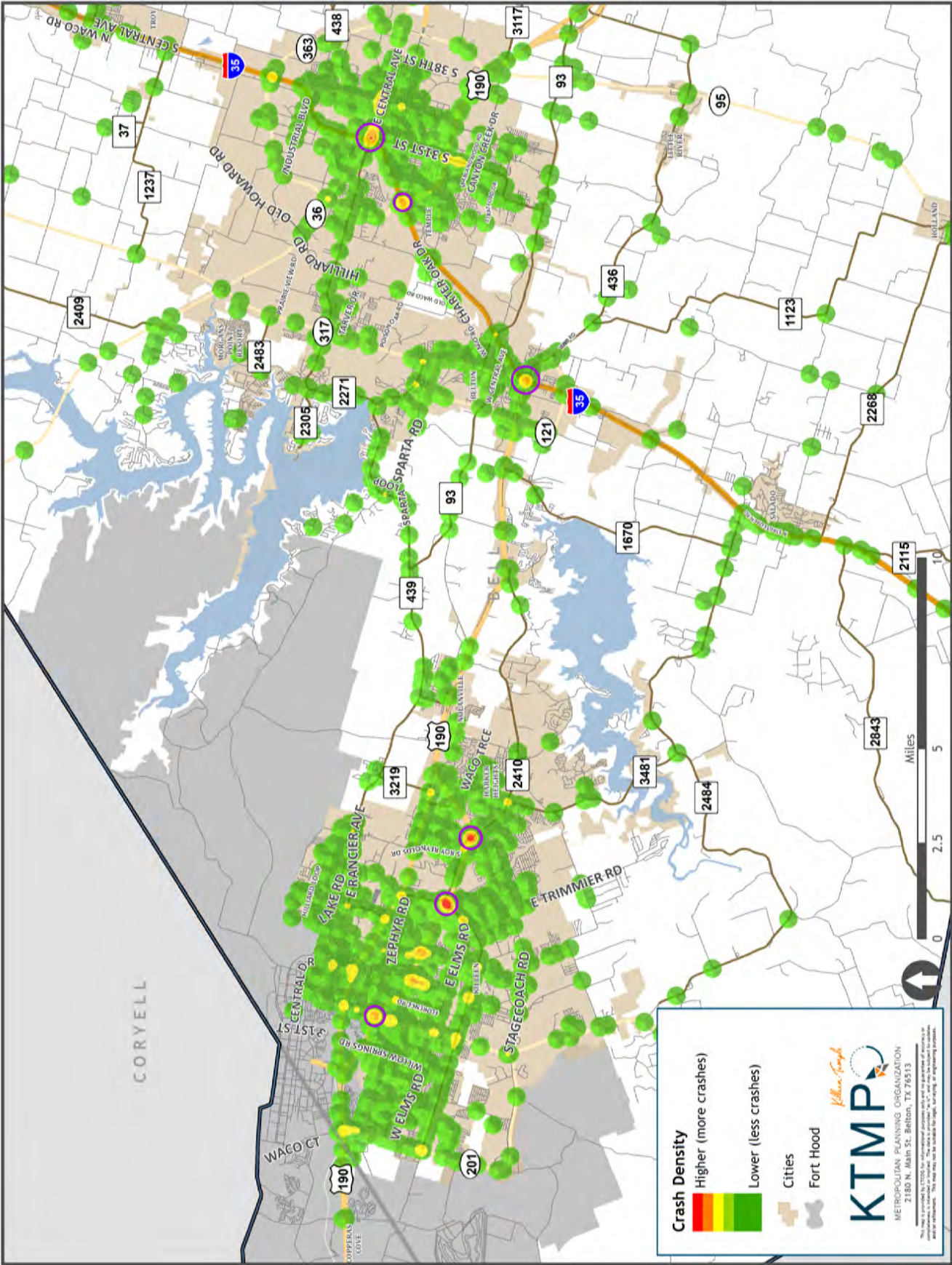




Exhibit 8.9: High Crash Roadway Segment Locations

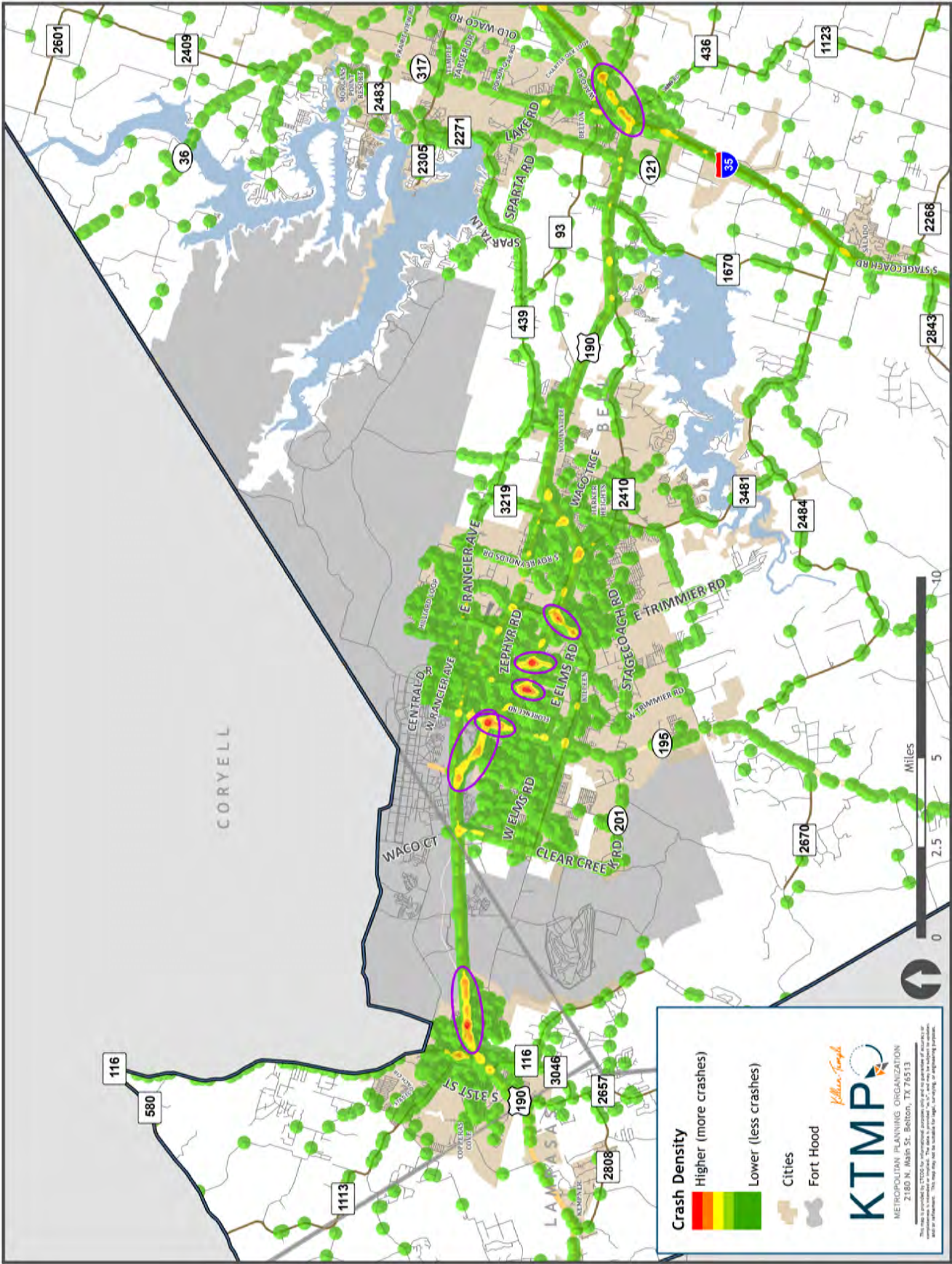
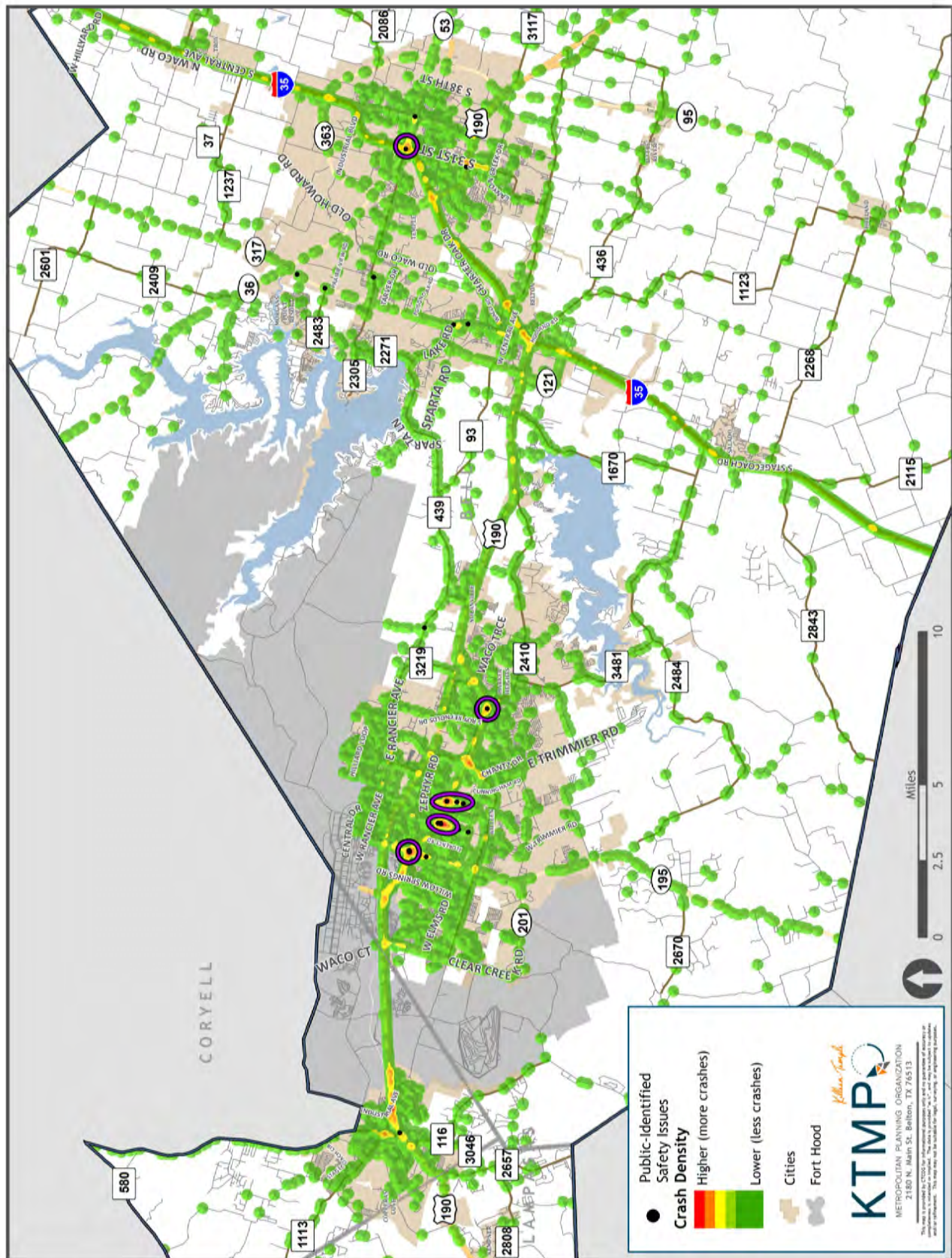




Exhibit 8.10: Crash Density vs. Public-Defined Safety Issues



## Planning Considerations

KTMPO uses the Texas SHSP emphasis areas as a shell for determining its regional emphasis areas. Exhibit 8.11 shows the prevalence of crashes for the emphasis areas identified by the Texas SHSP. Of these emphasis areas, those with at least 15% of total crashes in the KTMPO region are identified below as the most common location, system user, and user behavior in motor vehicle crashes in the region. These statistics help to narrow the focus of future safety planning efforts by concentrating on the trends unique to the region.

### Location & Type

- Intersection (42%)
- Run Off the Road (19%)

### System User

- Teen Drivers (17%)

### User Behavior

- Driver Error (43%)
- Speeding (36%)

KTMPO will provide significant results from the analysis to relevant planning partners. Some recommendations may be made to reduce the recurrence of crashes at particular locations, such as:

- Upgrades to existing transportation infrastructure
- Modification or implementation of safety infrastructure
- Creation of alternative routes to alleviate congestion
- Public campaigns promoting a particular safety issue
- Requirement of the use of motorcycle and bicycle safety gear
- An assessment of the transportation network to determine driver decisions

**Exhibit 8.11: KTMPO Safety Emphasis Areas**

	EMPHASIS AREA	TOTAL CRASHES (2010-2012)	PERCENTAGE (of all crashes)
Location & Type	Intersection	7188	42%
	Run-off-Road (ROR)	3273	19%
	Construction Zone	632	4%
	Head-On	250	1%
	Railroad	27	< 1%
System User	Teen Drivers	2980	17%
	Older Drivers	1879	11%
	Motorcycle	641	4%
	Large Truck	453	3%
	Pedestrian	146	1%
	Pedacyclist	66	< 1%
User Behavior	Driver Error*	7408	43%
	Speeding	6128	36%
	Distracted Driving	984	6%
	Impaired Driving	487	3%
	Road Rage	12	< 1%

\*Driver violations other than speeding, road rage, and distracted or impaired driving, such as failing to yield, unsafe parking, turning improperly, disregarding a stop, etc.

The improvement of transportation safety is an ongoing process that requires collaboration with all transportation decision makers in the KTMPO region. Continuing efforts will assist this process as new issues are discovered or updated data can be obtained to inform new decisions.

A large part of safety on the roads involves the attention and attitude of the transportation users. Successful safety programs also incorporate a public education element to help the KTMPO public make informed decisions in its driving behavior. KTMPO will continue to push information from national and state safety organizations and keep the public aware of safety issues in our region via online social media methods and in line with the public involvement process.

## SECURITY

The transportation system is vital to our defense yet is extremely vulnerable to disaster or attack due to its large spread and accessibility. Effective management is important for the system's preparedness and ability to respond and recover from an event in order to maintain the well-being of the transportation system users.

### Coordination Efforts

Security planning starts at the local, municipality level, and progresses up to the state, and eventually, federal level. Coordination amongst the cities, neighboring counties, and the state must occur because the geographic extent of a disaster cannot be predicted. KTMPO works closely with the Homeland Security division of the Central Texas Council of Governments (CTCOG) to increase awareness of the transportation system's role in the security of the region's citizens. CTCOG's Homeland Security division works with the Emergency Management Coordinators of all counties of the CTCOG region and serves as a central clearinghouse for the emergency and evacuation plans of each county. At the MPO level, the information from these plans allows transportation planners to assess the ability of the system to respond to an event as the plan details. The following routes are considered the major evacuation routes of the KTMPO region: **IH 35, US 190, US 190/SH 36, SH 95, FM 93, and FM 2268**. Bell County's plan, specifically Annex E, details potential evacuation areas with hazardous material locations and evacuation routes as shown below in Exhibit 8.12:

**Exhibit 8.12: Potential Evacuation Areas (Hazardous Materials)**

ID	Name	Description	Hazard	Estimated Population	Evacuation Routes	Estimated Evacuation Time
E-1	Holland	Best Butane Company, 100 Fannin St.	Butane	500 Homes, 1100 People	Hwy 95, FM 2268 (other routes to be selected based on wind conditions)	3 hours
E-2	Heidenheimer	Blue Bonnet Grain and Storage	Numerous fertilizer chemicals	100 Homes, 950 people	Hwy 36, FM 93 (other routes to be selected based on wind conditions)	3 hours
E-3	Temple, Troy, Belton, Nolanville, Harker Heights, Killeen	BNSF Railroad, cross county railroad system	Transportation of multi-hazard chemicals	will vary by location	To be selected based on wind conditions	5 hours
E-4	Brazos Cooperative	Fertilizer	Farm chemicals	will vary due to wind direction	FM 817 & River Road	4 hours
E-5	Belton	Brazos River Authority, 2406 E 6th, Waste Treatment Plant	Chlorine	7000 homes 14,600 people	E. 6th, IH 35 South, IH 35 North	6 hours
E-6	Holland	Chemical Supply Co., 901 Lexington	Chlorine, Calcium Hypochlorite	100 homes, 950 people	Hwy 95 (other routes to be determined at time of evacuation)	5 hours
E-7	Pendleton	Lone Star Gas Co., Bell County Pipeline Distributor	Natural and other gases	Number will be determined by location and wind direction	Refer to company pipeline maps	TBD
E-8	Pendleton	Pendleton Agri. Supply	Agri chemicals	150 Homes, 350 People	IH 35 South and North	4 hours
E-9	Pendleton Water Supply	Pendleton water supply, water distributor	Chlorine	150 Homes, 350 People	IH 35 North and South	TBD



## Flood Monitoring

Monitoring was recently enhanced in flood prone areas to gauge water levels, providing advanced notice for thoroughfare closure and evacuation. In the MPO area, USGS has established six monitors, 5 of which are in close proximity to major roadways as described below:

- *IH 35*
  - ⇒ Leon River near Belton
  - ⇒ Lampasas River near Belton
  - ⇒ Salado Creek in Salado
- *US 190*
  - ⇒ Lampasas River near Kempner
- *SH 95*
  - ⇒ Little River near Little River-Academy

Additional locations in the rural areas are currently utilized by emergency responders and planners involved in flood mitigation.

## Scenario Planning

Recently, CTCOG's Homeland Security division performed several security scenario planning exercises to estimate the impact to people and infrastructure in the event of security and natural disasters. Geospatial analysis was performed to predict the people involved, infrastructure damage, and roadways affected. Emergency coordinators were given an advanced look at the following:

- The effect an F5 tornado would have on the Killeen urbanized area;
- The situation caused by active shooters at the annual 4<sup>th</sup> of July Parade in Belton;
- The threat zone and congestion situation from a methanol truck spill on the intersection of IH 35 and SE Loop 363 in Temple;
- The impacts of flooding of Nolan Creek.

## Fort Hood

Fort Hood makes a concerted effort to ensure the safety and security of the military community, both on-post and in the surrounding area. They employ various levels of Force Protection conditions, and in the most threatening emergencies they will elect to seal the facility from all traffic, in or out. This notification is pushed out to local law enforcement and other emergency communications outlets. KTMPO is willing to assist in public messaging to inform local motorists when such a lockdown takes place, in order to prevent excessive congestion that may form at the Access Control Points from backing up onto local streets and highways.

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# Congestion Management



**Congestion management is the application of strategies to improve transportation system performance and reliability by reducing the adverse impacts of congestion on the movement of people and goods.** The Congestion Management Process (CMP), as defined in federal regulation, is intended to serve as a systematic process that provides for safe and effective integrated management and operation of the multimodal transportation system.



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## PROCESS

A CMP is required in Transportation Management Areas (TMAs), which are metropolitan areas with a population exceeding 200,000. Federal requirements also state that in all TMAs, the CMP shall be developed and implemented as an integrated part of the metropolitan transportation planning process. KTMPO was designated a TMA in 2012 as a result of data from the 2010 US Census which shows the general population of the KTMPO planning area at 365,882. Steps involved in the Congestion Management Process, as outlined in federal regulation, are identified and discussed below.



**Develop Objectives** - It is important to consider, "What is the desired outcome?" and "What do we want to achieve?" It may not be feasible or desirable to try to eliminate all congestion, and so it is important to define objectives for congestion management that achieve the desired outcome. Some MPOs also define congestion management principles, which shape how congestion is addressed from a policy perspective.

**Define Network** - This process involves answering the question, "What components of the transportation system is the focus?", and involves defining both the geographic scope and system elements (e.g., freeways, major arterials, transit routes) that will be analyzed in the CMP.

**Develop Performance Measures** - The CMP will address, "How do we define and measure congestion?" This process involves developing performance measures that will be used to measure congestion on both a regional and local scale. These performance measures should relate to, and support, regional objectives.

**Collect Data/Monitor System Performance** - After performance measures are defined, data should be collected and analyzed to determine, "How does the transportation system perform?" Data collection may be on-going and involve a wide range of data sources and partners.

**Analyze Congestion Problems and Needs** - Using data and analysis techniques, the CMP should address the questions, "What congestion problems are present in the region, or are anticipated?" and "What are the sources of unacceptable congestion?"

**Identify and Assess Strategies** - Working together with partners, the CMP should address the question, "What strategies are appropriate to mitigate congestion?" This action involves both identifying and assessing potential strategies, and may include efforts conducted as part of the MTP, corridor studies, or project studies.

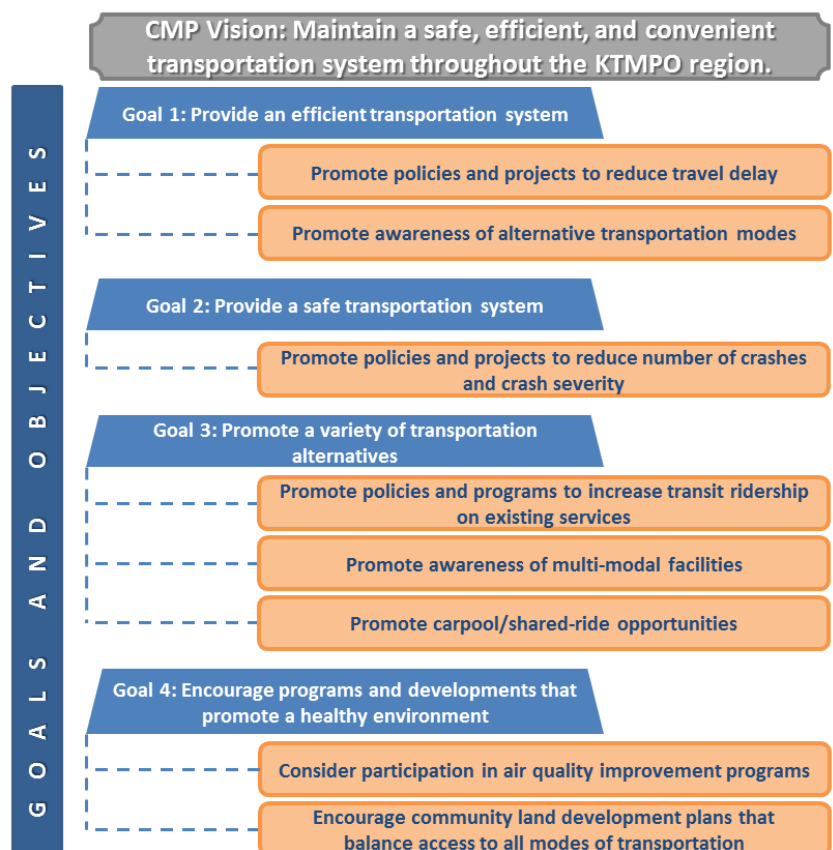
**Program and Implement Strategies** - This process involves answering the question, "How and when solutions will be implemented?" It typically involves including strategies in the MTP, determining funding sources, prioritizing strategies, allocating funding in the TIP, and ultimately, implementing these strategies.

**Monitor Strategy Effectiveness** - Finally, efforts should be undertaken to assess, "What have we learned about implemented strategies?" This process will be tied closely to monitoring system performance and is designed to inform future decision making about the effectiveness of transportation strategies.

KTMPO began development of the CMP in September 2012. The initial stage of KTMPO's CMP included developing a vision, goals and objectives; defining the CMP network; developing performance measures; developing a monitoring plan; and identifying possible congestion mitigation strategies.

## VISION, GOALS, AND OBJECTIVES

The CMP is an ongoing process which will be refined and re-evaluated as more information and data become available. The objectives define what the region wants to achieve in regard to congestion management, and are an essential part of an objectives-driven, performance-based approach to planning for operations. A set of Vision, Goals and Objectives for KTMPO's CMP was developed based on review of existing KTMPO planning documents to include the 2035 MTP. The MTP goals were reviewed and are the basis for the CMP vision, goals and objectives.

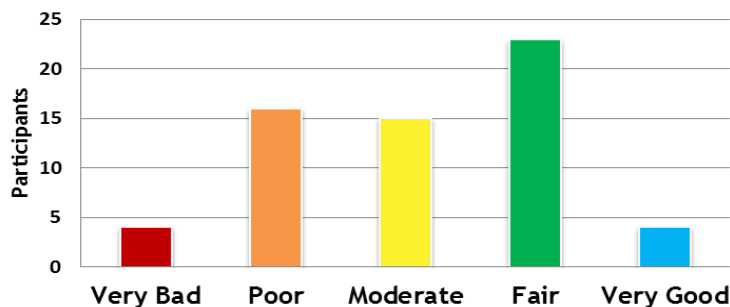




## Public Involvement

The CMP development process included soliciting public input through a series of public workshops on various transportation topics, including congestion. A total of five workshops were held during the month of May 2013 in the cities of Belton, Copperas Cove, Harker Heights, Killeen, and Temple. Maps of roadways throughout the region were disseminated to workshop attendees to collect their perceptions of congested locations. In this exercise participants were asked to place color-coded stickers on the maps to indicate the reason for the congestion as follows: accidents; too many vehicles; signal timing or speed limits; driver behavior (distracted or aggressive); construction areas; road design or turn lanes; major employers, entertainment, shopping areas; other/unsure. The

**Exhibit 9.1: Public's Overall View of Congestion in the Region**

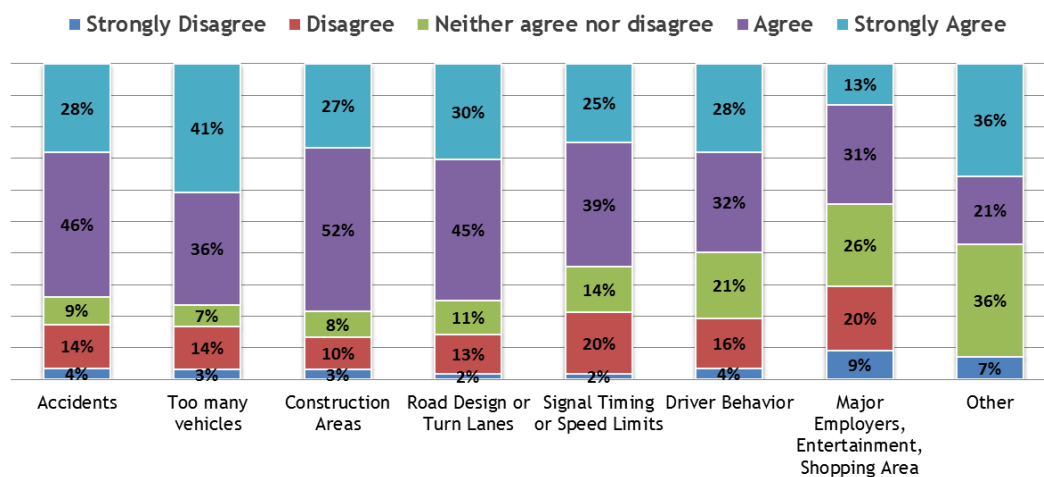


maps displayed on the following page depict the results of this exercise. Corridors with many dots are highlighted by black segments and callouts on the maps.

In addition to the maps, participants were asked to complete a survey with congestion-related questions. These included comments on the proposed CMP

goals and objectives, as well as defining congestion, identifying modes used to commute, rating overall level of congestion, and identifying reasons for congestion. As a whole, 43% of the participants rated congestion on the region's roadways as **Fair** or **Very Good**, while 32% rated it as **Poor** or **Very Bad**. At least 60% of all participants stated that they **Agreed** or **Strongly Agreed** that all noted factors are causes of congestion, with the exception of Major Employers, Entertainment, and Shopping Areas (44%).

**Exhibit 9.2: Public Perception of Cause of Congestion**



Congested corridors were also identified by the regional public transit provider—Hill Country Transit District (HCTD)—along with corridors considered by TxDOT to be among the top 500 congested roadways in the state. KTMPO Staff consolidated the lists of roadways provided by the public, HCTD, and TxDOT and presented the roadways to the KTMPO Technical Advisory Committee for their recommendation and approval by the Transportation Planning Policy Board. All of these efforts led to the identification of potentially congested corridors across the region for inclusion in the initial version of the CMP. The CMP was provided to the public for review and comment and was adopted by the TPPB at their October 16, 2013 meeting.

Exhibit 9.3: Public-Defined Congestion Areas (IH 35 Corridor)

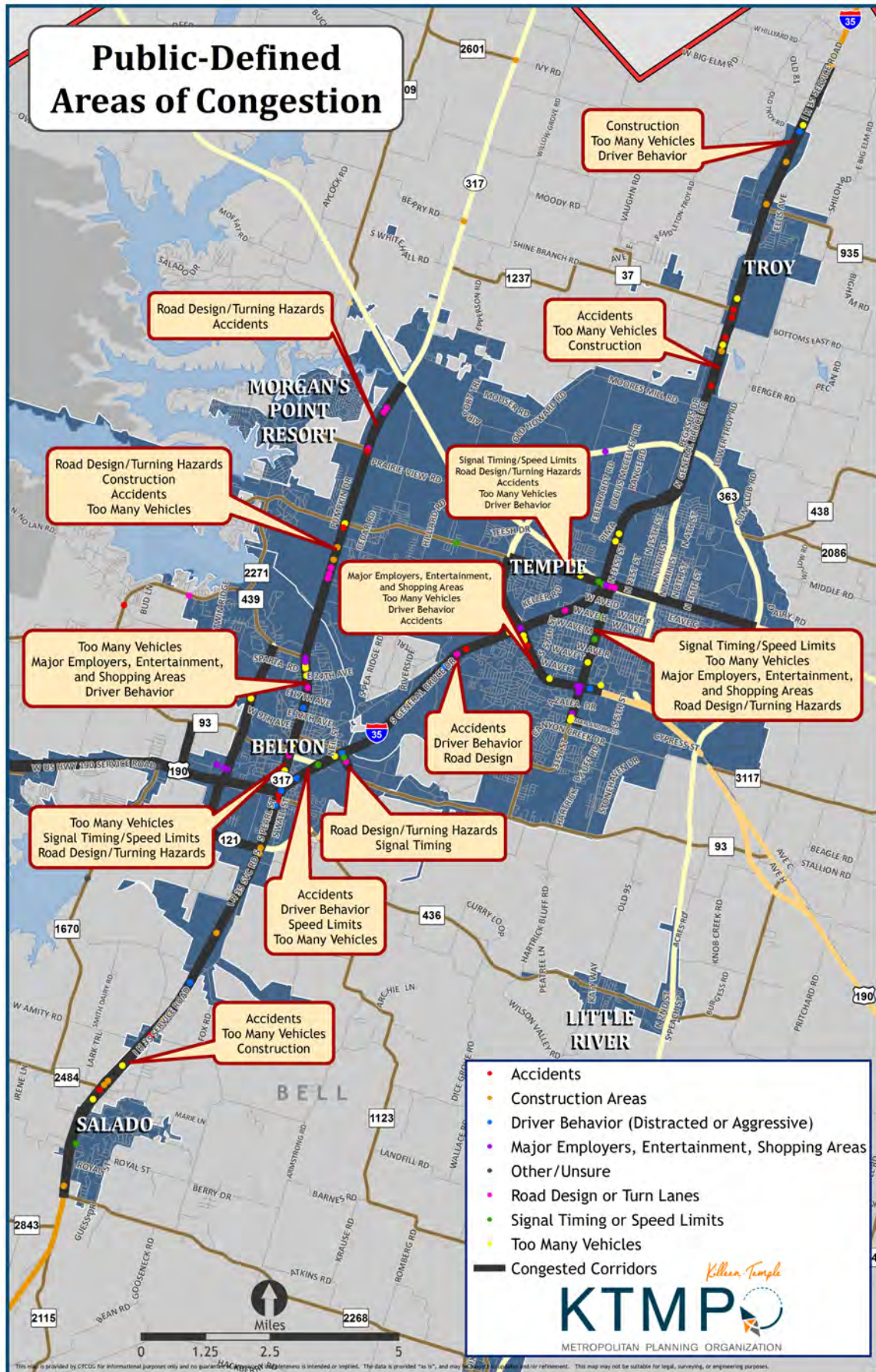
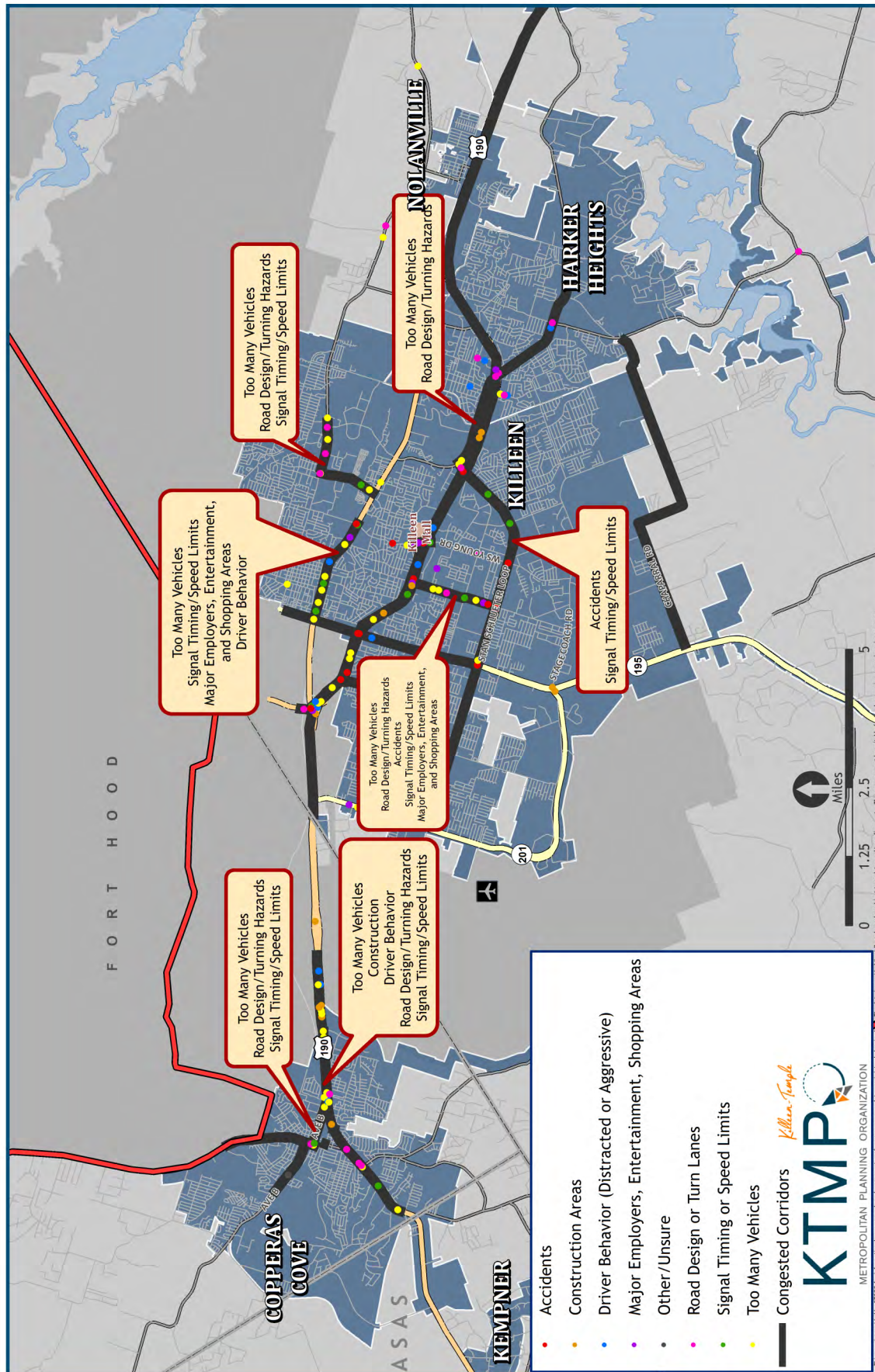




Exhibit 9.4: Public-Defined Congestion Areas (US 190 Corridor)





**Exhibit 9.5: List of Congestion Areas Defined by Public, HCTD, and TxDOT**

## Public-Defined Areas of Congestion

### Copperas Cove Area

- ◆ US 190 through Copperas Cove (Clarke Road to Lampasas Co. line)
- ◆ Ave B/1<sup>st</sup> Street intersection

### Killeen Area

- ◆ US 190 from Business 190 to FM 2410
- ◆ Business 190 from US 195 to east of 38<sup>th</sup> Street
- ◆ 38<sup>th</sup> Street to FM 439
- ◆ FM 439 from 38<sup>th</sup> Street to East Side Drive
- ◆ Trimmier from US 190 to Stan Schlueter
- ◆ Stan Schlueter from Trimmier to US 190
- ◆ FM 2410 (MLK Blvd) from Stan Schlueter to US 190
- ◆ Loop 201 at 195 intersection and Bell Tower Drive intersection
- ◆ W S Young Drive from US 190 to Zephyr Road area
- ◆ FM 2410 and Verna Lee Blvd intersection
- ◆ FM 439 (Rancier Ave) near Root Ave and Henderson St

### Harker Heights Area

- ◆ Ann Blvd and Harley Drive vicinity
- ◆ Market Heights East and Indian Oaks Dr vicinity

### Nolanville Area

- ◆ FM 439 near Chalk Lane intersection

### Temple Area

- ◆ IH 35 from Leon River crossing to Berger Road, esp. Twin City Blvd intersection, Midway Drive intersection, Ave H intersection, Industrial Blvd intersection,
- ◆ SW Loop 363 from IH 35 to S 31st Street
- ◆ S 31st Street from Canyon Creek /Marlandwood area to Adams
- ◆ W Adams from 31st Street to Loop 363
- ◆ Hwy 36 at Old Howard Road intersection
- ◆ W Adams at S Cedar Road intersection and Sundance Drive intersection
- ◆ NW Loop 363 near Wendland Road/Eberhardt Road intersections
- ◆ SH 317 at Berry Road intersection and Ivy Road intersection

## Public-Defined Areas of Congestion (cont)

### Belton Area

- ◆ SH 317 from US 190 to SH 36
- ◆ IH 35 from US 190 intersection to Leon River crossing
- ◆ FM 439 at Sparta Road intersection and near Wild Wood Drive intersection
- ◆ Loop 121 and Powell Road intersection and north of W 9th Ave Intersection
- ◆ IH 35 intersection with SH 93

### Troy Area

- ◆ IH 35 from Berger Road to Hillyard Road

### Salado Area

- ◆ IH 35 from Thomas Arnold to Elmer King
- ◆ FM 3481 intersection with FM 2484

## Transit-Defined Areas of Congestion

Hill Country Transit District identified the following congested areas in the region.

- ◆ SH 53 from US 190 to East Loop SL 363
- ◆ SH 317 from US 190 to Lake Road
- ◆ SH 317 from Lake road to SH 36
- ◆ SH 195 FM 3470 to US 190
- ◆ SH 195 from US 190 to FM 439
- ◆ FM 3470 from SH 201 to SH 195
- ◆ FM 3470 from SH 195 to FM 2410
- ◆ FM 2410 from Ann Boulevard to FM 3481
- ◆ FM 2410 from FM 3481 to Warriors Path Road

## TxDOT-Defined Areas of Congestion

The areas listed below are considered by TxDOT to be among the top 500 congested roadway segments in the state.

- ◆ IH 35 from FM 2268 to Main Street
- ◆ IH 35 from Main Street to US 190
- ◆ IH 35 from US 190 to SH 53
- ◆ IH 35 from SH 53 to North Loop SL 363
- ◆ US 190 from SS 172 to WS Young Drive
- ◆ US 190 from Paddy Hamilton Road to IH 35
- ◆ Willow Springs from Westwood Drive to US 190

## CMP NETWORK

KTMP staff reviewed the list of congested corridors identified by the public, transit provider, and TxDOT and compiled a comprehensive list of potential congested corridors for study, as shown in Exhibits 9.6 and 9.8. This list provides KTMP with a starting point, or draft network, to collect data on current and projected roadway conditions.

A future CMP network will be defined using resources such as the Travel Demand Model (TDM). KTMP anticipates receiving an updated Travel Demand Model during the latter part of 2014 which will aid in the evaluation of the CMP network. The collected data and use of the model will help determine the Level of Service (LOS) for these roadways which essentially defines how well the roadway performs.

LOS definitions are shown in Exhibit 9.7 and range from A—Excellent (no congestion) to F—Severely Congested, describing operational conditions within a traffic stream, generally described in terms of speed and travel time, freedom to maneuver, traffic interruptions, comfort and convenience, and safety. At the planning level, corridor level of service is typically determined by the roadway volume and capacity it carries and can accommodate. At the operational level, corridor level of service may be more appropriately assessed using travel speed.

**Exhibit 9.6: CMP List of Potential Congested Corridors for Study (Draft Network)**

- IH 35 from FM 2268 to Hillyard Road
- US 190 from Lampasas Co. line to IH 35
- SH 317 from US 190 to SH 36
- Business 190 from US 195 to WS Young
- SH 195 from FM 3470 to Rancier
- FM 3470 from SH 201 to US 190
- FM 2410 from Ann Blvd to Warriors Path Road
- SH 53 from IH 35 to East Loop SL 363
- FM 2305 from SW Loop 363 to 31<sup>st</sup> Street
- Loop 363 from FM 2305 to 5<sup>th</sup> Street
- W. Trimmer Road from FM 3470 to US 190
- FM 439 from 38<sup>th</sup> Street to East Side Drive
- 38<sup>th</sup> Street from Business 190 to FM 439
- 31<sup>st</sup> Street from Canyon Creek Drive to FM 2305
- Willow Springs Road from Westwood Drive to US 190
- Avenue D from US 190 to N. 1<sup>st</sup> Street

**Exhibit 9.7: Level of Service Definition**


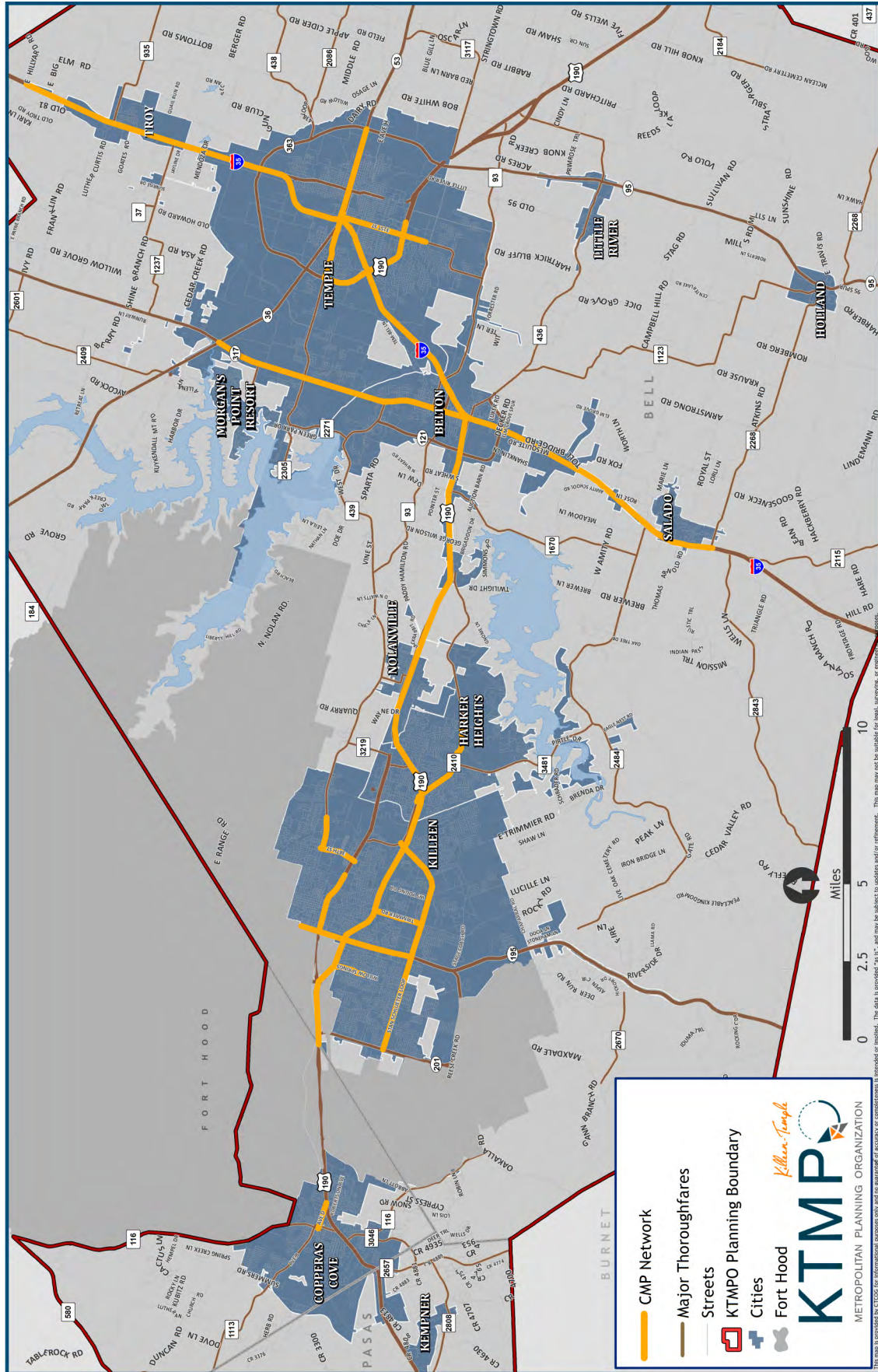
<b>A</b>	<b>Excellent</b> Very low vehicle delays, free traffic flow, signal progression extremely favorable, most vehicles arrive during given signal phase.	 <p>Free Flow</p> <p>Severe Congestion</p>
<b>B</b>	<b>Good</b> Good traffic flow, good signal progression, more vehicles stop and experience higher delays than for LOS A.	
<b>C</b>	<b>Average</b> Stable traffic flow, fair signal progression, significant number of vehicles stop at signals.	
<b>D</b>	<b>Acceptable</b> Noticeable traffic congestion, longer delays and unfavorable signal progression, many vehicles stop at signals.	
<b>E</b>	<b>Congested</b> Unstable traffic flow, poor signal progression, significant congestion, traffic near roadway capacity, frequent traffic signal cycle failures.	
<b>F</b>	<b>Severely Congested</b> Unacceptable delay, extremely unstable flow, heavy congestion, traffic exceeds roadway capacity, stop-and-go conditions.	



Exhibit 9.8: CMP Network





Level of service may also be defined for intersections. Level of service for unsignalized and signalized intersections is based on control delay. In general, control delay is the difference between the travel time actually experienced to the travel time experienced under ideal conditions in the absence of traffic control, geometric delay, incidents, and other vehicles. At signalized intersections level of service is defined for the intersection as a whole or individual approaches based on average control delay. Control delay reflects the combined impact of a number of variables including cycle length, deceleration and acceleration delay, stopped delay, and the volume to capacity ratio for the lane group or approach in question. Exhibit 9.9 shows the signalized intersection traffic flow characteristics for each LOS value based on average delay for vehicles (in seconds).

**Exhibit 9.9: Level of Service and Traffic Flow Characteristics**

Level of Service	Average Delay (seconds per vehicle)	Traffic Flow Characteristics
<b>A</b>	$\leq 10$	Most vehicles arrive during the green phase and do not stop at all
<b>B</b>	$>10 - \leq 20$	More vehicles stop, causing higher delay
<b>C</b>	$>20 - \leq 35$	Vehicle stopping is significant, but many still pass through the intersection without stopping
<b>D</b>	$>35 - \leq 55$	Many vehicles stop, and the influence of congestion becomes more noticeable
<b>E</b>	$>55 - \leq 80$	Very few vehicles pass through without stopping
<b>F</b>	$>80$	Considered unacceptable to most drivers. Intersection is not necessarily over capacity, even though arrivals exceed capacity of lane groups

Source: Highway Capacity Manual (HCM)

To determine signalized intersection LOS, Highway Capacity Software (HCS) or Synchro is required and the following data (inputs) are needed:

#### **Traffic Conditions**

- ⇒ Approach volumes (left, through, right)
- ⇒ Vehicle type
- ⇒ Location of bus stops

#### **Roadway Conditions**

- ⇒ Number and width of lanes
- ⇒ Grades
- ⇒ Lane use (including parking lanes)

#### **Signal Conditions**

- ⇒ Signal phasing
- ⇒ Signal timing
- ⇒ Type of control
- ⇒ Signal progression

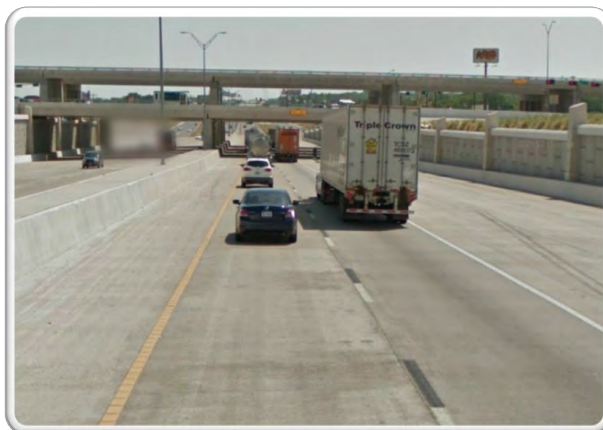
Travel Time Runs are also being used to evaluate roadway performance. Travel time measures focus on the time needed to travel along a selected portion of a highway corridor. Common variations of travel time measures include the following and may be used for specific roadway segments, intersections, or corridors:

- Travel time – the amount of time needed to traverse a corridor segment
- Travel speed – the length of a segment divided by the travel time
- Average delay – the difference between travel time and acceptable or free-flow travel time
- Travel time index – ratio of peak-period to non-peak-period travel time

Another resource available to KTMPO is TxDOT/FHWA data. TxDOT and FHWA have recently announced that they anticipate making certain types of data available to MPOs. These data depict travel delays for roads and are collected by private companies using a variety of global positioning system (GPS) sources. The data are collected primarily on freeways and principal arterials using GPS fixtures on large trucks and cell phones that have mapping and GPS services activated in all types of vehicles. In some cases these will be the only data available for roads and in other cases these data will serve as comparisons to other type of data that KTMPO collects or obtains.

It is important to keep in mind that no single source or type of congestion monitoring data tells the complete story about congestion and travel delays. The combined use of multiple data sources is vital to the continuing, dynamic congestion monitoring process.

All of these resources assist KTMPO staff in identifying roadways needing improvements. As the KTMPO region grows in population, new roadways will be needed and existing roadways expanded in order for our transportation system to meet specified performance measures. As such, the CMP network is dynamic and will be continually updated and revised.



## ACTION PLAN

KTMPO developed an Action Plan that outlines specific objectives and actions to be undertaken to achieve the stated vision, goals and objectives in the CMP. These are listed below.

### Goal 1: Provide an efficient transportation system

#### Promote policies and projects to reduce travel delay

##### Action:

- Identify five most congested locations during peak hour travel in order to reduce travel delay (segment, corridor, intersection).
- Collect travel time data as resources allow (can include Bluetooth, GPS, and similar means)
- Analyze travel time data to calculate delay and LOS
- Report observations, findings, potential treatments and costs within one year
- Notify responsible entities

#### Promote awareness of alternative transportation modes

##### Action:

- Identify alternative transportation modes on the KTMPO website.
- Provide information regarding passenger rail on the KTMPO website.
- Coordinate with cities to identify and promote use of hike/bike trails and pedestrian/bike friendly roadways.
- Identify and support “bike to work” days and similar events.
- Coordinate with HCTD to promote awareness of the need for public transit services in the KTMPO region.

### Goal 2: Provide a safe transportation system

#### Promote policies and projects to reduce number of crashes and crash severity

##### Action:

- Identify crash locations (up to five) where crashes most occur in order to reduce number of crashes and crash severity
- Collect and analyze crash data as resources allow
- Identify the causes of crashes
- Suggest tools and strategies to reduce crashes and crash severity
- Notify responsible entities



### Goal 3: Promote a variety of transportation alternatives

#### Promote policies and programs to increase transit ridership on existing services

##### Action:

- Coordinate with HCTD to identify areas of potential growth needed by the public transit system.
- Identify advantages in using public transit system on the KTMPO website.
- Coordinate with HCTD to identify policies that can help to promote transit ridership

#### Promote awareness of multi-modal facilities

##### Action:

- Identify benefits of multi-modal facilities on KTMPO website.
- Coordinate with city officials and KTMPO technical committee/policy board on benefits of multi-modal facilities.

#### Promote carpool/shared-ride opportunities

##### Action:

- Coordinate with city officials to promote ideas on carpool or shared ride opportunities
- Identify potential private sector partners in developing strategies to promote carpool/shared-ride opportunities
- Coordinate with public/private partners to identify common origins/destinations

### Goal 4: Encourage programs and developments that promote a healthy environment

#### Consider participation in air quality improvement programs

##### Action:

- Research Participation in air quality improvement programs
- Monitor results of Ozone monitoring stations in Killeen and Temple and inform public of results and implications, and possible actions to improve air quality.
- Obtain information regarding Ozone Advance program and present information to KTMPO technical committee/policy board.
- Work with city officials and KTMPO technical committee/policy board to reach consensus on appropriate action to be taken with regard to improving the region's air quality.

#### Encourage community land development plans that balance access to all modes of transportation

##### Action:

- Coordinate with cities to encourage inclusion of multi-modal transportation elements in development plans.

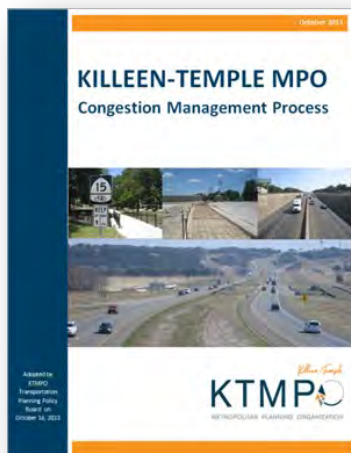
An annual Performance Report will be developed after the close of each fiscal year to report on the status of the Action Plan. This in turn will help identify appropriate revisions to the CMP to ensure congestion management is an ongoing process and may include various elements such as new objectives, performance measures, congestion network, strategies for mitigating congestion, etc.

## NEXT STEPS

MAP-21 placed increased emphasis on performance management within the Federal-aid highway and transit programs to achieve desired performance outcomes for the multimodal transportation system. Federal and state performance goals are currently under development; when finalized, they will be incorporated in the MPO's plans and processes such as the MTP, CMP, and TIP (Transportation Improvement Program).

The next stage of the CMP is to continue implementing the CMP Action Plan; continue collecting data on the CMP network and determine congestion problems and needs; identify and assess strategies to mitigate the congestion; program and implement the strategies; and then monitor and evaluate the strategy effectiveness.

Due to the timing of the CMP development, KTMPO staff was unable to collect data on the CMP network to use in the Mobility 2040 MTP project evaluation. However, data will be available for use as subsequent MTPs are developed and KTMPO will decide how this data can be best used in the evaluation of projects.



The approved Congestion Management Process and action plan is included as **Appendix G**.

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# Environment & Quality of Life



The environment in which we live includes a variety of features that may be natural or man-made, physical or perceived. **Protecting natural and cultural features and minimizing impacts of transportation projects on the environment are important considerations in transportation planning.** It is important to achieve a balance between economic development and mobility with the desire for a high quality of life that includes clean air and water, environmental preservation, and recreational opportunities.

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The definition of the word “environment” varies depending upon the context, but in general, it is the aggregate of surrounding things, conditions, or influences, i.e. the surroundings. These surroundings may be natural or man-made, physical or perceived. The environment in which we live affects our quality of life. This Chapter discusses a variety of environmental factors including air quality, climate change, planning and environmental linkages, sustainability, and context sensitive solutions.

## AIR QUALITY

KTMPO is bisected by IH 35, one of the nation’s busiest interstate corridors. An average of 65,000 vehicles pass through this corridor on a daily basis. The Killeen and Temple urbanized areas have experienced considerable growth during the past 10 years and growth is projected to continue. KTMPO is also located between two major urbanized areas (UZA)—Austin UZA to the south and Waco UZA to the north. These factors may have an impact on the air quality of the KTMPO region. As a result, KTMPO has been actively researching and monitoring air quality information to incorporate into regional planning efforts.

### Air Quality Standards

The Clean Air Act, which was last amended in 1990, requires the Environmental Protection Agency (EPA) to set National Ambient Air Quality Standards (NAAQS)(40 CFR part 50) for pollutants considered harmful to public health and the environment. The Clean Air Act identifies two types of national ambient air quality standards. **Primary standards** provide public health protection, including protecting the health of "sensitive" populations such as asthmatics, children, and the elderly. **Secondary standards** provide public welfare protection, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings. These standards are implemented by the EPA to assign limits to the amount of pollution that can be present in the atmosphere. Based on monitoring data, the EPA will determine whether a region is in compliance with the NAAQS. An area may be considered to be in nonattainment if the thresholds are exceeded.

EPA has set National Ambient Air Quality Standards for six principal pollutants, which are called "criteria" pollutants, as listed below:

- Carbon Monoxide
- Lead
- Nitrogen Dioxide
- Ozone
- Particulate Matter
- Sulfur Dioxide





Units of measure for the standards are parts per million (ppm) by volume, parts per billion (ppb) by volume, and micrograms per cubic meter of air ( $\mu\text{g}/\text{m}^3$ ). The NAAQS, as of October 2011, are shown in the following Exhibit 10.1.

**Exhibit 10.1: National Ambient Air Quality Standards (as of October 2011)**

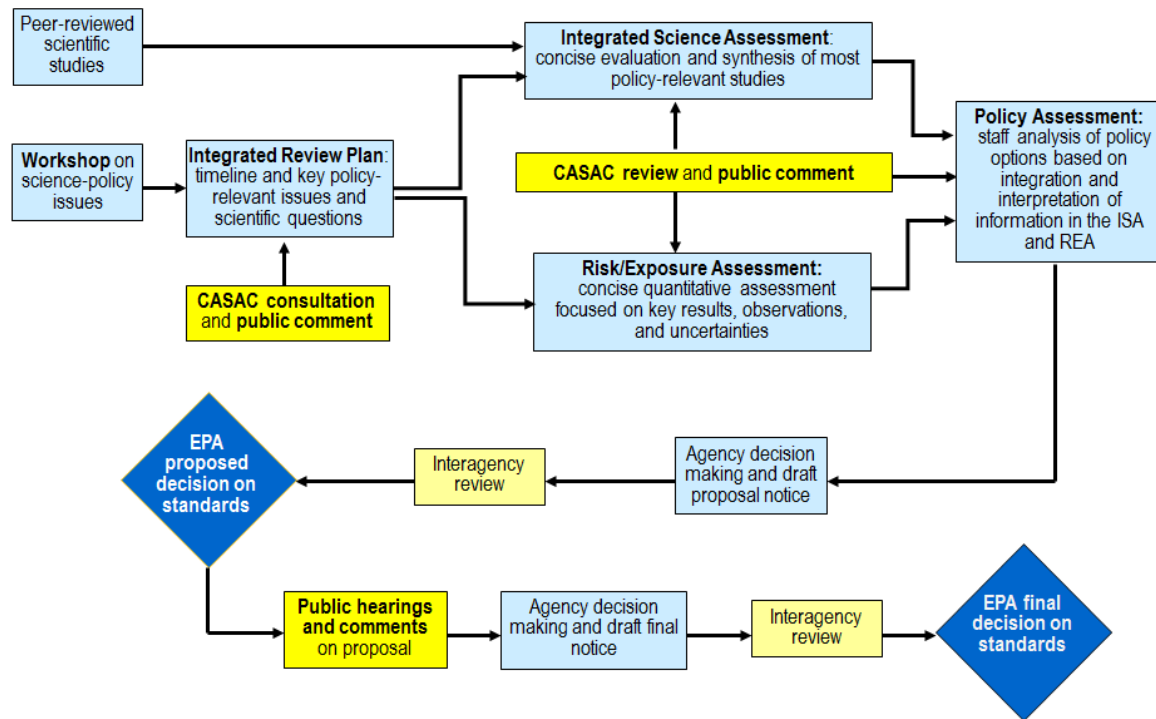
Pollutant [final rule cite]		Primary/ Secondary	Averaging Time	Level	Form
<b>Carbon Monoxide</b> [76 FR 54294, Aug 31, 2011]		primary	8-hour	9 ppm	Not to be exceeded more than once per year
			1-hour	35 ppm	
<b>Lead</b> [73 FR 66964, Nov 12, 2008]		primary and secondary	Rolling 3 month average	0.15 $\mu\text{g}/\text{m}^3$	Not to be exceeded
<b>Nitrogen Dioxide</b> [75 FR 6474, Feb 9, 2010] [61 FR 52852, Oct 8, 1996]		primary	1-hour	100 ppb	98th percentile, averaged over 3 years
		primary and secondary	Annual	53 ppb	Annual Mean
<b>Ozone</b> [73 FR 16436, Mar 27, 2008]		primary and secondary	8-hour	0.075 ppm	Annual fourth-highest daily maximum 8-hr concentration, averaged over 3 years
<b>Particle Pollution</b> Dec 14, 2012	PM <sub>2.5</sub>	primary	Annual	12 $\mu\text{g}/\text{m}^3$	annual mean, averaged over 3 years
		secondary	Annual	15 $\mu\text{g}/\text{m}^3$	annual mean, averaged over 3 years
		primary and secondary	24-hour	35 $\mu\text{g}/\text{m}^3$	98th percentile, averaged over 3 years
	PM <sub>10</sub>	primary and secondary	24-hour	150 $\mu\text{g}/\text{m}^3$	Not to be exceeded more than once per year on average over 3 years
<b>Sulfur Dioxide</b> [75 FR 35520, Jun 22, 2010] [38 FR 25678, Sept 14, 1973]		primary	1-hour	75 ppb	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		secondary	3-hour	0.5 ppm	Not to be exceeded more than once per year

The EPA is in the process of reviewing the NAAQS for ozone that were set in 2008. A reduction in the standards from 0.075 ppm to 0.060 - 0.070 ppm is under consideration. The illustration on the following page shows the steps involved in revising NAAQS standards. It is anticipated that proposed revised standards will be available December 1, 2014, with a final rule on the standards expected October 1, 2015.

### KTMP0 Air Quality

KTMP0 is currently in attainment for all criteria air pollutants. In 2007, an air quality monitoring station was established at Skylark Field in Killeen. A second monitoring station was established in October 2013, in Temple, at West Temple Park near Georgia Avenue. These are the only monitoring stations in the KTMP0 boundary and ozone is the only pollutant that is measured. Ozone forms when two types of pollutants, volatile organic compounds (VOC) and oxides of nitrogen, combine with sunlight and high temperatures. These pollutants are found in emissions from vehicles, construction equipment, lawn and garden equipment, sources that combust fuel such as industries and utilities, small industries such as gas stations and print shops, and consumer products including some paints and cleaners.

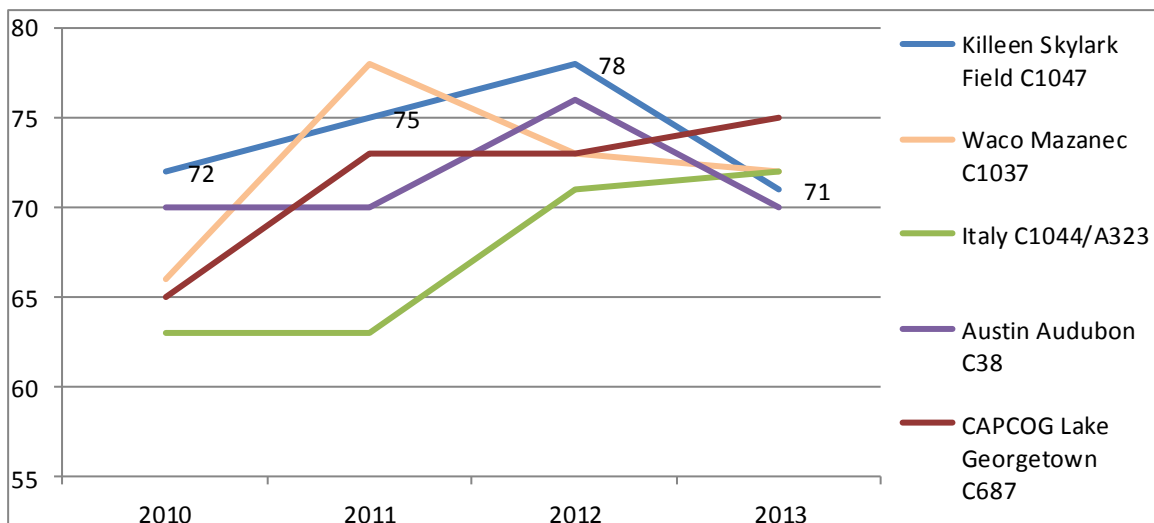
# Overview of NAAQS Review Process



1

Data collected from the monitoring stations is posted on the Texas Commission on Environmental Quality (TCEQ) website and is available for viewing by the public. These values are collected hourly and averaged over 8-hour blocks. At the end of the calendar year, the highest values are recorded and the 4<sup>th</sup> highest daily maximum 8-hour concentration is used for compliance calculations. Once three full years of data are available, the 4<sup>th</sup> highest values are averaged to determine compliance. Based on current standards, this average cannot exceed 0.075 ppm (75 ppb). If exceeded, the area is considered to be nonattainment for the ozone standard.

**Exhibit 10.2: Regional Ozone Monitor Data**



## Air Quality Related Information and Studies

**Air Quality—Next Steps Guide:** KTMPO contracted with a consulting firm in 2012 for assistance in assessing KTMPO's air quality issues and developing recommendations regarding future actions. The resulting report, Air Quality—Next Steps Guide, is attached as **Appendix H**. The report includes the following sections:

- **Introduction to Air Quality** – summary of overarching topics and terminology
- **Impacts for KTMPO** – potential actions and timelines involved with air quality nonattainment
- **Preparing for Air Quality Nonattainment** – summary of Ozone Advance program and next steps for MTP, TIP, and travel demand model
- **Transportation Conformity** – overview of conformity process for KTMPO
- **The MOVES Model** – summary of data needs and integration of the travel demand model
- **Potential Staffing Needs** – description of options for staffing to facilitate air quality modeling
- **Interagency Consultation** – discussion of participants in air quality consultation process

The report notes that KTMPO may face nonattainment if the NAAQS for ozone are revised to a standard lower than 0.075 ppm. As such, an important segment of the report addresses preparing for nonattainment status. Undertaking proactive measures to lower ozone concentrations and avoid designation as nonattainment is a key strategy. One tool available to KTMPO is the Ozone Advance program. This voluntary program has the following goals:

1. Help attainment areas take action in order to keep ozone levels below the level of the standard to ensure continued health protection
2. Better position areas to remain in attainment
3. Efficiently direct available resources toward actions to address ozone problems quickly

The Ozone Advance program offers participating entities the opportunity to work in partnership with EPA and each other within a framework that focuses on efforts to keep their air clean. Participation in the program is not a guarantee that an area will avoid a future nonattainment designation or other Clean Air Act requirements; however, it can better position the area to comply with the requirements associated with such a designation.



Ozone Monitoring Station: Temple Georgia C1045



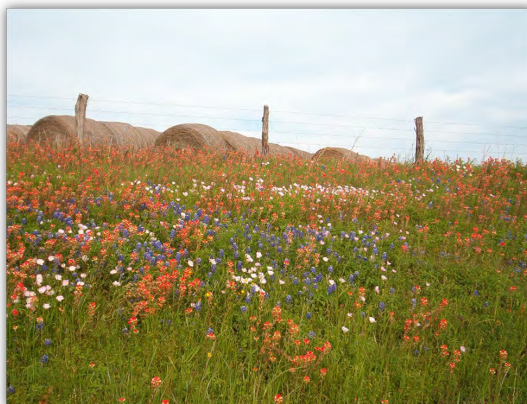
KTMPPO staff has researched this program and an initial presentation was given to the Transportation Planning Policy Board and Technical Advisory Committee in 2012. Staff is working to obtain more information to educate and inform the public about air quality issues such as ozone and will work with the Policy Board to consider participation in this program. Program participation will include collaboration and support of the KTMPO member entities to identify measures for consideration to lower ozone concentrations. These measures may include transportation demand management programs such as ridesharing, carpooling, telecommuting, transit, and bike/pedestrian travel. This endeavor works hand-in-hand with the Congestion Management Process (CMP) that KTMPO is implementing. When congestion is alleviated, ozone-contributing pollutants from vehicle emissions are reduced. However, an in-depth study to determine primary sources of the pollutants has not been conducted for the KTMPO area. This is needed to identify airsheds and predominant wind patterns to help determine sources of the pollutants. Once the sources are identified, more specific measures may be considered and undertaken to reduce the pollutants.

**Waco Area Studies:** Several air quality related studies were conducted for the Waco area during 2010 – 2013 with funding from the TCEQ Rider 8 Program. Funding from this program is no longer available. The studies included conceptual models for ozone and emission inventory review for both point source and off road emissions.

The Waco area studies focused primarily on data from the Community Air Monitoring Station (CAMS) located in McLennan County approximately 9 miles northeast of downtown Waco, referred to as CAMS 1037. As part of these studies, data from the CAMS located at Skylark Field in Killeen—CAMS 1047—was examined to complement results from the Waco CAMS through analysis of regional trends. As a result, limited data is available for the Killeen monitoring station.

One of the reports, Conceptual Model for Ozone for the Waco Area (2012), provided annual, seasonal, day-of-week, and time-of-day trends of high ozone concentrations for both the Waco and Killeen CAMS. An excerpt from this report showing results for these monitors is provided in **Appendix H**. The report also noted “...that three years of data may not provide a sufficiently large dataset for a robust investigation of ozone annual and seasonal trends in Killeen and that Killeen is influenced by different local emissions sources than the Waco area.”

**Other Data Sources:** KTMPO is coordinating with TCEQ and EPA to identify sources of air quality data relevant to the KTMPO region. TCEQ’s Point Source Emissions webpage provides a list of entities throughout the state who are reporting their emissions to TCEQ. Nine have been identified in Bell County and 16 from the adjacent counties to the north, east, and south. Nitrogen Oxides and Volatile Organic Compounds are among the pollutants that are reported. KTMPO is reviewing this information and will encourage these entities to participate as stakeholders as air quality issues for the region are examined. Other sources of information that will be reviewed include TCEQ’s Air Modeling webpage and Air Quality Research webpage, along with data from Fort Hood and the US Army Corp of Engineers.



## Implications of Nonattainment

Three full years of certified data is needed in order to make a determination whether an area is in attainment with the NAAQS. A nonattainment designation may include an entire county or part of a county. Nonattainment areas must develop a plan to return to compliance within a specified time period. This time period varies from 3 to 20 years, depending upon the severity of the classification. Failure to comply may trigger sanctions, such as a loss of federal transportation dollars.

The Texas State Implementation Plan (SIP) is the state's comprehensive plan to clean the air and meet federal air quality standards. The SIP must be revised to include areas (counties) classified as nonattainment. Components of a SIP Revision Include:

- Monitoring Data
- Emissions Inventory
- Photochemical Modeling
- Control Measures

The SIP revision process typically takes 3 – 4 years and is initiated upon nonattainment designation. This is an intense period of data collection and modeling; control measures and strategies are proposed and tested, and the revision is drafted. TCEQ goes through a rule making process which involves public meetings, hearings, review of public comments, etc. TCEQ then adopts final rules and the SIP revisions. The State's SIP revision package is then submitted to the EPA for review and approval.

Metropolitan Planning Organizations (MPO's) in nonattainment areas must demonstrate that their Metropolitan Transportation Plan (MTP) and Transportation Improvement Program (TIP) conform to the purpose of the SIP, i.e. "transportation conformity". Transportation Conformity only addresses air pollution from on-road sources which includes emissions created by cars, trucks, buses, commuter rail, and motorcycles. Federal Projects receiving FHWA/FTA funding and/or approval are also subject to Transportation Conformity. Conformity to a SIP means:

- Activities will not cause or contribute to any new violations of the NAAQS
- Activities will not increase the frequency or severity of NAAQS violations
- Activities will not delay timely attainment of the NAAQS or any required interim milestone

A conformity determination demonstrates that implementation of the MTP, TIP or project will not cause any new violations of the air quality standard, increase the frequency or severity of violations of the standard, or delay timely attainment of the standard or any interim milestone. Total projected emissions for the MTP or TIP must be within the "emissions budgets" established by the SIP. Transportation Control Measures (TCM) must be implemented in a timely fashion and State and local agencies consulted on data, modeling, and other issues. Development and implementation of TCMs are the responsibility of the MPO's participating local governments and includes both regulatory and non-regulatory measures.

Examples of TCMs include the following:

- Programs for improving public transit
- Developing high occupancy vehicle (HOV) lanes
- Employing ordinances to promote non-motor vehicle travel

MTP/TIP transportation conformity determination occurs within 12 months of a nonattainment designation. This determination is based upon the SIP; however, if SIP revisions have not been developed, conformity is determined by “Build/No Build” evaluation and comparison to determine impact of the proposed projects on air quality.

New EPA NAAQS for ozone are expected to be released in December of 2014 and finalized in October 2015; therefore, additional nonattainment designations are not likely to occur until 2016 or thereafter.

### Future Steps

It is in the best interest of the KTMPO region to remain in compliance with the NAAQS and avoid a nonattainment designation. Steps/measures that will be undertaken by KTMPO are discussed below.

**CMP Development and Implementation:** KTMPO will continue developing and implementing the Congestion Management Process (CMP) which involves collecting data to identify congested corridors and developing strategies to alleviate congestion. Reducing vehicle emissions will help provide cleaner air for our region. Objectives may include the following:

- Promote policies and projects to reduce travel delay
- Promote awareness of alternative transportation modes
- Promote policies and projects to reduce number of crashes and crash severity
- Promote policies and programs to increase transit ridership on existing services
- Promote awareness of multi-modal facilities
- Promote carpool/shared-ride opportunities
- Consider participation in air quality improvement programs
- Encourage community land development plans that balance access to all modes of transportation

**Ozone Advance Participation:** Steps involved in enrolling and participating in the Ozone Advance program include the following:

1. Signup letter to EPA
2. Identify available information regarding area’s ozone issue
3. Secure stakeholder participation
4. Coordinate control strategy development
5. Submit path forward letter to EPA
6. Implement control strategy per schedule and provide annual status updates
7. Apply for federal grants if desired/available



As previously discussed, an in-depth air quality study focusing on the KTMPO region has not been conducted. Therefore, before the KTMPO region signs up for the Ozone Advance program, preliminary steps are needed. KTMPO plans to proceed as follows:

- 1) collect existing information and data to help determine pollution sources;
- 2) identify stakeholders and form an air quality coalition/advisory group;
- 3) focus on public education and awareness programs highlighting information about ozone and associated pollutants.

These preliminary measures will prepare the KTMPO region for participation in the program and will lead to the Signup Letter and subsequent steps. KTMPO may enroll in the Ozone Advance program until the effective date of nonattainment designation.

**TWG Participation:** The Technical Working Group for Mobile Source Emissions (TWG) was formed by the Texas Department of Transportation (TxDOT) in the early 1990's. It was originally designed for a small group of technical staff to work out problems or strategies for modeling on-road mobile source emission inventories. Since then, topics have grown to include policy discussions and membership has grown considerably.

TxDOT Transportation Planning and Programming (TPP) Division has overall management responsibility for the TWG. The Texas Transportation Institute (TTI) facilitates the meetings and provides other staff support for the TWG as part of a contract with TxDOT. KTMPO has been participating in TWG meetings and will continue to do so. TWG meetings are currently held twice a year in March and September. Topics have included Ozone Advance Program, State Implementation Plan (SIP), NAAQS, MOVES (Motor Vehicle Emissions Simulator) Model, CMAQ (Congestion Mitigation and Air Quality Improvement) Program, Transportation Conformity reviews, etc.

**Public Education:** Educating the public regarding air quality issues and obtaining public support is a key factor for any program to be successful. KTMPO will continue to review data from the ozone monitors at Skylark field in Killeen and West Temple Park (Georgia Avenue) in Temple. Information will be provided on the KTMPO website to educate the public regarding ozone and other pollutants and inform the public of ways to reduce pollutant levels and improve air quality.

## CLIMATE CHANGE

Extreme weather events can damage transportation networks and affect air quality. Extreme heat contributes to high Ozone levels which can be harmful to our health and affect our ability to breathe. Heat waves and flooding can be particularly taxing on the road infrastructure. Higher temperatures can cause road pavement to soften and expand resulting in potholes, buckling of roads, and stress on bridge joints. Heavy rains and flooding can disrupt traffic, delay construction activities, and weaken or wash out the soil and culverts that support roads and bridges. These extremes in weather can shorten the life expectancy of the roadway, resulting in a need for more frequent maintenance and repairs.

High temperatures can also affect railways causing rail tracks to expand and buckle. Heavy rains can cause delays and disrupt service, and flooding can damage the rail lines resulting in repairs and/or replacement of the line and possible relocation to avoid future flooding events.

Weather extremes can also impact air travel. Extreme heat may result in cargo restrictions, flight delays, and cancellations. Heavy rains and flooding can cause disruptions by delaying service and forcing airports to close. Air related infrastructure, including runways, may also be damaged by flooding and higher temperatures.

According to FHWA, “Many state DOTs and MPOs are recognizing the role that transportation policies and investments play in contributing to the emissions of GHGs and conversely, the potential impact of climate change on transportation systems.” Promoting the reduction of CO2 gases and other pollutants that make up “greenhouse gases” (GHG) is in the best interest of our region to extend the life of the infrastructure and ensure a healthy air supply for our population.



KTMPO is researching this issue to collect information that will promote awareness of the damaging effects of GHG and encourage practices to reduce these gases. These efforts will include publishing educational material on the KTMPO website and discussions with the Transportation Planning Policy Board to enlist support of future programs to promote a healthy environment and lengthen the lifespan of the transportation infrastructure.

In addition, through CTCOG, KTMPO is coordinating with the Homeland Security Advisory Council to assimilate information from Emergency Management Plans for counties within and adjacent to the MPO boundary. This information includes evacuation routes which may be needed during extreme weather events such as flooding, hurricanes, etc. These routes should be given top priority with regard to maintenance.

### Information Resources

Federal Highways Administration (FHWA) is a resource KTMPO may use in assimilating information on climate change. FHWA supports transportation and climate change research and dissemination of information, technical assistance to stakeholders, and coordination within US DOT and other Federal agencies. FHWA is also involved in climate change initiatives with the US DOT Center for Climate Change and Environmental Forecasting and other partners. The FHWA website provides information on FHWA research, publications, and resources related to climate change science, policies, and actions along with current state and local practices in adapting to climate change and reducing GHG emissions. The following areas of focus have been identified by FHWA and are discussed in detail on the following page:

**Mitigation:** Identifying strategies that reduce GHG emissions from transportation sources;

**Adaptation:** Preparing for the impacts of global climate change on the nation's transportation infrastructure and systems;

**Sustainability:** Ensuring that balanced choices are made among environmental, economic, and social values that will benefit current and future road users;

**Energy:** Promoting the use of alternative and renewable fuels, and vehicle technologies to reduce oil dependence, vehicle pollution and energy use.

## Mitigation Strategies

- Improve system and operational efficiencies by optimizing the design, construction, operation, and use of transportation networks. The strategies range from anti-idling ordinances to traffic management to congestion pricing. The objective of this group of strategies is to reduce the energy use and GHG emissions associated with a given unit of passenger or freight travel (e.g., person-miles, vehicle-miles, or ton-miles of travel).
- Reduce travel activity by reducing growth in vehicle-miles traveled. The objective of this group of strategies is to influence travelers' activity patterns, thereby reducing total travel, shifting travel to more efficient modes, increasing vehicle occupancy, or otherwise taking actions that reduce energy use and GHG emissions associated with personal travel.
- Introduce low-carbon fuels. The objective of this group of strategies is to develop and introduce alternative fuels that have lower carbon content and generate fewer transportation GHG emissions. These alternative fuels include ethanol, biodiesel, natural gas, liquefied petroleum gas, synthetic fuels, hydrogen, and electricity.
- Increase fuel efficiency by advancing and bringing to market advanced engine and transmission designs, lighter-weight materials, improved aerodynamics, and reduced rolling resistance. The objective of this group of strategies is to use less fuel and generate fewer GHG emissions.

## Adaptation

Planning, designing, constructing, operating, or maintaining transportation infrastructure while incorporating consideration of climate changes. The impacts of climate change should be taken into account as transportation systems are planned and as transportation projects are developed. Highways are an integral part of the broader context of sustainable development. A sustainable

## Sustainability

highway should satisfy the functional requirements of societal development and economic growth while striving to enhance the natural environment and reduce consumption of natural resources. Significant advances are being made to improve the overall efficiency of the energy sector,

## Energy

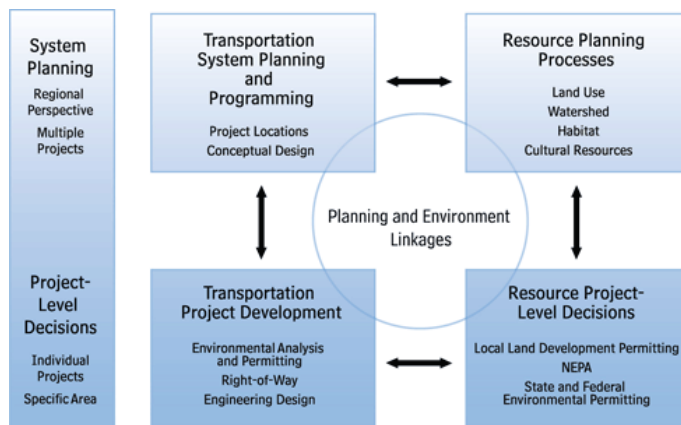
particularly with regards to fuel economy. However, further fuel savings is needed. The traveling public is increasingly investing in alternative fuels, plug-in hybrid and other electric vehicle (EV) technologies. States and localities in the U.S. are beginning to build the necessary infrastructure to support the use of these fuels and vehicle technologies.

KTMPO will use these resources and others to promote awareness of climate change and the impact it may have on the transportation network, as well as methods and strategies to mitigate these impacts.



## PLANNING AND ENVIRONMENTAL LINKAGES (PEL)

When planning transportation projects, it is important to consider the effect a project may have on the environment. Environmental issues should be considered early in the transportation planning process and should focus on the following principles: 1) avoid; 2) minimize; and 3) mitigate. When possible, projects should avoid environmentally sensitive areas and natural resources. If avoidance is not possible then efforts should be made to minimize adverse effects on the environment. When environmental impacts are known, mitigation efforts may be necessary and involve implementing projects or programs to offset the known impacts.



By including environmental analysis early in the project planning stage, environmental, regulatory, and resource agencies are actively involved from the beginning which will help to streamline environmental reviews that occur later in the process.

Potential problems may be identified in the early stages which may result in cost savings and more efficient project delivery times.

When considering environmental impacts of transportation planning, it is important to include the following:

### Define and Identify Environmentally Sensitive Areas and Natural Resources

It is important to define “environmentally sensitive areas” and “natural resources” within a region. Once defined, these areas can then be identified and mapped. Defining and identifying these areas will involve coordination with various agencies and groups and review of local conservation plans and programs.

### Evaluate Impact

When projects are proposed it is important to determine what impact, if any, the project may have on the environment. By obtaining geospatial data of the sensitive areas and overlaying potential infrastructure projects over them in GIS, potential impacts can be easily assessed from a geographic perspective.

### Coordinate with Agencies

As previously stated, it is important to communicate with environmental agencies and groups, as well as TxDOT Environmental Coordinators, early in the planning process to identify potential conflicts and evaluate possible actions and mitigation strategies.

## Environmentally Sensitive Areas

KTMPO actively researches the geographic location of environmentally sensitive areas and natural resources in the region, as depicted in Exhibit 10.4. The identification of these areas began with the established statewide datasets from state agencies and has been augmented with local data from member entities. The southwestern portion of the KTMPO region has the most concentration of sensitive areas, largely due to the watersheds and recharge zones for two major aquifers. Detailed information on the identified sensitive areas is discussed below.



Natural or Recreational Areas: A database is maintained of natural or recreational areas in the region, consisting of data from a variety of sources, including Texas Parks and Wildlife, TxDOT, and local entities.

Archaeological Sites: The Gault archaeological site is located in the KTMPO region, west of Salado and south of Stillhouse Hollow Lake. Considered one of the major excavation sites in Texas, it is receiving international attention because of the wealth of new information on Clovis culture that is being discovered.

The MPO coordinates with TxDOT on issues related to identifying Native American tribal lands and potential artifact locations. Maps are available depicting historic tribal territories in Texas and KTMPO has access to a tribal representative database to obtain more information on tribal lands within the KTMPO region. The available maps indicate the KTMPO region is within historic tribal territories for two tribes—the Comanche Nation of Oklahoma and the Tonkawa Tribe of Oklahoma. KTMPO will continue coordination efforts to determine whether the MPO region lies within historic tribal territories of other Indian tribal groups with interests in Central Texas and will contact these groups as needed.

Historical Structures or Areas: Data for the National Register of Historic Places was obtained from the Texas Historical Commission for structures and districts, and additional local historic data has been received. The majority of historic areas and structures are found in the cities of Temple, Belton, and Salado. Historic structures are not depicted on the map due to scale, but are maintained by KTMPO in their database for use in analysis. Cemetery locations are obtained from the respective counties.

Environmental Justice Communities of Concern (EJCOC): EJCOC areas were discussed in Chapter 2, Demographics, and are areas containing a higher percentage of low income or minority groups (Exhibits 3.3-3.6). The purpose of an environmental justice review is to ensure that federally-funded transportation projects do not adversely impact minority populations and low-income populations.

Landfills: The identification of closed landfills and waste disposal sites is important for new transportation projects, as soil testing may indicate poor load-bearing qualities, unsupportive of the weight of the roadway and heavy vehicle traffic. In this case, a costly and time-consuming process of removing the buried waste may be necessary. Hazards of excavating a previously closed landfill include contaminated water and the release of disease-causing pathogens to the surrounding area.

Watersheds: Of the Brazos River Basin, the watersheds present in the planning area include the Lampasas, Leon, Little, Lower Brazos-Little Brazos, Cowhouse, and San Gabriel watersheds. Though not depicted on the map, KTMPO has geospatial data detailing the location of the watersheds for use in analysis. Particularly sensitive, the Nolan Creek watershed, a part of the Leon River watershed, covers a large portion of the Killeen urbanized area and Little Nolan Creek from confluence with Nolan Creek/South Nolan Creek upstream has been determined by TCEQ to have elevated bacteria concentrations. These segments are classified as 5b, indicating that a review of the water quality standards for this water body will be conducted before a total maximum daily load (TMDL) will be scheduled. An assessment of water quality began in June 2013 and should be concluded the latter part of 2014.

Aquifers: The Trinity Aquifer underlies all of the planning area, while the Edwards Aquifer underlies the south central portion. In an aquifer recharge zone, or outcrop, water from precipitation and/or storm water runoff may easily enter the aquifer system. If the runoff carries pollutants, these pollutants will also enter the aquifer system. Structural damage to the aquifer is also a concern as this could affect the ability of an aquifer to recharge.



The Edwards Aquifer is a karst limestone aquifer consisting of porous, honeycombed, rock in which water easily moves through. In the recharge zone where the aquifer is exposed at the surface, the Edwards is highly faulted and fractured allowing large quantities of water to flow into the aquifer with little if any filtration. As a result, the Edwards aquifer recharge zone is considered particularly sensitive. In the downdip area of an aquifer, the water-bearing layers underlie other layers and are under artesian pressure. Construction projects in these areas should be carefully planned and monitored to ensure there is no loss of artesian pressure which can result in declining spring flows.

It should be noted that both the Trinity and Edwards BFZ aquifers are considered major aquifers by the Texas Water Development Board. Within the KTMPO planning boundary, there are several other groundwater resources that are smaller in extent and capacity and are not classified as major or minor aquifers. These other groundwater resources supply the majority of water wells in the eastern half of the KTMPO area and are relatively close to the surface, i.e. generally less than 100 feet below the surface.

Endangered species: While the KTMPO region is the home to several endangered species, the U.S. Fish and Wildlife Service has not identified any critical habitats in the region; therefore, there are currently no specific areas designated as essential for the conservation of an endangered species. Both U.S. Fish and Wildlife Service (USFWS) and Texas Parks and Wildlife maintain a county level inventory of species of special concern in Texas.



Exhibit 10.3 depicts the rare, threatened, or endangered species that are present in Bell County, the largest portion of the KTMO planning area. The most well-known endangered species present include the black-capped vireo, the golden-cheeked warbler, and the whooping crane. Recently, there has been much discussion regarding the Salado Springs salamander. On February 24, 2014, the USFWS officially listed the Salado Springs salamander as threatened; critical habitat has not been designated at this time.



**Exhibit 10.3: Rare, Threatened, or Endangered Species in KTMO region**

Taxon	Common Name	Scientific Name	Federal Status	State Status
Amphibians	Salado Springs salamander	Eurycea chisholmensis	T	
Birds	Henslow's Sparrow	Ammodramus henslowii		
Birds	Sprague's Pipit	Anthus spragueii	C	
Birds	Western Burrowing Owl	Athene cunicularia hypugaea		
Birds	Mountain Plover	Charadrius montanus		
Birds	Peregrine Falcon	Falco peregrinus	DL	T
Birds	American Peregrine Falcon	Falco peregrinus anatum	DL	T
Birds	Arctic Peregrine Falcon	Falco peregrinus tundrius	DL	
Birds	Whooping Crane	Grus americana	LE	E
Birds	Bald Eagle	Haliaeetus leucocephalus	DL	T
Birds	Golden-cheeked Warbler	Setophaga chrysoparia	LE	E
Birds	Interior Least Tern	Sterna antillarum athalassos	LE	E
Birds	Black-capped Vireo	Vireo atricapilla	LE	E
Fishes	Guadalupe bass	Micropterus treculii		
Fishes	Smalleye shiner	Notropis buccula	PE	
Mammals	Red wolf	Canis rufus	LE	E
Mammals	Cave myotis bat	Myotis velifer		
Mammals	Plains spotted skunk	Spilogale putorius interrupta		
Mollusks	Smooth pimpleback	Quadrula houstonensis	C	T
Mollusks	False spike mussel	Quadrula mitchelli		T
Mollusks	Texas fawnsfoot	Truncilla macrodon	C	T
Plants	Texabama croton	Croton alabamensis var texensis		
Reptiles	Texas horned lizard	Phrynosoma cornutum		T
Reptiles	Texas garter snake	Thamnophis sirtalis annectens		

Federal Status Legend

LE: Listed Endangered  
T: Threatened  
C: Candidate  
DL: Delisted

State Status Legend

E: Endangered  
T: Threatened

Source: Texas Parks & Wildlife

## Evaluate Impacts

The evaluation of potential impacts of new transportation projects on sensitive areas helps prevent damage to the natural or historical environment of the region. Proposed transportation projects that intersect with any of the identified environmentally sensitive areas are shown on Exhibit 10.5. The appearance of projects in Exhibit 10.6 indicates that some part of the project lies in the same geographic location as one of the identified sensitive areas and should be addressed in the initial stages of planning. The awareness of the potential effects on these sensitive areas early in the planning process ensures that efforts and resources are not spent towards a project only to fail during the National Environmental Policy Act (NEPA) process, costing more resources as the project is changed or refined. It should be noted that the entire KTMO region lies within one watershed or another, so this factor in itself was not considered in listing a project in Exhibit 10.6. Likewise, the entire KTMO region overlies one or more groundwater resources.

Exhibit 10.4: Environmental Sensitive Areas

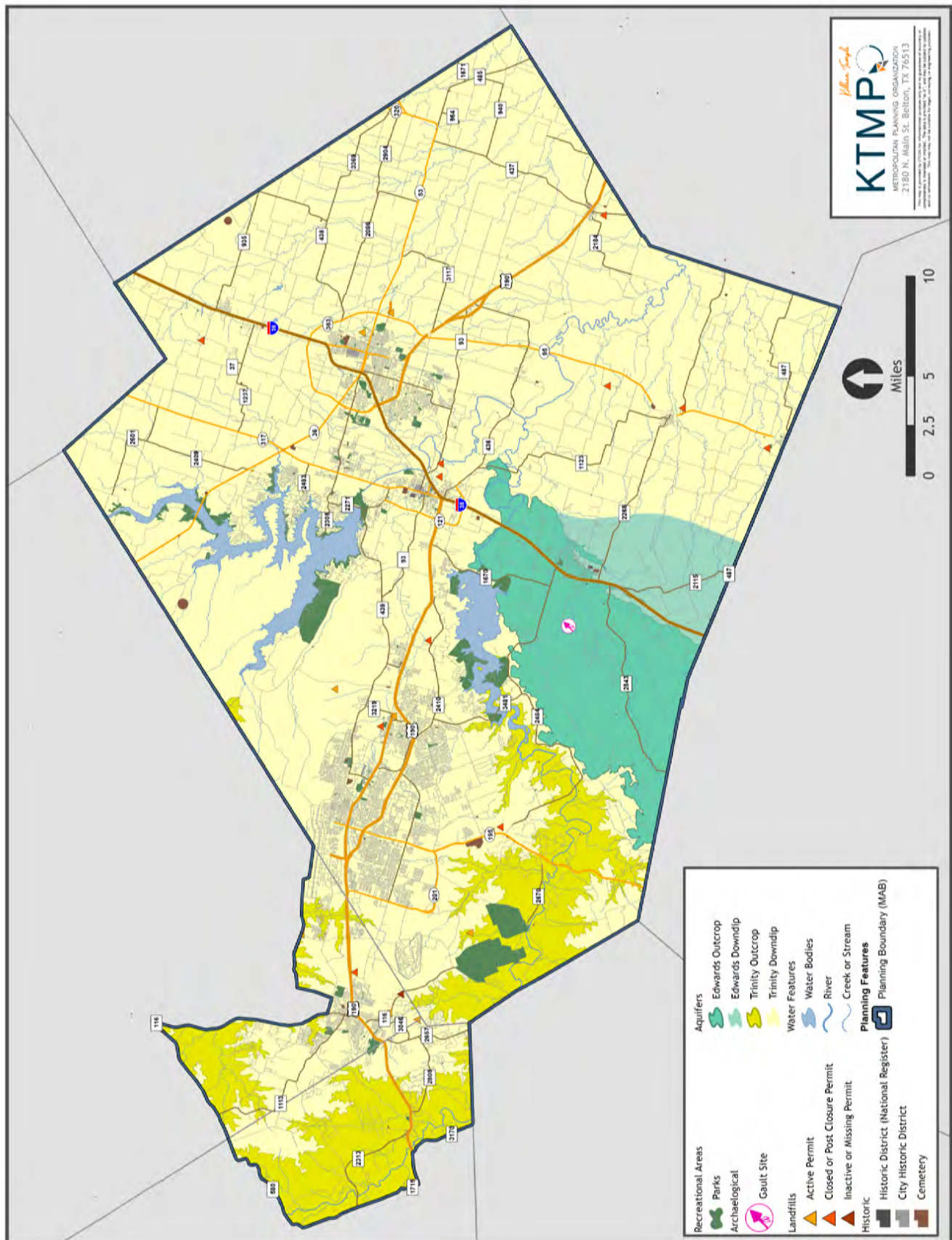
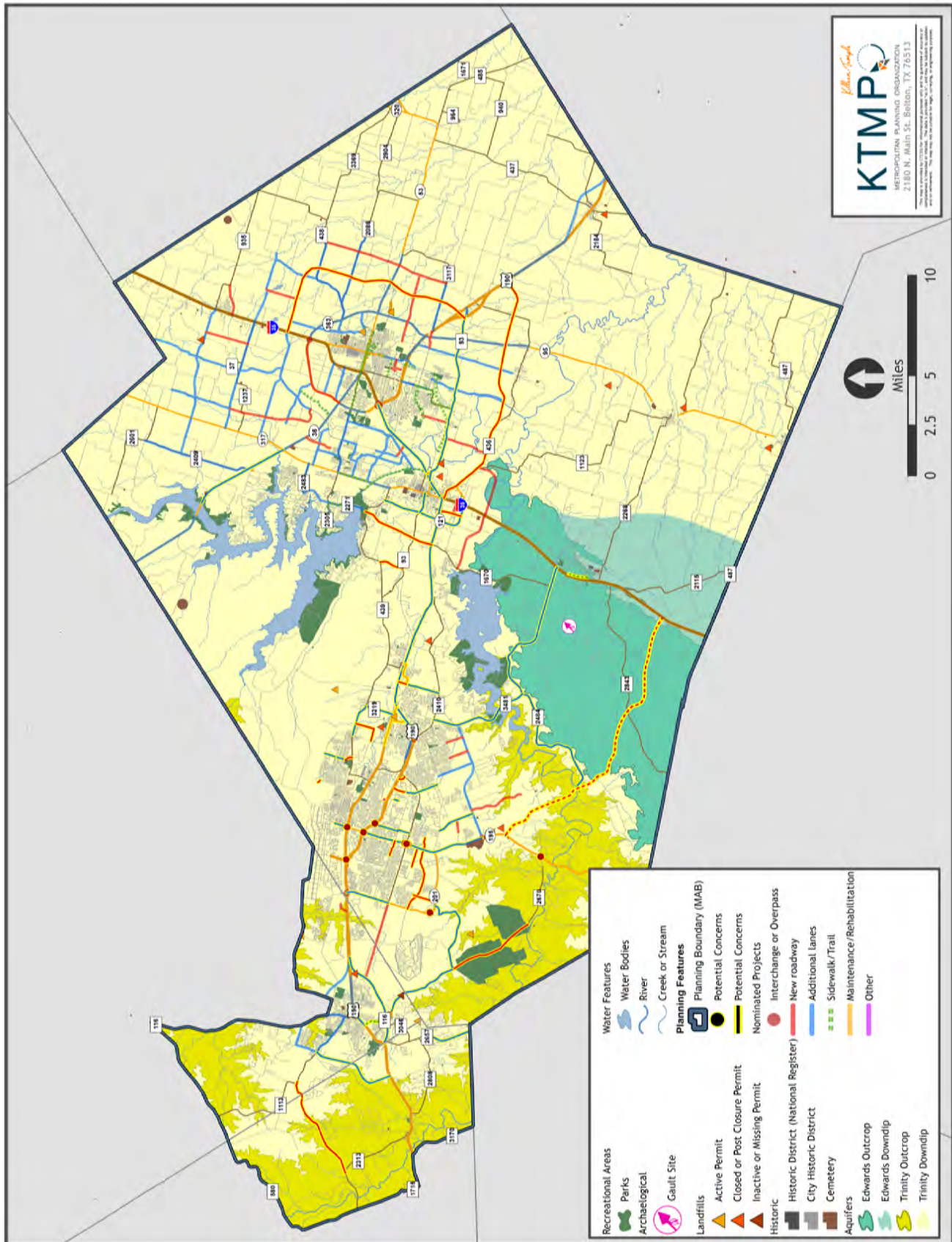




Exhibit 10.5: Proposed Projects and Environmental Sensitive Areas Analysis





**Exhibit 10.6:**  
**Proposed Projects**  
**and Environmental**  
**Sensitive Areas**  
**Overlap**

KTMO ID	Project Name	Extent Description	Description	Areas of Concern
B15-02	FM 2271	FM 439 to US 190 at FM 1670	Construct 4 lane divided roadway with raised median	Park, EJ
B30-01	George Wilson Extension	FM 93 at George Wilson Rd to FM 439	Construct 2 lane roadway with shoulder	EJ
B30-04	US 190	IH 35 to SH 36/US 190	Construct 2 lanes of ultimate 4 lane freeway on new location	EJ
B40-01	Huey Drive	Southwest Pkwy to IH 35	Construct 2 lane roadway with center turn lane	EJ
B40-02	Southwest Parkway	Loop 121 to W Avenue O	Construct 2 lane roadway with center turn lane	EJ
C25-03	Big Divide "Loop"	US 190 to FM 1113	Widen from 2 to 4 lane roadway with raised median, curb and gutter, and storm drainage	Aquifer Recharge Zone, EJ
C40-01	FM 116	End of 5 lane segment at Tyler Dr to SH 201	Upgrade the current roadways to Farm to Market status, with accompanying surface improvements. Widen from 2 to 5 lane roadway with curb and gutter.	Landfill, EJ
H15-02b	FM 2410	City Limit (near Roy Reynolds Dr) to US 190	Widen from 2 to 4 lane roadway, with sidewalks, median and turn lanes in a context sensitive design	EJ
H30-07	FM 3481	FM 2410 to FM 2484	Widen from 2 to 4 lane divided roadway	Park
H30-07	FM 3481	FM 2410 to FM 2484	Widen from 2 to 4 lane divided roadway	EJ
K15-05	Elms Road	Carpet Ln to SH 195	Construct 5 lane section with shoulder	EJ
K25-01	Cunningham Rd	Little Nolan Rd to Stagecoach Rd	Widen from 2 to 4 lane with shoulder	EJ
K25-02	60th Street	Lake Rd to Hilliard Ave	Widen from 2 to 5 lane section with curb and gutter	EJ
K25-04	SH 195	At Business 190	Construct grade separation over Business 190 and BNSF RR	EJ
K25-05	Old Florence Rd	FM 3470 to US 190	Widen from 2 to 5 lane section with curb and gutter	EJ
K25-07	Twin Creek Dr	FM 439 to Lake Rd at 60th St	Extend 5 lane divided roadway with curb and gutter	C, EJ
K30-02	Rosewood Dr	Serpentine Dr to Chaparral Rd	Construct 4 lane roadway with median, curb and gutter	EJ
K30-07	Platinum Dr	Siltstone Loop to Chaparral Rd	Construct 4 lane roadway with curb and gutter	EJ
K30-13	Chaparral Rd	SH 195 to FM 3481	Widen from 2 to 4 lane roadway with center turn lane, curb, and gutter	EJ
K30-21	E/W Arterial (Mohawk)	SH 201 to SH 195	Construct 4 lane roadway with median, curb and gutter	EJ
K30-23	Jasper Bridge Expansion	S Florence Rd to Jasper Dr	Construct 8 lane overpass with pedestrian improvements with turnarounds	EJ
K30-24	Cunningham Rd	Little Nolan Rd to US 190	Construct 4 lane with median, curb and gutter	EJ
K30-25	Bacon Ranch Rd Exit	US 190 Access Road to FM 3470 at Greenlee Dr	Construct 2 lanes to Bacon Ranch, 4 lanes to Greenlee Dr with curb and gutter	EJ
K30-27	SH 195	At FM 3470 (northside)	Construct turn-around on north side	EJ
K30-28	SH 195	At FM 3470 (southside)	Construct turn-around on south side	EJ
K40-03	FM 3470 (Stan Schlueter Loop)	SH 201 to US 190 Bypass	Construct 4 lane FM Road with continuous turn lane and shoulders	EJ
K40-06	FM 2484	SH 195 to IH 35	Widen to 4 lane roadway	Aquifer Recharge Zone
K40-07	WS Young	Bacon Ranch Rd to Little Nolan Rd	Add turn lane and traffic signal	TRUE
K40-09	CR 2670 Overpass	CR 2670 to SH 195	Construct overpass at CR 2670 and Hwy 195	Aquifer Recharge Zone
K40-10	SH 195	Old FM 440 South to Pershing Dr	Widen from 6 to 10 lane roadway with turnarounds	EJ
K40-11	WS Young	Mall Dr to AJ Hall Blvd	Add turn lane and relocate traffic signal at Mall Dr to AJ Hall Blvd; control of access management improvements	EJ
K40-14	Bridgewood Drive Extension	Bridgewood Dr to SH 201	Construct 4 lane roadway with curb and gutter	EJ
K40-16	East Trimmer Road Improvements	Stagecoach Rd to Chaparral Rd	Widen from 2 to 4 lane roadway with center turn lane, curb, and gutter	EJ
K40-17	Trimmer Road Improvements	Stagecoach Rd to Chaparral Rd	Widen from 2 to 4 lane roadway with center turn lane, curb, and gutter	EJ
K40-18	Major E/W Arterial	SH 195 to IH 35	Construct 4 lane divided roadway with shoulders	Aquifer Recharge Zone
T15-04	N East Loop 363	IH 35 to SH 36	Widen to 4 lane freeway with frontage roads	EJ
T15-06k	IH 35	South Loop 363 to US 190	Reconstruct and widen to 8 lanes	EJ
T15-07	FM 93	IH 35 to FM 1741	Widen to provide for a raised median	EJ
T25-03	FM 95	SH 36/US 190 to FM 93	Widen from 2 to 4 lane divided with curb and gutter	EJ
T25-10	Little River/Taylor Rd	Loop 363 to FM 93	Widen from 2 to 4 lane with curb and gutter; will incorporate multimodal design	EJ

**Exhibit 10.6 Cont:**  
**Proposed Projects**  
**and Environmental**  
**Sensitive Areas**  
**Overlap**

KTMPD ID	Project Name	Extent Description	Description	Areas of Concern
T30-01	Outer Loop	IH 35 to FM 93/SH 36 Junction	Construct 4 lane divided roadway with shoulder	C, EJ
T30-02	Blackland/Canyon Creek Extension	Little River Rd to SH 36	Construct 4 lane divided roadway with curb and gutter; will incorporate multimodal design	EJ
T35-03	Airport Rd/SH 53	IH 35 to SH 317	Widen from 4 to 6 lane divided roadway with curb and gutter	EJ
T35-04	FM 3117	US 190 to Rabbit Rd	Widen from 2 to 4 lane undivided roadway with curb and gutter	EJ
T35-18	Tower Rd Extension W	Martin Luther King Jr Dr to Proposed Red Barn Extension	Extend and widen from 2 to 4 lane undivided roadway with curb and gutter	EJ
T35-19	Red Barn Lane	FM 3117 to FM 438	Extend and widen from 2 to 4 lane undivided roadway with shoulder	EJ
T35-30	Old Hwy 95	FM 93 to Little River City Limits	Widen from 2 to 4 lane undivided roadway with shoulder	EJ
T35-33	Enterprise Rd	IH 35 to NW Loop 363	Extend and widen to a 4 lane undivided roadway with curb and gutter	EJ
T35-34	W Nugent Ave	IH 35 to NW Loop 363	Widen from 2 to 4 lane undivided roadway with curb and gutter	EJ
T35-36a	S 5th St Interchange to S 1st St	SE Loop 363 to Avenue M	Widen from 4 lane undivided to 4 lane divided roadway with curb and gutter; will incorporate multimodal design	EJ
T35-36b	1st Street	SE Loop 363 to 5th Street	Extend and realign with 5th Street; will incorporate multimodal design	EJ
T40-03	W Avenue U & 13/17th Connector	Avenue U & 13/17th Street to Scott and White Blvd & 13th St to Avenue R	Extend and widen 2 to 3 lane roadway with center land and curb and gutter; includes sidewalks and bike lanes to incorporate multimodal transportation options	EJ
T40-14	Ave R Sidewalks	31st Street to 1st Street	Construct 8' trail with landscaping	EJ
T40-15	Adams Ave Bicycle/Pedestrian Improvements	IH 35 to Martin Luther King Jr Blvd	Construct 6' sidewalk and 5' bike path along Central and Adams Avenue	EJ
T40-17	1st Street Sidewalks	Avenue F to Avenue M	Construct 8 foot trail	EJ
T40-18	Friars Creek Trail (5th St)	N of Marlanwood Rd to S of Friars Creek Rd	Construct 10 foot wide trail	EJ
T40-21	FM 2305 Trail	West Ridge Park to Wilson Park	Construct 10 foot wide trail	EJ
T40-22	Leon River Trail	Millers Springs Park to IH 35	Construct 8 foot wide trail	EJ
T40-23	Downtown Linear Park	Main St & Ave C to Central Ave & 14th St	Construct 10 foot wide trail	EJ
W25-02	SH 36	SH 317 to Lake Belton Bridge	Widen from 2 to 4 lane divided roadway	Park
W25-04	SH 53	E Loop 363 to FM 3117	Widen from 2 to 4 lane divided roadway	EJ
W30-05	SH 201	US 190 to FM 3470	Widen from 5 to 6 lane divided roadway	EJ
W30-07	US 190	At SP 172	Reconstruct major interchange	EJ
W30-08	SH 195	US 190 to FM 3470	Widen from 4 to 6 lanes with raised median	EJ
W30-09	SH 195	Business 190 to Fort Hood East Gate	Widen from 4 to 6 lane divided roadway	EJ
W30-15	Loop 121	IH 35 to US 190	Widen from 2 to 4 lane divided roadway	EJ
W30-16	Loop 121	US 190 to FM 439	Widen from 2 to 4 lane divided roadway	EJ
W30-17	FM 93	SH 317 to Loop 121	Widen from 2 to 4 lane divided roadway	EJ
W30-23	Loop 363	SP 290 to SH 95	Upgrade to 4 lane freeway with continuous frontage roads, and grade separation @ MLK Blvd	EJ
W30-24	SH 95	FM 93 to FM 436	Widen from 2 to 4 lane divided roadway	EJ
W30-29	US 190	Nola Ruth Blvd to IH 35	Widen main lanes from 4 to 6 lane divided freeway and ramp alignment	EJ
W35-02	SH 195	At FM 3470	Upgrade interchange	EJ
W35-03	SH 195	FM 3470 to Chaparral Rd	Reconstruct to 4 lane freeway with frontage roads	EJ
W35-04	FM 439	Roy Reynolds Dr to FM 3219	Widen from 4 lane to 6 lane divided	EJ
W35-05	US 190	At SH 195	Upgrade interchange	EJ
W35-08	FM 93	FM 1741 (S 31st) to SH 95	Widen from 2 to 4 lanes, provide for a raised median, and construct grade separation at UP RR	EJ
W35-09	FM 93	SH 95 to SH 36	Widen from 2 to 4 lanes, provide for a raised median	EJ
X30-02	FM 3536	FM 2313 to Coryell County Line	Construct 2 lane roadway w/ shoulder on new location	Aquifer Recharge Zone
Z40-01	FM 93/US 190	IH 35 to US 190/SH 36	Construct connection from IH 35 to FM 93 and widen existing roadway from 2 to 4 lanes	EJ
Z40-02	Main St Sidewalks	Mill Creek Dr to College Hill Dr	Construct 5 foot wide trail	Aquifer Recharge Zone

## Coordination with Agencies

KTMPO initially coordinated with statewide agencies in the identification of areas of environmental sensitivity, followed by outreach to local entities. These agencies and entities are shown below. An inventory of groups and agencies with interests in the KTMPO region will be maintained and augmented for use in coordination efforts as more groups are discovered and participate.

- **Environmental Protection Agency**
- **Texas Commission on Environmental Quality**
- **Texas Historical Commission**
- **U.S. Fish & Wildlife Service**
- **Texas Parks & Wildlife**
- **Texas Water Development Board**
- **Clearwater Underground Water Conservation District**
- **City of Belton**
- **City of Temple**
- **City of Killeen**
- **City of Harker Heights**
- **City of Copperas Cove**

## Environmental Mitigation Activities

KTMPO will continue coordination with appropriate entities to identify environmentally sensitive areas and develop mitigation activities. To the extent possible, transportation projects should minimize off-site disturbance in sensitive areas and develop strategies to preserve air and water quality, limit tree removal, minimize grading and other earth disturbance, provide erosion and sediment control, and limit noise and vibration. Where feasible, alternative designs or alignments may be developed that would lessen the project's impact on environmentally sensitive areas. Federal Regulation 40 CFR 1508.20 suggests that typical steps for mitigation include the following:

- Avoiding the impact altogether by not taking a certain action or parts of an action.
- Minimizing impacts by limiting the degree or magnitude of the action and its implementation.
- Rectifying the impact by repairing, rehabilitating, or restoring the affected environment.
- Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.
- Compensating for the impact by replacing or providing substitute resources or environments.

Effective mitigation starts at the beginning of the environmental process and should be included as an integral part of the alternatives development and analysis process. There are a variety of possible mitigation activities and measures that can be considered when dealing with environmental impacts, most of which should be considered during the project development process. The environmental mitigation strategies and activities shown on the following page are intended to be regional in scope, and may not necessarily address potential project-level impacts. As the location and magnitude of the proposed projects are determined, appropriate project level mitigation measures will be developed in consultation with appropriate entities.



## Potential Environmental Mitigation Activities

Resource	Mitigation Measures
Natural/Recreational Areas	Avoidance; minimization; replacement property for open space easements to be of equal fair market value and of equivalent usefulness; design exceptions and variances ;environmental compliance monitoring.
Archaeological Sites/Historic Structures and Areas	Avoidance; minimization; landscaping for historic properties; preservation in place of excavation for archeological sites; Memoranda of Agreement with the Department of Historic Resources; design exceptions and variances; environmental compliance monitoring.
EJCOC	Impact avoidance or minimization; context sensitive solutions for communities (appropriate functional and/or aesthetic design features).
Landfills	Avoidance; minimization; design exceptions and variances; environmental compliance monitoring.
Watersheds/Aquifers	Avoidance; minimization; design exceptions and variances; environmental compliance monitoring.
Endangered Species	Avoidance; minimization; time of year restrictions; construction sequencing; design exceptions and variances; species research; species fact sheets; Memoranda of Agreements for species management; environmental compliance monitoring.

## SUSTAINABILITY

**Sustainability** is defined as the capacity to maintain, support, or endure. Since the 1980's, *sustainability* has been used more in the sense of human sustainability on planet Earth and this has resulted in a definition related to the concept of sustainable development as follows: sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs (United Nations, 1987).



## Incorporating Sustainability into the Planning Process

**Sustainable transportation** is the process of designing transportation systems in order to improve livability and mobility by simultaneously meeting social, environmental, and economic goals. It is not an end state, but it is an interlocking series of processes, guided by a collection of principles to meet the needs of present and future members of the community by conserving natural resources. KTMPO may choose any combination of accepted best practices to implement sustainability principles:

**Triple Bottom Line** – considering the Social, Environmental and Economic impacts equally.

**Life Cycle Assessment** – considering environmental impacts over the life of a project.

**Project Scoring and Selection** – placing higher value on projects or methods that combine a positive effect on quality of life with minimal impact on the natural environment.

**Performance Measures** – Collecting data from multiple sources related to the Triple Bottom Line. Public Surveys, Air Quality Monitoring, Cost Analysis, and other metrics may be used.

**INVEST** - Employing the web-based tools developed by FHWA: [www.sustainablehighways.org](http://www.sustainablehighways.org).

**Congestion Management** – implementing a broad policy in order to improve mobility and reduce emissions, resulting in higher quality of life for our region.

**Materials Selection** – Seeking ways to use recycled materials during construction and maintenance, and eliminate use of non-renewable resources.

**Energy Efficiency** – Developing projects to maximize efficient travel in terms of time and fuel.

KTMPO will strive to inform and educate the public on sustainability through various media to include the KTMPO website, and incorporate the practices and principles discussed above into the transportation planning process.

KTMPO seeks to include as many of the principles of sustainable transportation as described by FHWA, American Association of State Highway and Transportation Officials (AASHTO), American Society of Civil Engineers (ASCE), TXDOT, and other organizations. These principles are in line with KTMPO goals and include but are not limited to:

### Strategies for Implementing Sustainable Principles

<b>Access</b>	providing the same level of service to all members of the community
<b>Movement</b>	balancing the need to move people and goods, free from congestion
<b>Choice</b>	providing a range of options, including public transit, bicycles and walking, and alternate routes to alleviate bottlenecks
<b>Environmental Justice</b>	ensuring that low-income or minority communities do not suffer adverse effects of construction or design of transportation systems
<b>Economic Impact</b>	considering the local and regional financial effects
<b>Environmental Impact</b>	examining the impact during construction as well as the impact of obtaining, processing and transporting various road-building materials, and the long-term impact of the different components of the transportation system

KTMPO acknowledges that sustainable transportation planning is a complex and challenging undertaking. Sustainable principles may be applied to any of our planning focus areas, listed below:

- Long and Short-Range Planning
- Project Scoring and Prioritization
- Project Selection and Funding
- Traffic Modeling and Forecasting
- Congestion Management
- Intelligent Transportation Systems (ITS)
- Environmental Justice
- Air Quality
- Safety
- Public Involvement, Outreach, and Education

## CONTEXT SENSITIVE SOLUTIONS

Overall, context sensitive solutions techniques provide a more enjoyable experience of the transportation system. Community participation is encouraged in developing the project design concept and considering community needs and concerns in project implementation. As a result:

- Local leader commitments to the project are enhanced
- Dialogue between local entities and the MPO is further supported
- Purpose of a given project is clearly defined
- Land use decisions in the area are coordinated
- Lines of communication regarding multi-modal transport are opened
- Environmental, aesthetic and scenic harmony is promoted
- Overall system user safety and security is improved
- Project expectations yield more positive results
- More stakeholders are integrated and efficiency of resources is increased
- Local issues are addressed while increasing long-term value for community

***Context sensitive solutions (CSS) is a collaborative, interdisciplinary approach that involves all stakeholders in providing a transportation facility that fits its setting. It is an approach that leads to preserving and enhancing scenic, aesthetic, historic, community, and environmental resources, while improving or maintaining safety, mobility, and infrastructure conditions.***

Source: Results of Joint AASHTO/FHWA Context Sensitive Solutions Strategic Planning Process, Summary Report, March 2007

Currently, TxDOT Waco and Brownwood Districts have taken the lead on Context Sensitive Solutions for a variety of projects in the KTMPO area, most notably the I-35 expansion. With this aspect being shifted



towards the MPO, KTMPO is researching methodologies to integrate CSS into the public participation process through TxDOT's experience. Of note, the City of Harker Heights recently adopted "Designing Walkable Urban Thoroughfares: A Context Sensitive Approach" as the design manual for use in the Development Overlay District 1—The Knights Way Corridor (FM 2410 Overlay). TxDOT has also adopted this publication as an appropriate design manual and city officials have encouraged TxDOT to implement the recommendations for projects in Harker Heights.



# Financial Plan



Member entities of the Killeen-Temple MPO strive to keep the region's transportation system functioning by planning projects that will ensure it can handle the current and projected travel in the region. These proposed investments involve maintaining, operating, and expanding transportation facilities for a variety of modes. The financial plan is an analysis of the Killeen-Temple region's ability to fund these projects in the 25-year forecast period based on the estimations of future transportation dollars and by the assumptions of future growth and legislative changes.

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Federal regulations require the financial component of the Metropolitan Transportation Plan to demonstrate that the requested projects' cost does not exceed that amount which can be reasonably expected to be made available to the MPO in the next 25 years. When these costs do not exceed forecasted revenues the financial plan is considered to be fiscally constrained. KTMPO demonstrates this compliance in the complete project listing, which can be found in **Appendix A**.

KTMPO prioritizes roadway projects in the MTP in accordance with the approved Project Selection Process (found in **Appendix B**). From the rank created from this process, KTMPO staff worked with the TAC and a TAC/TPPB workgroup to finalize the project listing based on the following criteria identified in the adopted Project Selection Process: 1) consistency with KTMPO goals; 2) identified local funding for match requirements; and 3) project readiness. Project readiness was a priority and resulted in a decision by the TPPB to reserve a percentage



of funding for preliminary engineering (PE) costs—5% of funding was reserved for PE costs for small cities (populations under 50,000), and 5% was reserved for PE costs for any size city. The TPPB also chose to reserve 10% of funding for transit projects. Those projects which can be funded with the estimated available dollars are placed on a short and long-range plan list. Those projects which fall outside of the available funding limits are placed on the regionally significant-unfunded list.

Because of KTMPO's new designation as a Transportation Management Area (TMA), it receives two new dedicated sources of funding that are available for alternative transportation modes. Since the project selection role for transportation alternative projects has shifted from TxDOT to the MPO, scoring criteria for these projects have not been developed and approved by the Transportation Planning Policy Board. The project listing includes a Transportation Alternatives Program (TAP) placeholder in the long and short range plans for Category 9 in the anticipation of an approved TAP scoring process. For the transit element, the provider's federal, state, and local funding projection is provided.

## REVENUE FORECAST METHODOLOGY

Funding forecasts were determined from figures included in TxDOT's 2014 Unified Transportation Program (UTP), which is TxDOT's 10-year plan to guide transportation project development. The baseline financial forecast for KTMPO was developed by determining the percentage of funding from both the Waco and Brownwood TxDOT Districts that would be allocated to KTMPO over the ten-year period covered in the UTP by funding category based on historical trends. These numbers were extended from TxDOT's UTP through the year 2040 and assumed no change in tax rates or revenues. Additionally, the percentage of each funding category for maintenance and mobility were calculated.

KTMPO is eligible for and expects to receive funding in categories 1, 2M, 6, 7, 8, 9, and 11. See **Appendix B**—Page 3 of TxDOT's Project Selection Process for a detailed description of the funding categories. However, State and Federal funding is considerably reduced for this MTP cycle. In Category 2M, KTMPO will not receive any funding through the year 2020 due to an advanced funding agreement used to finance the Copperas Cove bypass project. Beyond year 2020, TxDOT is not forecasting any funding in Category 2 up to year 2040 for any MPO. As a result, the baseline scenario has forecasted allocations for all eligible categories except 2M. With the new status designation of TMA, KTMPO receives direct distributions for metropolitan mobility and transportation alternatives (categories 7 and 9).



In regards to maintenance, bridge replacement, and safety (categories 1, 6, and 8 respectively), placeholders for TxDOT grouped CSJ projects are provided in the project listing. KTMPO participates in the use of grouped projects in cooperation with FHWA and TxDOT. TxDOT developed Grouped Project CSJ (Control-Section-Job) numbers for projects that are “not determined to be regionally significant.” This allows those projects to be grouped in one line item as permitted in Title 23 USC Section 135 Statewide Planning. For these categories, the MPO assumed that given a 25-year planning period, future allocations would reflect similarly on past allocations, allowing no additional funding for inflationary purposes. Likewise, district discretionary funding (category 11) is assumed to stay at a constant rate.

## FUNDING SCENARIO DEVELOPMENT AND SELECTION


The KTMPO region relies primarily on state and federal funding to implement regional transportation improvements. Considerable statewide needs coupled with rising fuel efficiency and an unstable transportation funding trend leave many future transportation funding questions unanswered. As a result, TxDOT and the Texas Association of MPOs developed a model to estimate future state & federal highway revenues based upon user-specified assumptions and inputs. This model, called TRENDS (Transportation Revenue Estimation and Needs Determination System) forecasts state transportation revenues by year through the year 2040. In addition to requiring users to estimate the degree and timing of various tax and revenue changes, the model also requires users to estimate possible population growth and fuel economy scenarios. To estimate revenues available to the MPO for the MTP planning period of 2014-2040, the MPO utilized this model and developed possible funding scenarios by making certain assumptions on how funds would be distributed using previous practices and TxDOT's UTP. The scenarios that were developed include a **Baseline, Low, Medium, Medium (with Local Option), and High**, which represent varying extremes of federal and state legislative changes that would generate increased revenue for transportation funding.

For each scenario, the TRENDS model outputs a statewide revenue figure. The model defaults the percentage of revenue increases spent on mobility and maintenance categories at 75%/mobility and 25%/maintenance, which KTMPO accepted. From the statewide total, mobility, and maintenance figures, KTMPO can calculate their share based on the baseline figure per category that was originally calculated from TxDOT's UTP.

The baseline scenario represents forecasted funding as identified in TxDOT's UTP and assumes no change in tax rates or revenues. The remaining scenarios offer possible funding options based on several politically realistic estimates of future revenues. All scenarios rely heavily on state and federal legislative action before actual project funding can be obtained. The projected funding to year 2040 resulting from the scenarios ranged from approximately \$0.5 million for the Baseline scenario to \$1.5 million for the High scenario. The assumptions for each scenario are identified in Exhibit 11.1 on the following page.

The Technical Advisory Committee reviews the scenario options developed by KTMPO staff and forwards a scenario recommendation with growth and legislative changes that are most reasonably justified in the current 25-year planning period for final Transportation Planning Policy Board approval. During the project planning and submission process for Mobility 2040, total project cost estimates were developed for each project proposed by the entity sponsor. The total cost of all submitted projects is roughly \$2.5 billion. The scenario options are displayed in conjunction with the TAC recommendation to the Transportation Planning Policy Board in Exhibit 11.2.

Exhibit 11.1: Funding Scenario Assumptions per Option

	Baseline	Low	Medium	Medium (Local Option)	High
	SCENARIO				
State Population Growth Rate	Low	Low	Low	Low	High
Fuel Efficiency	Average	High	Average	Average	Low
TxDOT Maintenance Standards by 2030	Current TxDOT scenario	Current TxDOT scenario	80% good or better condition	80% good or better condition	90% good or better condition
FEDERAL AND STATE OPTIONS					
State Gas Tax	No Increase	\$0.02 increase in 2020 and \$0.05 in 2030	\$0.06 increase in 2020 and 2030	\$0.06 increase in 2020 and 2030	\$0.10 Increase in 2020 and 2030
State Diesel Tax	No Increase	\$0.02 increase in 2020 and \$0.05 in 2030	\$0.06 increase in 2020 and 2030	\$0.06 increase in 2020 and 2030	\$0.10 Increase in 2020 and 2030
Federal Gas Tax	No Increase	\$0.02 increase in 2020 and \$0.05 in 2030	\$0.06 increase in 2020 and 2030	\$0.06 increase in 2020 and 2030	\$0.10 Increase in 2020 and 2030
Federal Diesel Tax	No Increase	\$0.02 increase 2020 and \$0.05 in 2030	\$0.06 increase in 2020 and 2030	\$0.06 increase in 2020 and 2030	\$0.10 Increase in 2020 and 2030
TX Rate of Return on Federal Funds	Default (85%)	90%	95%	95%	100%
Indexing the Gas Tax to CPI	No	No	Yes in 2030	Yes in 2030	Yes in 2020
% of state gas tax increase to transportation	Default (75%)	80%	85%	85%	90%
Vehicle Registration Fees Increase	No Increase	\$5 in 2020	\$15 in 2020	\$15 in 2020	\$25 in 2020
State Vehicle Mile Traveled Tax	No	No	No	No	\$0.001 per mile in 2020 and 2030 (\$1 per 1,000 mi)
Add New Capacity Dollars	No	No	No	No	\$5 Billion in 2030
LOCAL OPTIONS					
Local Option Gas Tax	None	None	None	\$0.05 Increase in 2025	\$0.10 increase in 2025
Local Option Diesel Tax	None	None	None	\$0.05 Increase in 2025	\$0.10 increase in 2025
Local Option Vehicle Registration Fee	None	None	None	\$5 Increase in 2030	\$10 increase in 2030
Local Option Vehicle Mile Traveled Tax	None	None	No	No	\$0.001 per mile in 2035 (\$1 per 1,000 mi)

## NOTES

- An increase in revenue, based on the above assumptions, could have potential to increase Category 2 funding in the future. Baseline scenario assumes no funding in Category 2 up to 2040.
- Used model defaults for scenario inputs for baseline calculation
- State Population Growth Rate Scenarios
  - Low Migration rates will be one-half those experienced from 2000 to 2010
  - High Migration rates will be equal to those experienced from 2000 to 2010
- TxDOT Maintenance Scenario: As outlined by the 2030 Committee report, using the current funding scenario results in an estimated 20% or less of pavement in Good or Better condition by 2030. In order to achieve 80% Good or Better roads by 2030, \$64 billion will be required. For 90% in Good or Better condition, \$77 billion would be required.

**Exhibit 11.2: Funding Scenario Options and TAC Recommendation**

Technical Advisory Committee Financial Plan Recommendation					
Category	Short Range	Scenario Chosen	Long Range	Scenario Chosen	Total Forecasted Funds
Maintenance (Categories 1, 6, 8)	\$ 165,803,999	Medium	\$ 295,989,993	Medium	\$ 461,793,992
Mobility (Categories 2, 7, 9, 11)	\$ 43,415,000	Baseline	\$ 152,449,789	Medium	\$ 195,864,789
					\$ 657,658,780

Staff Scenario Options Presented to Technical Advisory Committee					TAC Selection
Short Range Plan Revenues (2014-2023)					
Category	Baseline	Low Scenario	Medium Scenario	Medium Scenario (Local Option)	High Scenario
Maintenance (Categories 1, 6, 8)	\$ 151,973,590	\$ 155,159,602	\$ 165,803,999	\$ 165,803,999	\$198,790,874
Mobility (Categories 2, 7, 9, 11)	\$ 43,415,000	\$ 52,482,879	\$ 82,778,471	\$ 82,778,471	\$176,664,194
Local	\$0	\$0	\$0	\$0	\$0
Totals	\$ 195,388,590	\$ 207,642,481	\$ 248,582,470	\$ 248,582,470	\$ 375,455,069

Long Range Plan Revenues (2024-2040)					
Category	Baseline	Low Scenario	Medium Scenario	Medium Scenario (Local Option)	High Scenario
Maintenance (Categories 1, 6, 8)	\$ 274,357,815	\$ 279,341,064	\$ 295,989,993	\$ 295,989,993	\$347,584,850
Mobility (Categories 2, 7, 9, 11)	\$ 85,425,500	\$ 100,865,402	\$ 152,449,789	\$ 152,449,789	\$312,309,263
Local	\$0	\$0	\$0	\$ 131,400,000	\$478,400,000
Totals	\$ 359,783,315	\$ 380,206,466	\$ 448,439,781	\$ 579,839,781	\$ 1,138,294,113

Total Forecasted Funds (2014-2040)					
Category	Baseline	Low Scenario	Medium Scenario	Medium Scenario (Local Option)	High Scenario
Maintenance (Categories 1, 6, 8)	\$ 426,331,405	\$ 434,500,665	\$461,793,992	\$461,793,992	\$546,375,724
Mobility (Categories 2, 7, 9, 11)	\$ 128,840,500	\$ 153,348,281	\$235,228,260	\$235,228,260	\$488,973,457
Local	\$0	\$0	\$0	\$131,400,000	\$478,400,000
Totals	\$ 555,171,905	\$ 587,848,947	\$ 697,022,251	\$ 828,422,251	\$ 1,513,749,181

**Category Descriptions**

- 1 Preventative Maintenance and Rehabilitation
- 2 Metro Area Corridor Projects
- 6 Structures Replacement and Rehabilitation, Highway Bridge Program, Federal Railroad Grade Separation Program
- 7 Metropolitan Mobility and Rehabilitation (STP-MM)
- 8 Safety
- 9 Transportation Alternative Program (TAP)
- 11 District Discretionary



## CHOSEN SCENARIO

The Killeen-Temple MPO Transportation Planning Policy Board agreed with the Technical Advisory Committee that the most reasonable financial scenario for the Killeen-Temple region would be a combination of the Baseline and Medium (without local option funding) scenarios as shown below:

Although this scenario offers lower funding than in the past, the MPO Transportation Planning Policy Board feels that based on the current funding situation, this is the most reasonably justified funding scenario for the next 25-year planning period. However, the MPO Transportation Planning Policy Board would like to emphasize the assumptions made in this scenario are possible only through state and federal legislative changes.

### Short Range (2014-2023)

#### MAINTENANCE

Medium Scenario: \$165,803,999

#### MOBILITY

Baseline Scenario: \$ 43,415,000

Total Short Range: **\$209,218,999**

### Long Range (2024-2040)

#### MAINTENANCE

Medium Scenario: \$295,989,993

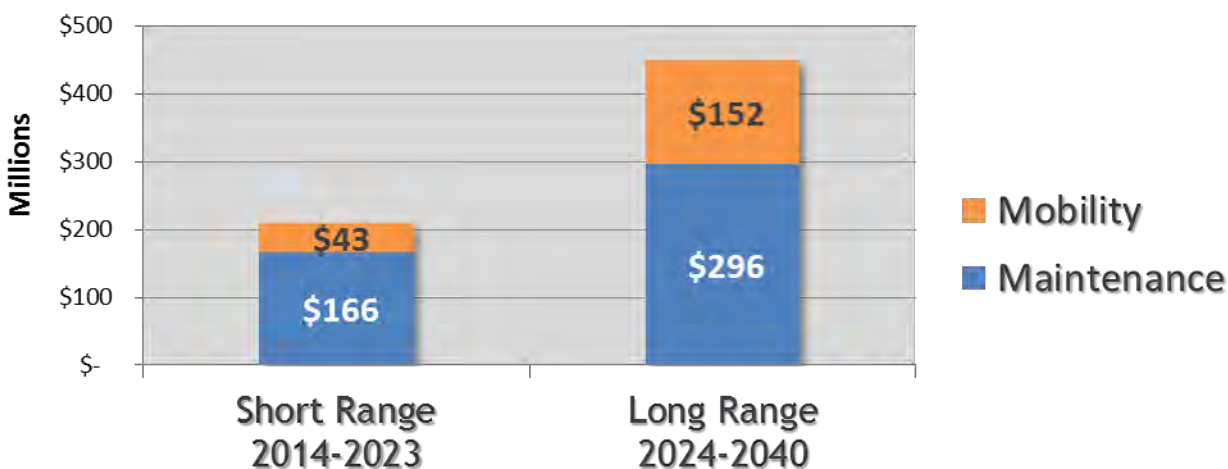
#### MOBILITY

Medium Scenario: \$152,449,789

Total Short Range: **\$448,439,781**

**Total Forecasted Funds (2014-2040): \$657,658,780**

Exhibit 11.3: Forecasted Funding by Short and Long-Range Plan



## FORECASTED FUNDING BY CATEGORY

Exhibit 11.4: Forecasted Funding by Category

Both short and long-range maintenance forecasts were determined by using the percentages of categories 1, 6, and 8 used in the baseline calculation and applied to total maintenance forecast generated by TRENDS for the chosen medium scenario.

Long-range mobility (categories 2, 7, 9, and 11) forecasts assumed that the difference between the baseline forecast and the medium scenario forecast would be assigned to Category 2. The percentages of categories 7, 9, and 11 used in the baseline were applied to the remainder.

These figures are depicted in Table 11.4.

Mobility 2040 Forecasted Funding by Category		
TxDOT Funding Category	Short Range (2014-2023)	Long Range (2024-2040)
<b>Category 1</b> (Preventative Maintenance)	\$124,352,999	\$221,992,495
<b>Category 2</b> (Metro & Urban Corridor)	\$0	\$67,024,288
<b>Category 6</b> (Bridge)	\$24,870,600	\$44,398,499
<b>Category 7</b> (Metro Mobility/Rehab)	\$35,500,000	\$69,851,555
<b>Category 8</b> (Safety)	\$16,580,400	\$29,598,999
<b>Category 9</b> (Transportation Alternatives)	\$7,900,000	\$15,544,430
<b>Category 11</b> (District Discretionary)	\$15,000	\$29,515
Subtotals	\$209,218,999	\$448,439,781
Total Short Range and Long Range		\$657,658,780

## TRANSIT FUND PROJECTIONS

Due to the progressing mileage and age of fixed route buses and complementary paratransit vehicles being used in service in the Killeen and Temple urbanized areas, HCTD projected the need and costs for replacement buses based on average annual miles, service life of existing vehicles, and increasing costs. The resulting funding for vehicle capital replacement projects for transit through 2040 is \$11,204,000. **Appendix F** provides detailed information on estimated operating costs through 2040.

## CONCLUSIONS

The fiscal constraint figures formulated in this section were determined using a combination of past and current funding allocations as identified in the TxDOT Unified Transportation Program and future funding projections generated by the TRENDS model. The fiscal constraint represents the most feasible funding scenario for the KTMPO region given the 25-year planning period. However, the future of transportation funding relies heavily on the actions of state and federal legislators and is subject to change and uncertainty.

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# **MOBILITY 2040** metropolitan transportation plan

Killeen-Temple Metropolitan Planning Organization

