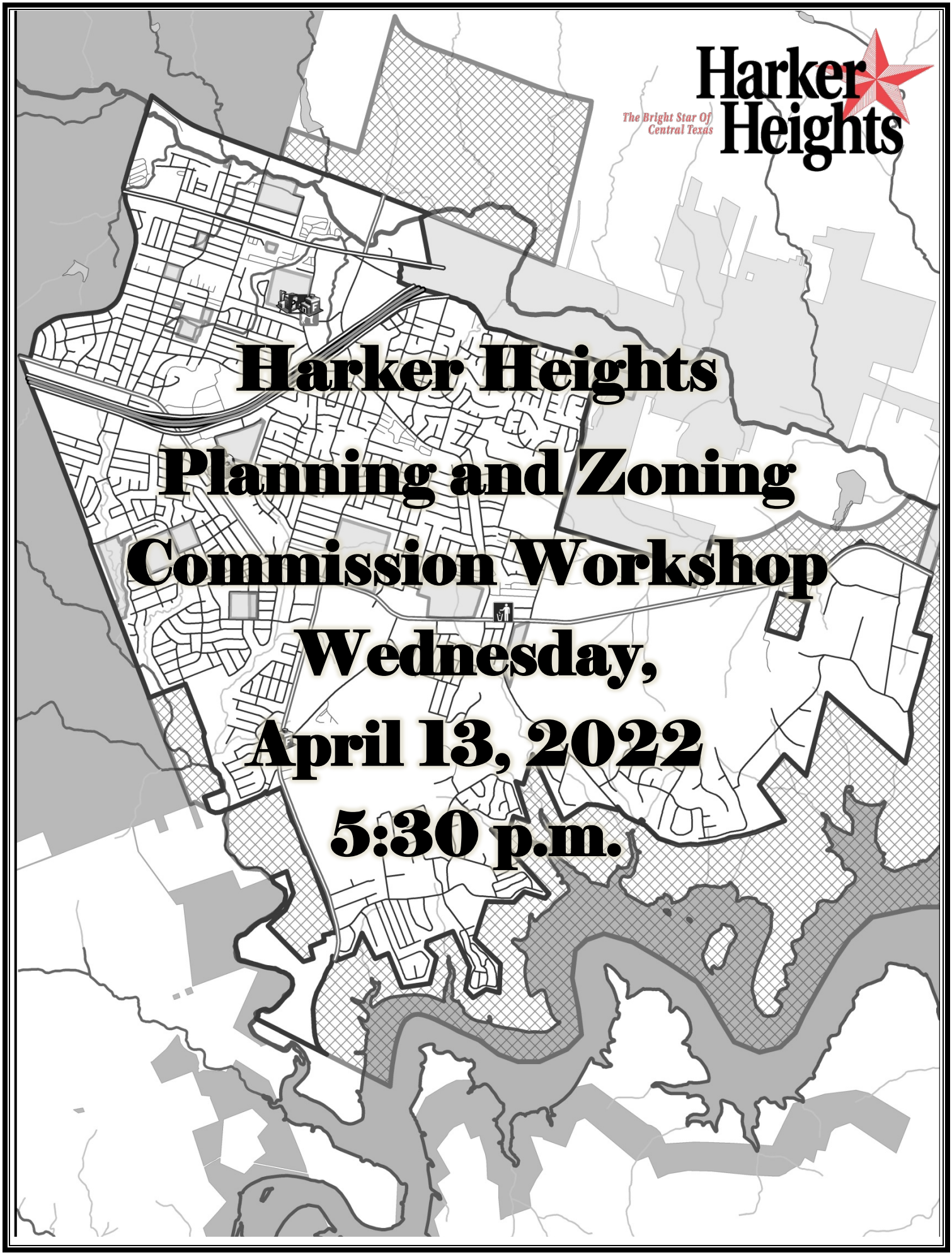
Harker Heights
The Bright Star Of Central Texas
Harker Heights
Planning and Zoning
Commission Workshop
Wednesday,
April 13, 2022
5:30 p.m.

**PLANNING & ZONING COMMISSION WORKSHOP**
**HARKER HEIGHTS CITY HALL**
**WEDNESDAY, APRIL 13, 2022**

Notice is hereby given that beginning at 5:30 P.M. on Wednesday, April 13, 2022, and continuing from day to day thereafter if necessary, the Planning and Zoning Commission (P&Z) of the City of Harker Heights will hold a workshop in the Kitty Young Council Chamber at 305 Miller's Crossing, Harker Heights, Texas 76548. The subjects to be discussed are listed in the following Agenda:

## MEETING AGENDA

***I.*** **CALL TO ORDER -** Convene Workshop of the Planning and Zoning Commission and establish a quorum.

***II.*** Presentations by Staff:

**1.** Receive & discuss update regarding the update to the Mobility 2030 Plan.

***III.*** Adjournment of Workshop.

I, the undersigned authority, do hereby certify that pursuant to the Texas Open Meetings Act, the above Notice of Meeting of the Planning and Zoning Commission of the City of Harker Heights, Texas, was posted at the Harker Heights Municipal Building, and the City of Harker Heights website which is readily accessible to the public at all times, by **10:00 A.M. on Friday, April 8, 2022.** Please contact the Planning and Development Department at (254) 953-5648 for further information.

Yvonne K. Spell

Yvonne K. Spell, City Planner

*This facility is wheelchair accessible and accessible parking spaces are available. Requests for accommodations or interpretive services must be made 48 hours prior to this meeting. Please contact the City Secretary's office at 254-953-5600, or FAX 254-953-5614, or email jhelsham@harkerheights.gov for further information.*

**Order of Contents**

- ☆ §154.01 Definitions
- ☆ §154.37 Streets
- ☆ City of Harker Heights Mobility 2030 Thoroughfare Plan (adopted May 27, 2014)
- ☆ Killeen-Temple Metropolitan Planning Organization
- ☆ Lampasas Thoroughfare Plan
- ☆ Copperas Cove Thoroughfare Plan
- ☆ Killeen Thoroughfare Plan
- ☆ Belton Thoroughfare Plan
- ☆ Temple Thoroughfare Plan

## § 154.01 DEFINITIONS.

For the purpose of this chapter, the following definitions shall apply unless the context clearly indicates or requires a different meaning.

***ACCESS.*** The means by which property is connected to a public street.***ACCESS*** to/from TXDOT facilities must be approved by TXDOT prior to approval of a plat. ***ACCESS*** to/from nonresidential property through or to residential streets must be avoided.

***ALLEY.*** A narrow public passage which provides a secondary means of vehicular access to abutting property and which is used primarily for vehicular traffic to the rear or side of properties which otherwise abut on a public street.

***AMENDING PLAT.*** A subdivision plat that reflects changes to an original filed final plat.

***BENCHMARK.*** A monument that is part of a leveling network and is a point of precisely measured elevation. See ***MONUMENT***.

***BUILDING.*** Any structure that encloses a space used for sheltering any occupancy. Each portion of a building separated from other portions by a firewall shall be considered a separate building.

***CITY ATTORNEY.*** The attorney employed as City Attorney of the city.

***CITY COUNCIL.*** The duly and constitutionally elected governing body of the city.

***CITY MANAGER.*** The person employed as the chief administrative officer of the city, and duly appointed by the City Council.

***COMPREHENSIVE PLAN.*** The plan and adaptations, thoroughfare plan, bikeway plan, future land use plan, gateways and corridors, amendments or supplements thereto, adopted by the City Council and used as a guide for future development of the city and surrounding areas.

***CONCEPT PLAN.*** The Concept Plan is the initial project layout that provides an opportunity to review and evaluate the impact of a proposed development on the character of the surrounding area in which it is proposed to be located. The process takes into consideration the general form of the land before and after development, as well as the spatial relationship of the proposed structures, open space, landscape areas, parking, and general access and circulation patterns as they relate to the proposed development and the surrounding areas.

***COUNTY COMMISSIONERS COURT.*** The duly and constitutionally elected governing body of Bell County, Texas.

***COVENANT.*** A private legal restriction on the use of land contained in the deed to the property or otherwise formally recorded.

***DENSITY.*** The number of dwelling units per acre in a residential development.

***DEVELOPER.*** Any person or persons, firm or corporation subdividing or developing a tract or parcel of land to be sold or otherwise marketed.

***DEVELOPMENT.*** Any activity initiated or directed to improve real estate and requiring a permit from a city, county, or government agency, including without limitation intensive brush and or tree removal of a significant amount.

***EASEMENT.*** A strip of land reserved for public use by the grantor and accepted by the city for the installation and maintenance of utility lines, improved drainage ditches or channels, or for other city or public services or for access to property. The ownership or title to the land encompassed by the easement being retained by the owner.

***EASEMENT, PEDESTRIAN. EASEMENT,*** as defined above, for the purposes of pedestrian traffic (i.e. for sidewalks, bike paths).

***EASEMENT, VEHICULAR. EASEMENT***, as defined above, for the purposes of vehicular traffic.

***ENGINEER.*** A person duly authorized and licensed under the provisions of the Texas Engineering Practice Act (V.T.C.A., Tex. Occupations Code Ch. 1001), as heretofore or hereinafter amended, to practice the profession of engineerings

***ENGINEERING DRAWINGS.*** Engineering drawings support and provide greater detail to a plat.***ENGINEERING DRAWINGS*** typically, where applicable, include, but are not limited to, water layout, sewer layout, drainage and topography, street light layout, street plan and profile sheets, sewer main plan and profile, water utility details, sewer utility details, paving details, drainage details, erosion and sedimentation control plan and standard construction details. ***ENGINEERING DRAWINGS*** shall be prepared and sealed by a Texas Licensed Professional Engineer and shall conform to the general requirements and minimum standards of design and requirements as presented in this chapter.

***EXTRATERRITORIAL JURISDICTION (ETJ).*** Under the terms of V.T.C.A., Tex. Loc. Gov't Code Ch. 42, the unincorporated area, not a part of any other city, which is contiguous to the corporate limits of the city, the outer boundaries of which are measured from the extremities of the corporate limits of the city outward for a distance of two miles, except where it overlaps the ETJ, of other municipalities. Such overlaps are apportioned by mutual agreement with the other municipalities, adopted by resolution and shown on the official ETJ map.

***FLAG LOT.*** A large lot not meeting minimum frontage requirements where access to the public road is by a narrow 30 foot wide strip of land which is part of the lot. Flag lots should be avoided if at all possible.

***INFRASTRUCTURE IMPROVEMENTS.*** Any public facility, service or amenity, constructed to sustain a proposed land use activity. ***INFRASTRUCTURE*** includes, but is not limited to, streets, alleys, sidewalks, crosswalks, sanitary sewers, sewage lift stations, septic tanks or other sewage facilities to include water mains, water systems, drainage culverts, lined channels, storm sewers, bridges, streetlights and fire hydrants.

***LAY DOWN CURB.*** A curb constructed of concrete that is a lower height to promote drainage, allow access onto property or into a driveway or allows for handicap access to a sidewalk.

***LOT.*** A physically undivided tract or parcel of land having frontage on a public street and which is, or in the future may be, offered for sale, conveyance, transfer, lease or improvement, which is designated as a distinct and separate tract and which is identified by a lot number or tract symbol on an approved subdivision plat which has been officially recorded.

***LOT, CORNER.*** A lot abutting two or more streets at their intersection.

***LOT DEPTH.*** The average depth of the lot.

***LOT, DOUBLE FRONTAGE.*** A lot that fronts and backs on two streets.

***LOT FRONT OR FRONTAGE.*** That portion of a lot or tract of land which is the principal side of a property and which abuts on a public street. This shall be the same side in which direction a building will face and the side on which there is the main entrance.

***LOT WIDTH.*** The average width of the lot.

***MAINTENANCE BOND.*** Bond or letter of credit guaranteeing against defects in public roads, utilities, drainage features or other public infrastructure for a specified time period following the approval of the final plat by the city.

***MAY.*** Deemed permissible.

***MINOR SUBDIVISIONS.*** See ***SUBDIVISIONS, MINOR***.

***MONUMENT.*** A reference point, line or plane used as a basis for measurements.

***OPEN SPACE.*** A public or common ownership property designated for a recreation area, private park, building setback and ornamental areas open to general view within the development. ***OPEN SPACE*** does not include streets or alleys.

***PARCEL.*** A tract of land owned and recorded as the property of the same persons or controlled by a single entity.

***PAVEMENT WIDTH.*** The width from the back of curb to the back of curb of a street.

***PERFORMANCE BOND.*** A surety bond posted by a developer guaranteeing full performance as specified in plans approved by the city with the proceeds to be used by the city to complete the improvements on the plans in the event of the developers nonperformance.

***PERSON.*** Any individual, association, firm, corporation, governmental agency, partnership or political subdivision.

***PLANNING AND ZONING COMMISSION.*** A board comprised of citizens of the city appointed by the City Council as an advisory body, charged to recommend changes in the zoning and other planning functions as delegated by the City Council.

***PLAT.*** A map of a subdivision showing the location and boundaries of individual parcels of land subdivided into lots, with streets, alleys and the like, and drawn to scale. As used in this chapter, a ***PLAT*** includes final plats, replats, amending plats and minor plats.

***PRELIMINARY PLAT.*** A map indicating the proposed layout of all phases of development of an area of land under the same ownership that is submitted to city staff for preliminary approval.

***REPLAT.*** The process of re-subdividing property.

***RESERVE STRIP OR PARCEL.*** Any lot, tract, parcel, strip or any other land which prohibits access from public or private tracts or parcels of land dedicated or intended to be dedicated to public use.

***RE-SUBDIVISION.*** The replacement of all or a part of a recorded plat with a new plat which alters the lines within the perimeter boundary of the previous plat.

***RIGHT-OF-WAY.*** A strip of land dedicated to the public for public streets or to accommodate access and/or utilities to lots or tracts.

***SERVICE LINES, PRIVATE.*** That portion of the utility service line from the property line at the right-of-way to the structure itself.

***SERVICE LINES, PUBLIC.*** That portion of the utility service line that is completely contained within the right-of-way.

***SHALL.*** Deemed as mandatory.

***SIDEWALK.*** A paved pedestrian walkway constructed within a street right-of-way and generally parallel to the street.

***SITE DEVELOPMENT REVIEW COMMITTEE (SDRC).*** A committee consisting of representatives from various city departments and private utility companies which reviews all plats and development proposals for compliance with applicable codes and ordinances.

***STREET.*** A way for vehicular traffic, whether designed as a street, highway, thoroughfare, parkway, throughway, road, avenue, boulevard, lane, place or other designation. ***STREETS*** may be classified as follows.

***ALLEY.*** Minor public right-of-way which provides a secondary means of vehicular access to abutting property and which is used primarily for vehicular traffic to the rear or side of properties which otherwise abut on a public street.

***CUL-DE-SAC.*** Street with only one outlet which terminates in a vehicular turnaround at the other end. See § 154.37 for specific standards associated with cul-de-sac streets.

***DEAD-END.*** Street with only one outlet but with no vehicular turnaround at the other end (see ***STREET*** and/or ***CUL-DE-SAC***). See § 154.37 for specific standards associated with dead-end streets.

***FRONTAGE ROAD.*** Service road, usually parallel to a highway, designed to reduce the number of driveways that intersect the highway. See § 154.37 for specific standards associated with frontage roads.

***INTERNAL STREET.*** Street within a subdivision that begins at an intersection and ends in a cul-de-sac or connects to the same street of origin. This street does not provide for the through movement of traffic. See § 154.37 for specific standards associated with internal streets.

***LOCAL STREET.*** Street whose primary function is to provide access to individual lots or tracts. See § 154.37 for specific standards associated with local streets.

***MAJOR ARTERIAL.*** High volume streets with multiple lanes. Arterials shall be between 60 and 80 feet wide, depending on the needs and the design as determined by the city. The right-of-way shall be between 90 and 120 feet, depending on the design requirements as determined by the city. These are high volume streets with five or more lanes. These are limited access roads on which no single-family or two-family residential lots may front.

***MAJOR COLLECTORS.*** Streets generally located along borders of neighborhoods and within commercial areas to collect and to channel this traffic to the arterial system. ***MAJOR COLLECTORS*** shall be 48 feet wide with a minimum of 80 feet of right-of-way. These are limited access roads on which no single-family or two-family residential lots may front (i.e., no driveways shall be allowed) unless there is no other reasonable and safe access to the lot.

***MINOR ARTERIALS.*** High volume streets that conduct traffic between communities and activity centers and connect to major state and interstate highways. Arterials shall be between 60 and 80 feet wide, depending on the needs and the design as determined by the city. The right-of-way shall be between 90 and 120 feet, depending on the design requirements as determined by the city. These are high volume streets with five or more lanes. These are limited access roads on which no single-family or two-family residential lots may front.

***MINOR COLLECTORS.*** Streets generally located within subdivisions or between subdivisions to collect traffic from residential streets and to channel this traffic to major collectors. Residential lots may front on these streets. ***MINOR COLLECTORS*** shall be 42 feet wide, with a minimum of 70 feet of right-of-way.

***RESIDENTIAL STREETS.*** Streets that serve individual residential lots. They carry low traffic volumes at low speeds. ***RESIDENTIAL STREETS*** shall be 36 feet in width back-of-curb to back-of-curb with a minimum 60 feet of right-of-way. These are streets that serve individual residential lots. Where entrances to subdivisions are not part of a collector street, they shall be 42 feet wide with 70 feet of right-of-way for a distance of 100 feet from the intersection.

***STRUCTURE.*** Anything that is built or constructed with a roof covering.

***SUBDIVISION.*** Any division of land for which a plat is required to be approved and recorded under the provision of V.T.C.A., Tex. Loc. Gov't. Code, § 212.004. This includes the division of land situated within the corporate limits of the city, or within the city's extraterritorial jurisdiction, into two or more parts for any purpose no matter how it is conveyed. However, it does not include the division of land into parts greater than five acres where each part has access and no public improvement is being dedicated. No subdivision of land within the city or its extraterritorial jurisdiction may be recorded with the County Clerk until a final plat, accurately describing the property to be subdivided and platted, has been approved by the city in accordance with this chapter, signed and dated by the Mayor, Chair of the Planning and Zoning Commission and/or other designated officers of the city.

***SUBDIVISION, MAJOR.*** Any subdivision consisting of five or more lots and/or a subdivision requiring extension of municipal facilities. Typically, ***MAJOR SUBDIVISIONS*** incorporate more than one phase of development.

***SUBDIVISION, MINOR.*** A subdivision of four or fewer lots fronting on existing streets and not requiring the creation of any new street or extension of municipal facilities.

***SURVEYOR.*** A licensed state land surveyor or a registered professional land surveyor, as authorized by the Professional Land Surveying Practices Act (V.T.C.A., Tex. Occupations Code, Ch. 1071).

***TEXAS COMMISSION ON ENVIRONMENTAL QUALITY (TCEQ).*** The environmental agency for the state.

***THOROUGHFARE PLAN.*** The plan of major and secondary streets and highways, which is the part of the comprehensive plan adopted by the City Council.

(Ord. 2010-08, passed 3-9-10; Am. Ord. 2012-21, passed 10-9-12)

## § 154.37 STREETS.

(A) *Street layout*.

(1) *Thoroughfare plan*. Proposed streets must be in conformance with the city thoroughfare plan. All arterial and collector street locations, alignments, right-of-way widths, pavement widths and cross-sections shall be in accordance with the adopted plans and standards. Streets that are not on the thoroughfare plan and are proposed to collect traffic from residential streets shall be designed and constructed as collectors.

(2) *Consistency with existing streets*. The arrangement, character, extent, width, grade and location of each proposed street shall be consistent with streets in the immediate area. However, new streets must meet the minimum current standards. Consideration shall be made for topographical conditions, public safety, convenience and the proposed use of land to be served by such streets.

(3) *Entrances to subdivisions*. In no case shall platted lots have their sole access through an adjacent jurisdiction. As a rule, new subdivisions must have at least two access streets. Entrances shall be 42 feet wide with a 70-foot right-of-way for a minimum distance of 100 feet from the intersection. A developer may request the approval of one access street if the access street has no connecting streets, terminates in a permanent cul-de-sac or provides access to not more than a total of 30 single-family dwelling lots or an equivalent housing unit density comprised of duplex or multi-family structures. In addition to the single point of access situation presented by streets that end in permanent cul-de-sac, a single point of access may be dictated by property configuration, safety or access management restrictions. In determining if a new subdivision may have one point of ingress/egress, consideration shall be given to:

(a) Traffic circulation and emergency vehicle access;

(b) Traffic and pedestrian safety with due consideration given to school bus routes; and

(c) Topography and visibility distances.

(4) *Residential streets*. Internal local streets shall be laid out so as to discourage then-use by through traffic when possible.

(5) *Secondary access streets*. Where a subdivision has frontage on an arterial street, the city may require a secondary access street to facilitate the sharing of curb cuts and/or to separate access to lots from through traffic.

(6) *Projection of streets*. Where adjoining areas are not subdivided, the developer shall design and construct abutting short stub-outs or temporary turnarounds for the projection of streets at proper block intervals into such unsubdivided areas.

(7) *Inadequate or substandard streets*. Inadequate or substandard existing streets and other infrastructure shall be upgraded to city standards by the developer, including dedication of an additional right-of-way if necessary. If development is on one side of such a street, the developer shall dedicate an additional right-of-way if necessary, upgrade the street pavement and associated infrastructure on the side that is being platted. Sidewalks shall be constructed or upgraded (if needed) to city standards by the builder/owner prior to the issuance of a certificate of occupancy.

(B) *Street design standards*.

(1) *Street design*. Street design shall be in accordance with the city's standards and specifications.

(2) *Curbs and gutters*. The developer shall install curbs and gutters on all new streets except as provided in §154.45, unless required in special situations determined by the city.

(3) *Curb cuts*. Restrictions to location, design, size and/or number of curb cuts are as required in the Zoning Code.

(4) *Pavement standards*. Streets shall be paved in accordance with city standards. The city may require increased right-of-way or pavement widths if traffic impacts of the proposed development or conditions in the area merit such changes.

(C) *Street classification*. All streets within the city shall be located and constructed as shown on the thoroughfare plan and, where not otherwise shown thereon, shall be designed as follows.

(1) *Residential streets*. Residential streets shall be 36 feet in width back-of-curb to back-of-curb with a minimum 60 feet of right-of-way. These are streets that serve individual residential lots. They carry low traffic volumes. Where entrances to subdivisions are not part of a collector street, they shall be 42 feet wide with 70 feet of right-of-way for a distance of 100 feet from the intersection.

(2) *Minor collectors*. Minor collectors shall be 42 feet wide, with a minimum of 70 feet of right-of-way. These are streets generally located within subdivisions or between subdivisions to collect traffic from minor (residential) streets and to channel this traffic to the major collectors. Residential lots may front on these streets.

(3) *Major collectors*. Major collectors shall be 48 feet wide with a minimum of 80 feet of right-of-way. These streets are generally located along borders of neighborhoods and within commercial areas to collect traffic from residential areas and to channel this traffic to the arterial system. These are limited access roads on which no residential lots may front (i.e., no driveways shall be allowed) unless there is no other reasonable and safe access to the lot.

(4) *Arterials*. Arterials shall be between 60 and 80 feet wide, depending on the needs and the design as determined by the city. The right-of-way shall be between 90 and 120 feet, depending on the design requirements as determined by the city. These are high volume streets with five or more lanes. These are limited access roads on which no residential lots may

front.

(D) *Miscellaneous street requirements*.

(1) *Property abutting arterials*. Where a subdivision abuts or contains an existing or proposed arterial, the Planning and Zoning Commission may require access streets, reverse frontage with a screening buffer containing a non-access easement along the rear property line, deep lots with rear service alleys or other such treatment as may be necessary for adequate protection of residential properties and to afford separation of through and local traffic.

(2) *Property abutting railroads*. Where a subdivision abuts or contains a railroad right-of-way or limited access highway right-of-way, the Planning and Zoning Commission may require a street approximately parallel to and on the side of such right-of-way.

(3) *Reserve strips*. Reserve strips controlling access to streets shall be prohibited except where their control is dedicated to the city, under conditions approved by the Planning and Zoning Commission.

(4) *Street jogs*. Street jogs with centerline off-sets of less than 125 feet shall be avoided.

(5) *Street intersections*. Streets shall be laid out so as to intersect at right angles, or as nearly as possible to 90 degrees. Six foot concrete valley gutters are required at street intersections where cross drainage will occur.

(6) *Non-cul-de-sac designed dead-end streets*. Dead-end streets shall be prohibited except for short stub-outs for future roadway extensions. Short stub-out streets may require special terminus treatments for drainage concerns and street integrity. Temporary turnarounds are required if they exceed 150 feet in length.

(7) *Cul-des-sac design*. For subdivisions with lots of less than one acre, cul-de-sac streets shall not exceed 800 feet in length (as measured from the right-of-way line of the intersecting roadway to the center of the turnaround). For single-family subdivisions with lots greater than one acre, the length may not exceed 1,200 feet. All cul-de-sacs shall be provided at the closed end with a turnaround having a minimum radius of 38 feet back of curb to back of curb with a 50 foot right-of-way required.

(8) *Street names*. No street names shall be used which will duplicate or be confused with names of existing streets. Street extensions shall use the existing street names. Street names shall be subject to the approval of the Planning and Zoning Commission.

(9) *Street signs*. The city, at the developer's expense, shall install all street signs. The developer shall be charged for the cost of materials only.

(E) *Alleys*.

(1) Alleys shall generally be parallel to the street.

(2) Alley intersections and sharp changes in alignment shall be avoided. Where two alleys intersect, or where an alley turns, additional width may be required to allow for the turning of vehicles or guying of utility poles.

(3) Easements may be required on either side of the alley or alleys for utility placement.

(4) The width of an alley shall not be less than 20 feet.

(5) Dead-end alleys shall be avoided where possible, but if unavoidable, shall be provided with adequate turn-around facilities at the terminus, as determined by the Planning and Zoning Commission.

(6) Alleys shall paved in the same manner as streets.

(F) *Construction standards*.

(1) *Design*. Pavement section design shall be accomplished by a professional engineer and shall be based upon a geo-technical analysis performed by a qualified geo-technical professional. All construction shall conform to Appendix A, Tables I through IV and the following adopted regulations where applicable: § 50.02, Chapter 50 of this Code of Ordinances, adoption of "Standard Specifications for Public Works Construction".

(2) *Street surfaces*. All street wearing surfaces shall consist of concrete or hot mixed asphaltic concrete (HMAC) laid over a base course of crushed stone which has been designed, and compacted in accordance with city standards and requirements.

(3) *Curb and gutter*. All curb and gutter, integral curbs, valley gutters, driveway approaches, drainage structures and the like shall be constructed of Class "A" (3,600 PSI) Portland Cement Concrete per city standards.

(Ord. 2010-08, passed 3-9-10)


Harker Heights

City of Harker Heights, Texas

# Mobility 2030

Ordinance 2014-10 Adopted 05/27/14 Ordinance 2015-22 Supplemented 10/27/15

**Mayors Letter:**

Date: May 28, 2014

To our citizens:

Our City strives to provide transportation opportunities that recognize the diverse nature of our population. Planning for a balanced and functional transportation system is a key element in our plans for growing a successful and sound community. **MOBILITY 2030** lays out the City's plans in relation to transportation.

***MOBILITY 2030*** is a critical update to the City's 2007 Comprehensive Plan that recognizes and embraces a true multi-modal systems approach to the transportation challenges of the future. This system provides a balanced network of roads, streets, sidewalks, trails, and transit opportunities that link our key residential, recreational, business and educational assets. Those operating motor vehicles, pedestrians, cyclists and persons with mobility challenges are all accommodated with transportation options that will meet their particular needs, challenges, and choices.

The definitions and standards contained within this document will guide decision making for years to come and they supersede and override any and all conflicting regulations. ***MOBILITY 2030*** will help ensure that the transportation needs of current and future generations of citizens are met.

Respectfully submitted,

Rob Robinson, Mayor
City of Harker Heights, Texas



Ordinance 2014-10 Adopted 05/27/14 Ordinance 2015-22 Supplemented 10/27/15

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# Section I

# Thoroughfare Plan

## Definitions

**Collector** – Street designed to distribute traffic between more principal traffic routes and residential streets within the neighborhood. Collectors often support cycling and pedestrians in the absence of sidewalks and trails, and must balance the need to move automobile traffic with maintaining and enhancing neighborhood character and the public realm.

**Context Sensitive Design Manual** – Designing Walkable Urban Thoroughfares: A Context Sensitive Approach is a design guide published by ITE, FHWA, and CNU. It is adopted by TxDOT as a preferred design manual due to the focuses on meeting the needs of stakeholders and users; preservation of scenic, aesthetic, historic, and environmental resources; safety, efficiency, capacity, and maintenance; and integration of the values and objectives of compatibility, livability, sense of place, urban design, and environmental impacts into public investment.

**Critical Intersection** – The confluence of several travel modes into an area where public safety is the primary concern. Pedestrians, cyclists, transit users and automobiles must share this space and designs must accommodate safety enhancements for all users.

**Design Speed** – A selected speed used to determine the various geometric design features of the roadway and is used explicitly for determining minimum values for highway design such as horizontal curve radius and sight distance.

**Green Book** – A Policy on Geometric Design of Highways and Streets is a design guide published by AASHTO. The Green Book is the dominant reference publication for geometric design in the U.S. and its application involves selecting a "design speed." The Green Book recommends that topography, anticipated operating speed, adjacent land use, and functional classification be considered, and as high a design speed as practical be selected.

**Minor Arterial** – High speed and high volume roads that move traffic between activity nodes. They are limited access roads with no single or two-family direct access. Movement and speed are the primary function.

**Principal Arterial** – High speed and high volume, multiple lane roads that move traffic between activity nodes. They are limited access roads with no single or two-family direct access. Movement and speed are the primary function.

**Definitions (Continued)**

**Residential Street** – A low speed, low volume street that supports neighborhood integrity by simultaneously providing for vehicular movement, social contacts, and civic activities within a neighborhood unit.

**Road** – A transportation facility designed to provide speed and efficiency of movement between places; any reduction in the speed and efficiency devalues that facility. Roads connect places: they get you from a-to-b. They have minimum distractions on the side, infrequent intersections, and are wide enough for course corrections at speed.

**Street** – Shared multimodal transportation spaces containing intersections with crosswalks; sidewalks which provide access to property, homes, and businesses; pedestrians and cyclists; and parking and transit. Streets facilitate mixed activities such as vehicles pulling over to park, vehicles entering and emerging from side-streets, pedestrians and cyclists moving along or crossing the streets, and buses stopping and starting. Maximum street speed should be 20 – 25 mph with lane widths of 10 feet.

**Target Speed** – A design principal where the geometrics are specifically applied so that a maximum speed is limited to an acceptable range that is dependent on the context.

## Policy Statement

The Thoroughfare Plan is referenced in the Harker Heights Code of Ordinances throughout the street layout section of the Subdivision Code. The street layout section opens with §154.37(A)(1), which states:

> *(1) Thoroughfare plan.* Proposed streets must be in conformance with the city thoroughfare plan. All arterial and collector street locations, alignments, right-of-way widths, pavement widths and cross-sections shall be in accordance with the adopted plans and standards. Streets that are not on the thoroughfare plan and are proposed to collect traffic from residential streets shall be designed and constructed as collectors.

This section gives the City the authority to require all proposed street layouts for future subdivisions to follow the Thoroughfare Plan. Further, this section requires proposed streets whose function appears to be a collector to be designed and constructed as a collector, meeting all requirements set forth in the Thoroughfare Plan.

## Use of the Thoroughfare Plan

The Thoroughfare Plan establishes a long-range guide for the location and function of roads and streets. It recognizes the basic functions of roads, such as Arterials, as moving traffic quickly between activity centers. Movement, capacity, and speed are the driving influence in road design.

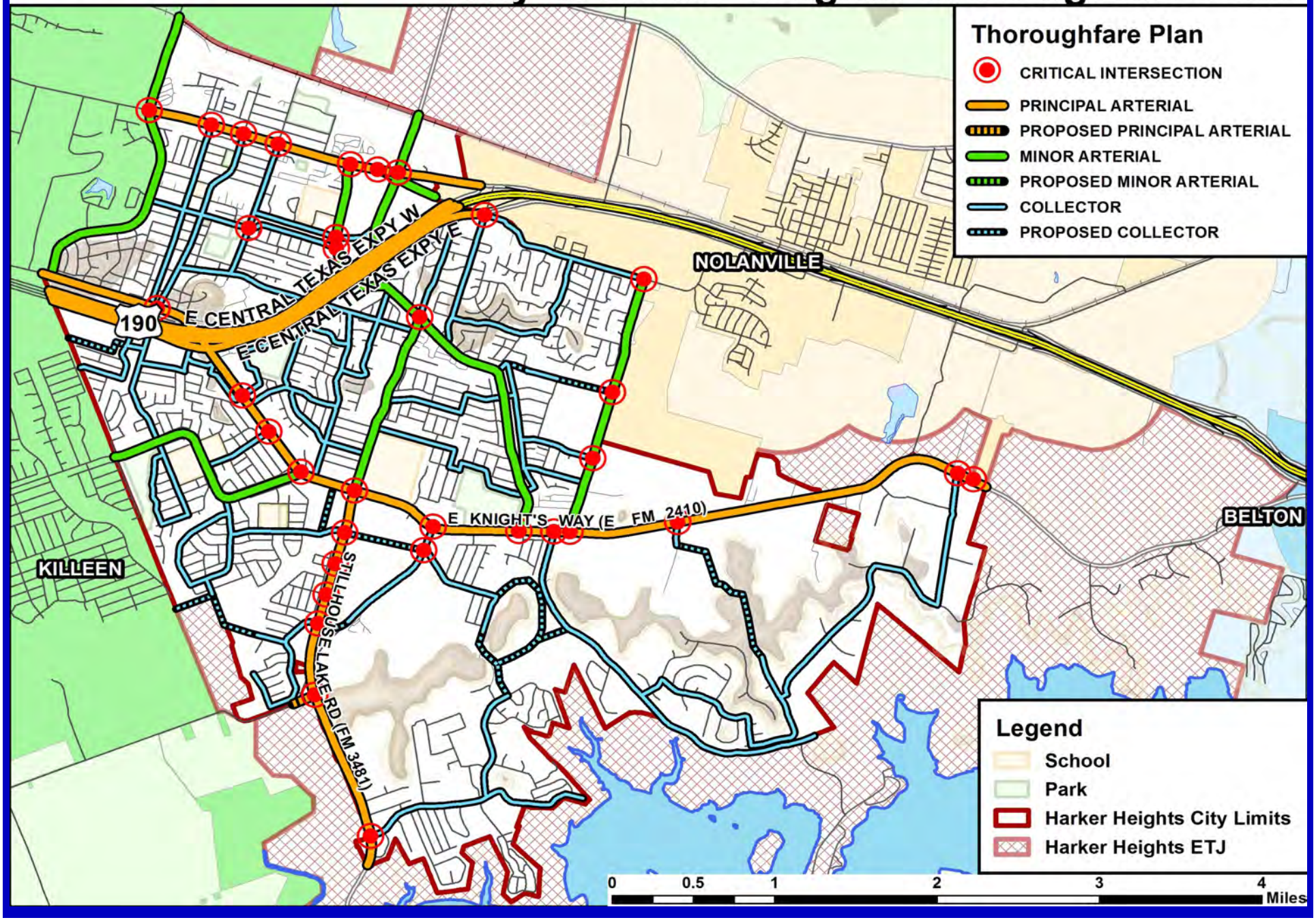
Streets, such as Collectors, function as conduits that gather or collect users from low speed, low volume areas and move them to other higher volume and higher speed facilities. Collectors must be designed within specific parameters so that safety and cost are the principal consideration.

Streets are also recognized as public investments that capture value from development, aesthetics, and social interaction. The inclusion of sidewalk and trail networks, lighting, landscape plantings, transit options, and other enhancements ensure that a full contingent of uses and users benefit from the street. Properly designed streets become activity areas that support human interaction, vehicular travelers, pedestrians, and cyclists.

By recognizing basic functions and context sensitive design considerations, and by applying these ideals to new construction as well as to the rehabilitation of older streets and roads, these public facilities begin to serve a full range of users and modes of transportation.

Map Date: 5/20/2014

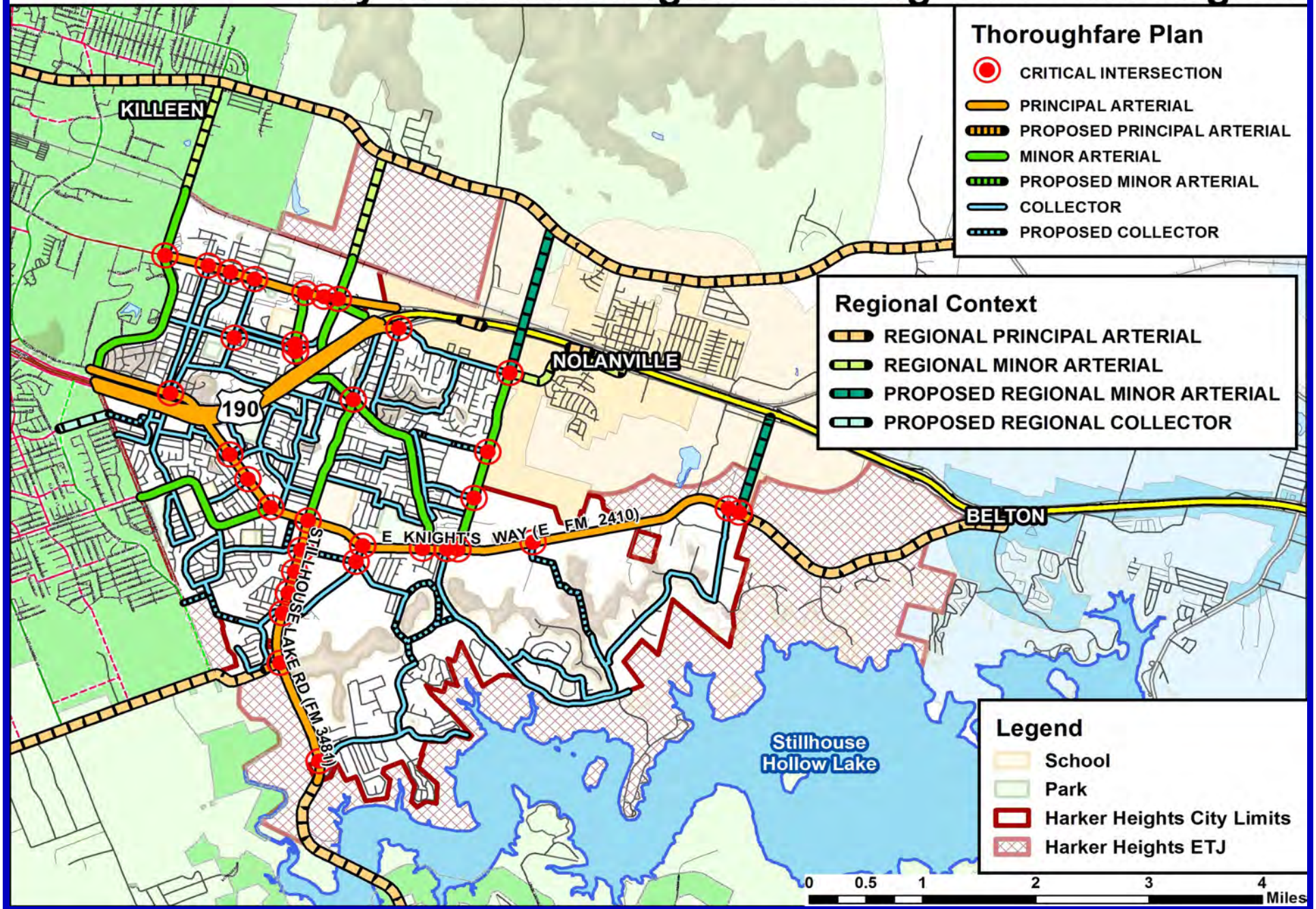
# City of Harker Heights Thoroughfare Plan




Ordinance 2014-10 Adopted 05/27/14 Ordinance 2015-22 Supplemented 10/27/15

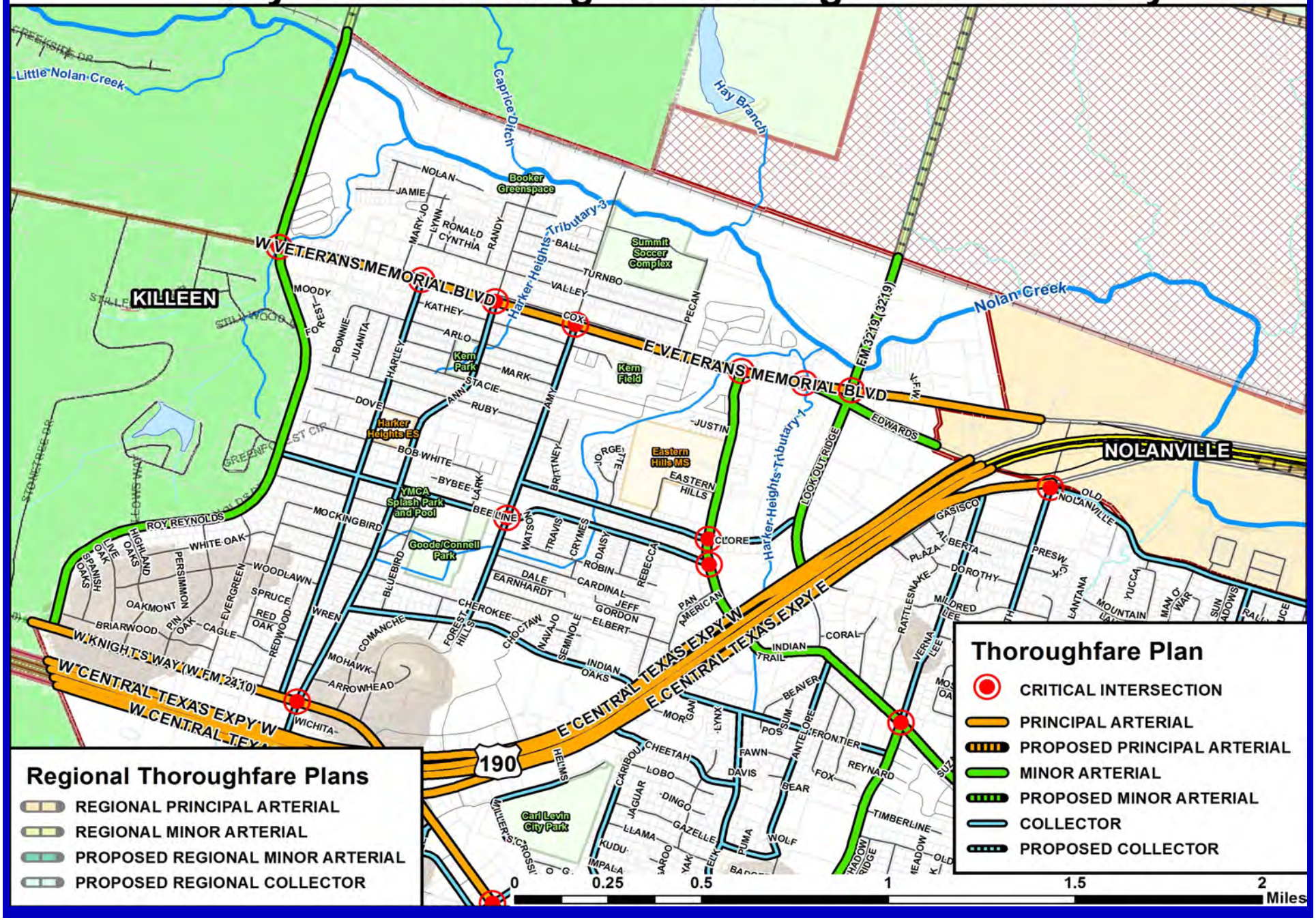
Map Date: 5/20/2014

# City of Harker Heights Thoroughfare Plan Region



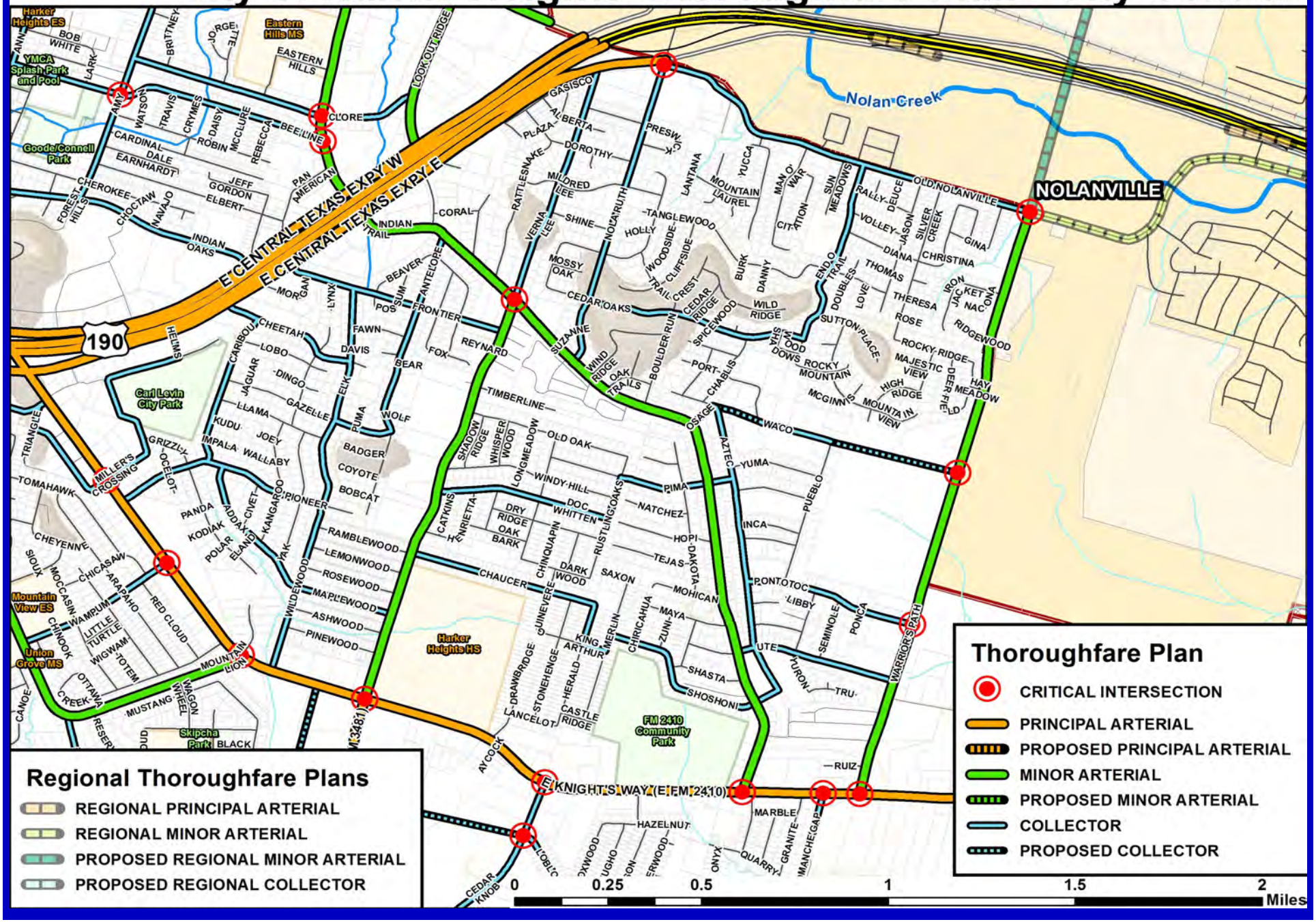
Map Date: 5/20/2014

# City of Harker Heights Thoroughfare Plan - City North



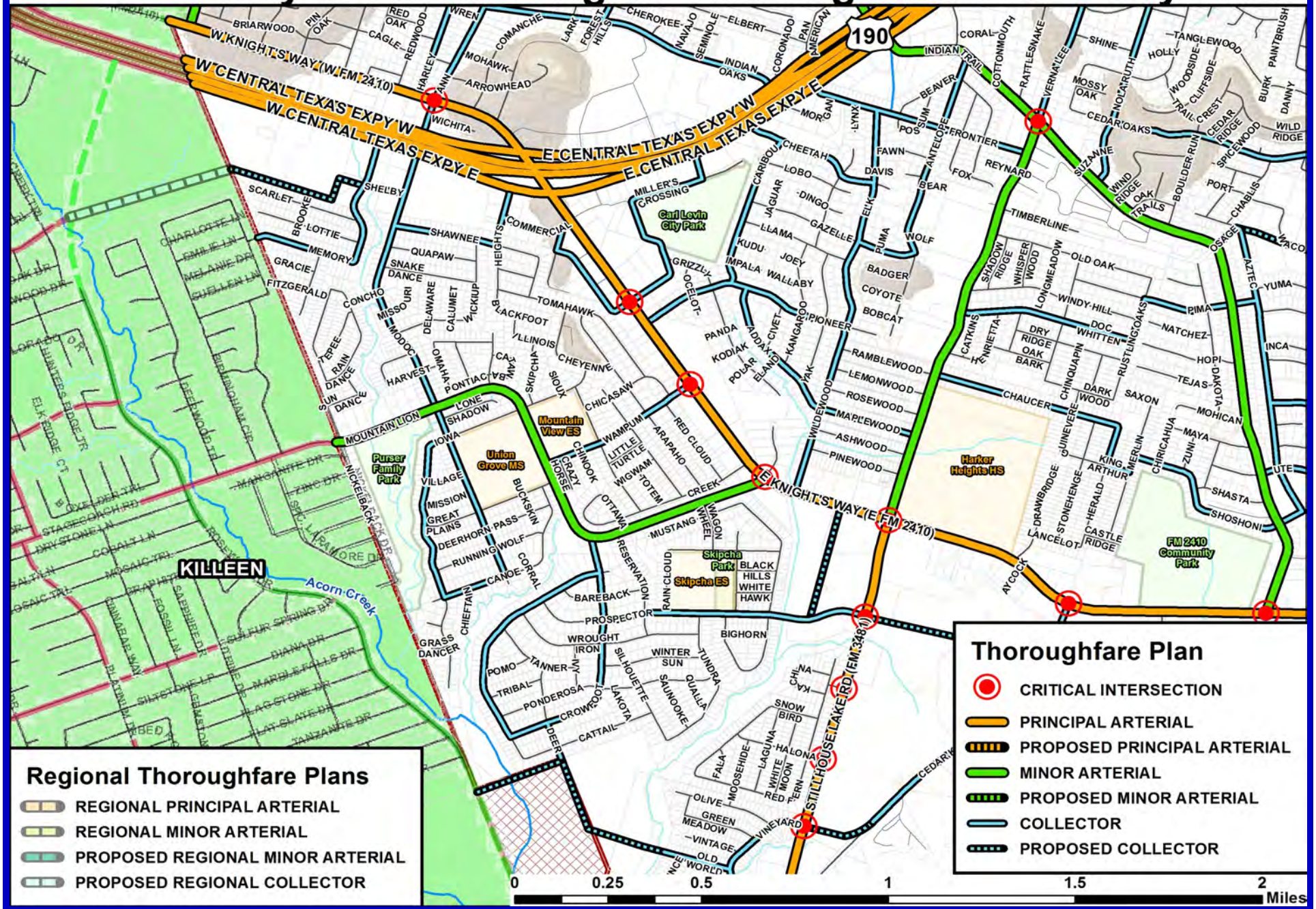
Map Date: 5/20/2014

# City of Harker Heights Thoroughfare Plan - City Central



Map Date: 5/20/2014

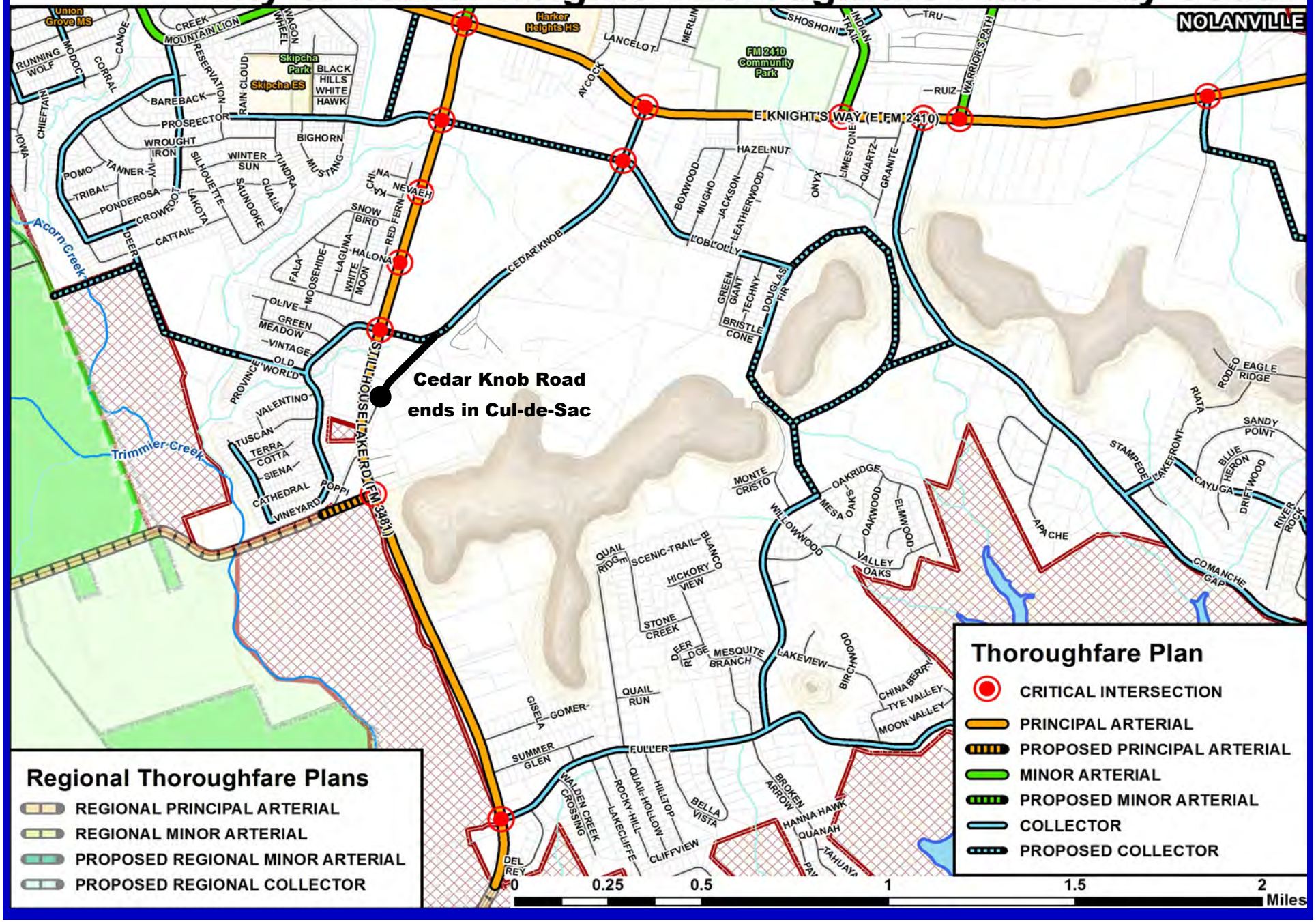
# City of Harker Heights Thoroughfare Plan - City West




Ordinance 2014-10 Adopted 05/27/14 Ordinance 2015-22 Supplemented 10/27/15

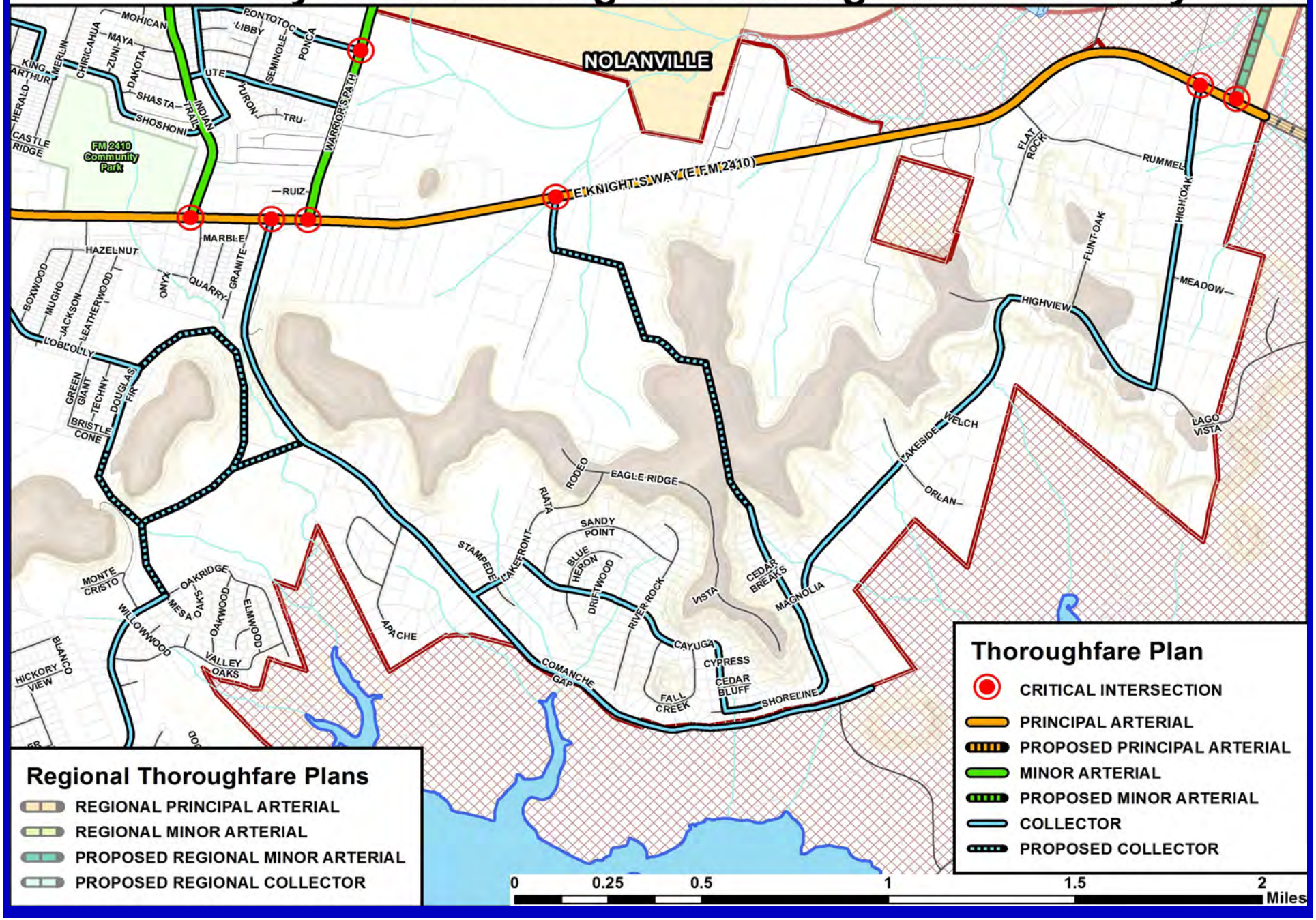
Map Date: 5/20/2014

# City of Harker Heights Thoroughfare Plan - City South



Map Date: 5/20/2014

# City of Harker Heights Thoroughfare Plan - City East



# Section II

# Sidewalk Plan

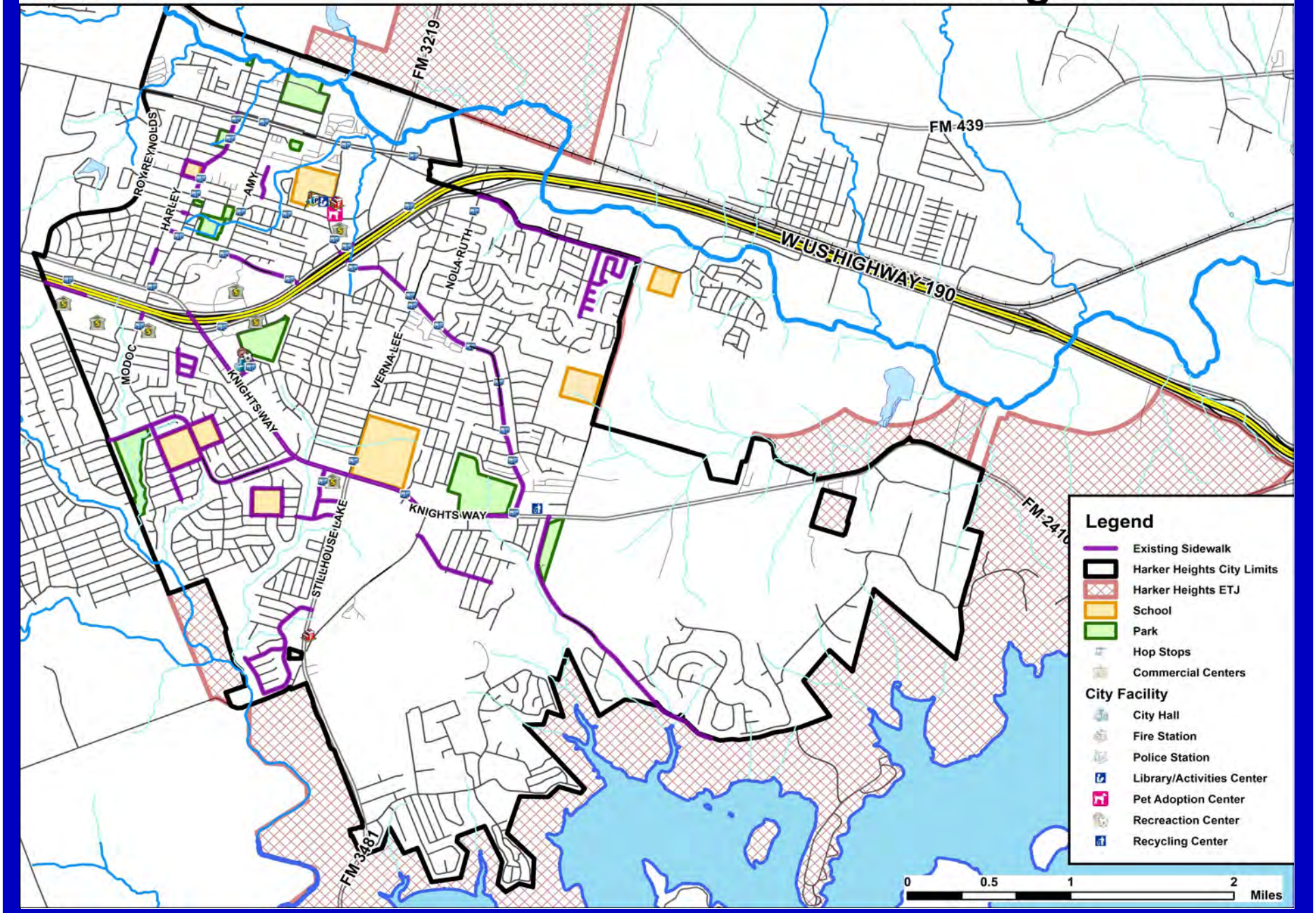
## Introduction

Providing paths for pedestrians has always been fundamental to community building, and while the need for and function of sidewalks has changed, it has not disappeared. The basic purpose of sidewalks is to provide a safe location for people to walk separated from motorized or mechanized vehicles. Sidewalks are an elemental form of transit, connecting people to public transit, schools, work, shopping, services, and cultural or recreational facilities and activities. They provide a space for spontaneous social interaction. They are increasingly used as a recreation and health amenity in themselves for walkers and joggers. For families with young children, sidewalks provide a safe and dedicated space for youngsters to learn to ride a bike or rollerblade.

The City previously had limited sidewalk requirements which has led to fragmented sidewalk network as seen on the Existing Sidewalk Network Map. For all of these reasons the City of Harker Heights has recognized the need for sidewalks to be constructed by individuals or businesses developing land in the City. The overriding goal is to provide pedestrian connections within neighborhoods, connections between neighborhoods, and connections from homes to services, facilities, and amenities in the community. The Plan articulates policies for where new sidewalks should be installed, effectively and rationally deals with new installations in developed areas, and sets guidelines on materials and size for construction.

# Existing Sidewalks

Map Date: 10/27/2015



## Definitions

**Promenade Sidewalk -** The main function of Promenade Sidewalk is to provide inter-community accessibility connecting community centers or major facilities as well as critical intersections in the City. It is the primary location for high volumes of pedestrians congregating, making transfers to other modes or walking to a destination. They serve high density residential, retail, service, industrial, and mixed uses. Promenade Sidewalks will be 6 to 10 feet wide mixed use paths on both sides of the street featuring numerous amenities such as benches, community flags and banners, water fountains, mile markers, and pet waste stations. They are primarily located along principal arterial streets in the City.

**Connector Sidewalk -** Connector Sidewalks connect with the principal sidewalk system to accommodate trips of moderate length with a lower level of travel mobility and a higher level of land access. Connector Sidewalk collects residential paths and channels them to public nodes such as parks, schools, and other public facilities and commercial nodes such as hospitals and shopping centers. They are 6 to 8 feet wide mixed use paths on both sides of the street featuring limited amenities such as benches and mile markers. They are primarily located along minor arterial streets in the City.

**Residential Sidewalk -** Residential Sidewalks are commonly located along neighborhood borders and collect traffic from residential areas and channel people to the Connectors and Promenade. They are 5 to 6 feet wide pedestrian paths on one or both sides of the street. They are primarily located along collector streets and some minor arterial streets in the City.

## New Sidewalk Installation and Classification

As a general policy, the Sidewalk Plan calls for concrete sidewalks along streets in the City of Harker Heights. The amount and location of sidewalks will vary depending on the type of street and its function. Table One describes the minimum standards and location for side-walks. Sidewalk Classifications are shown on the City of Harker Heights Sidewalk Plan.

On all new designated streets, sidewalks will be constructed as required in Table One unless an alternative is deemed necessary by the Planning and Zoning Commission, with the recommendation of the Public Works Department (PWD).

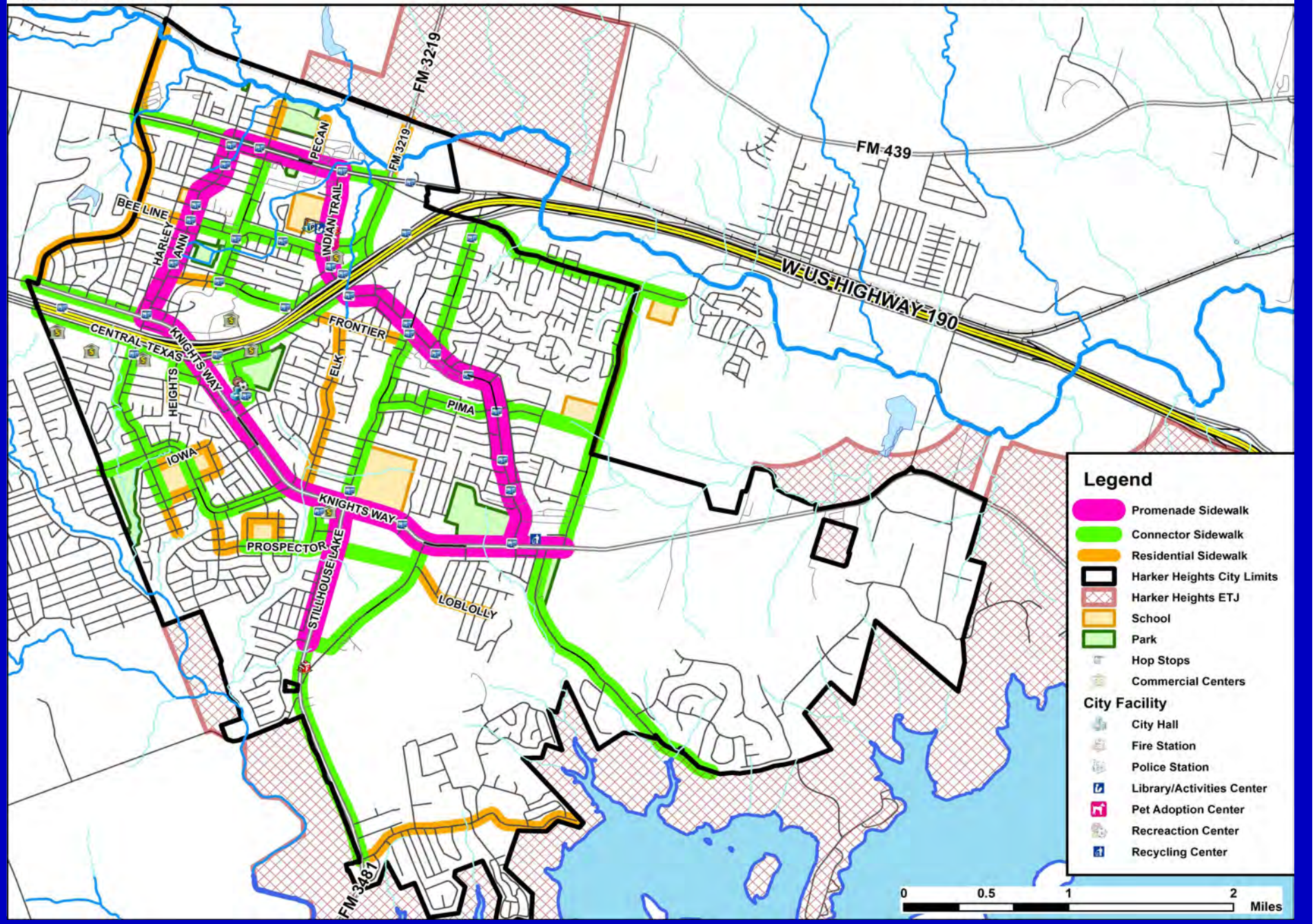
On all existing designated streets sidewalks will be required as identified on the Sidewalk Location Map unless an alternative is deemed necessary by the Planning and Zoning Commission, with the recommendation of the Public Works Department (PWD).

***TABLE ONE - SIDEWALK CLASSIFICATION SUMMARY***

| Sidewalk Classification | Sidewalk Width (feet) | One Side | Two Sides | Amenities |
|---|---|---|---|---|
| Promenade Sidewalk | 6 -10 | | X | Benches, Bicycle Racks, Mile Markers, Pet Waste Stations, Water Fountains |
| Connector Sidewalk | 6 - 8 | X | X | Benches, Mile markers, Bicycle Racks |
| Residential Sidewalk | 5 - 6 | X | X | |

# Sidewalk Network

Map Date: 10/26/2015



Regardless of the general policy and standards recommended in this Plan and contained in Table One above, the location of sidewalks on existing streets shall be based on the Sidewalk Network Map which is a part of this Plan. In some cases the Plan may require that sidewalks be built on both sides of an existing street if it is deemed necessary for pedestrian safety given the proximity to schools, the housing density of the neighborhood, and other factors to be determined by City Staff.

## Sidewalk Construction Details

(A) In developments in which the original application for approval is filed after the effective date hereof, the developer/property owner shall construct sidewalks on both sides of all streets, private access drives, passage easements and other circulation routes. Sidewalks shall be installed by the developer at the time of development, and owners of lots that remain undeveloped must construct sidewalks within two years after the date of approval of the final plat. Sidewalks must be constructed and accepted by the city prior to the issuance of a certificate of occupancy.

(B) Sidewalks shall be constructed one foot from the property line in the rights-of-way adjacent to their lots, whether on the front, side, or rear of the lots, with a minimum six foot buffer strip behind the back of the curb or edge of pavement. New sidewalks shall be properly connected with existing sidewalks and constructed according to city standards. Streets designated by the Thoroughfare Plan for use as a collector or larger shall require a minimum six foot wide sidewalk. All other sidewalks shall be a minimum of five feet in width.

(C) The appearance of a sidewalk (scoring pattern or special paving) shall be maintained across commercial driveways and alley access points, and crosswalks shall be marked at all legs of the intersection. Obstructions such as, but not limited to, fire hydrants, telephone poles, and street signs, shall not be located within a sidewalk, unless written approval of such is obtained from the Director of Public Works.

(E) An alternative sidewalk design may be approved in writing by the Director of Public Works where there are unusual and practical difficulties in carrying out the provisions set forth by this code, provided the alternate design will not adversely affect any adjoining property or the general public.

(F) Exemptions. Division (A) of this section shall not apply to:

(1) Large-lot residential subdivisions, where lots are one acre or larger in size;

(2) Cul-de-sacs with a throat length of one lot or fewer; or

(3) Improvements to existing developments on streets not identified in the sidewalk network where the majority of the developed portions of the street do not have sidewalks present.

# Section III

# Off-Street Hike and Bike Trail Network Plan

# Section IV

# On-Street Striping Plan for Biking and Pedestrians

# Section V

# Transit Planning

# chapter 4

# Regional Roadway System

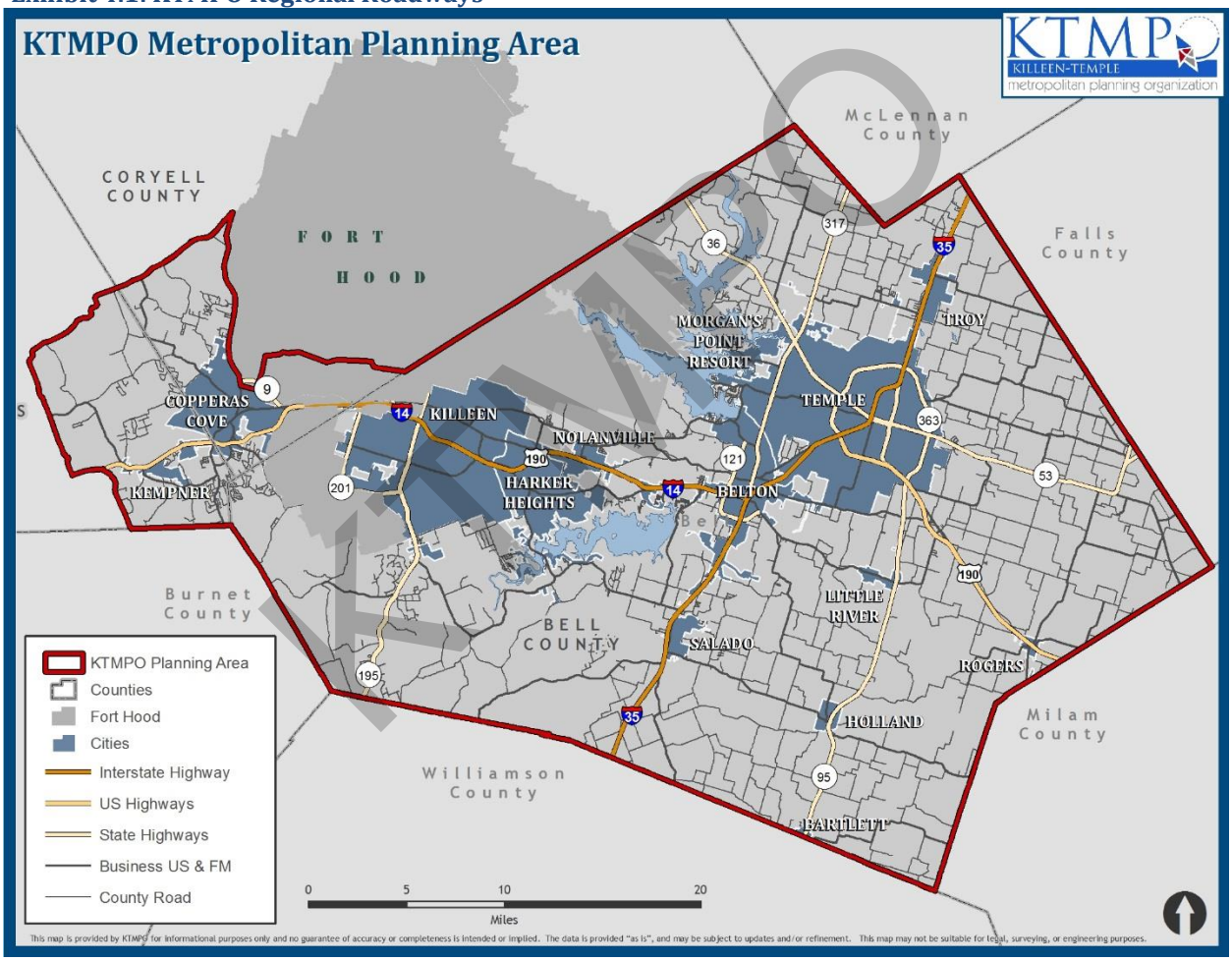


The KTMPO regional roadway system features **3,700 miles of roadway with 71 miles interstate, 107 miles of US highway and 135 miles of state highway.** On average there are approximately 4,500,000 daily vehicle miles traveled. These roadways are vital to business, rural farmers to market, military deployment,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

## REGIONAL FUNCTION OF MAJOR TRANSPORTATION FACILITIES

The Killeen-Temple Metropolitan Planning Organization (KTMPO) is situated in Central Texas and benefits greatly from growth economically. Central Texas maintains major roadway facilities that are vital to commerce, manufacturing and the military. As stated in the previous chapter, the KTMPO region expects to add another 206,000 in population by 2045. 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 and security for Texas and the United States.

**Exhibit 4.1: KTMPO Regional Roadways**




The KTMPO region is home to nationally known manufacturers of goods, distributers 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. Major highways such as I-35 and US 190/I-14 provide a safe and efficient way to move products through the State and the nation.


As of 2015, the Killeen-Temple-Fort Hood metro area is #9 in Texas based on population. From 2010 through 2015, the KTMPO region grew an estimated 5% and projections show that growth in the KTMPO region is expected to increase by an estimated 56% by 2045. As previously stated, these growth factors have a significant impact on the future KTMPO transportation facility needs. With growth comes the growth pains of congestion. Congestion in the KTMPO region has a significant impact on the region's ability to maintain air quality, effectively move goods, people and services, and to decrease transportation cost. KTMPO's goal is to maintain a safe, reliable, functional and efficient transportation system for the growing population, 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 reservoirs. Belton Lake covers 12,300 surface acres and Stillhouse Hollow Lake covers 6,430 acres. These lakes are critical for water resources and flood control, but also provide recreational users with 15 parks to visit for hiking, biking, boating, and swimming.

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 4th 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 4th 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".

With thousands of tourists visiting 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 Central Texas College and Texas A&M University - Central Texas in Killeen; University of Mary Hardin Baylor in Belton; and Temple College in Temple. Each of these facilities are 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. Along each of the KTMPO major transportation facilities, users of these facilities consist of businesses, 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.

In 2018, KTMPO developed a Regional Multimodal Plan which includes the Regional Thoroughfare and Pedestrian/Bicycle Plan. However, this plan expands its focus to include how other multiple transportation modes such as transit, freight and air interaction with the roadway and bike/pedestrian network and provides an outline on how to plan for developing an integrated and comprehensive regional transportation network. The plan can be found in **Appendix E, Regional Multimodal Plan.**

## TYPICAL CROSS-SECTIONS BY FUNCTIONAL CLASSIFICATION

The cross-section designs that follow are taken from the Regional Multimodal Plan and are tailored for each classification in the KTMPO planning area. More details on the development of the typical sections can be found in **Appendix E, Regional Multimodal Plan**. Future regional thoroughfare plans are depicted in Exhibits 4.8 through 4.12.

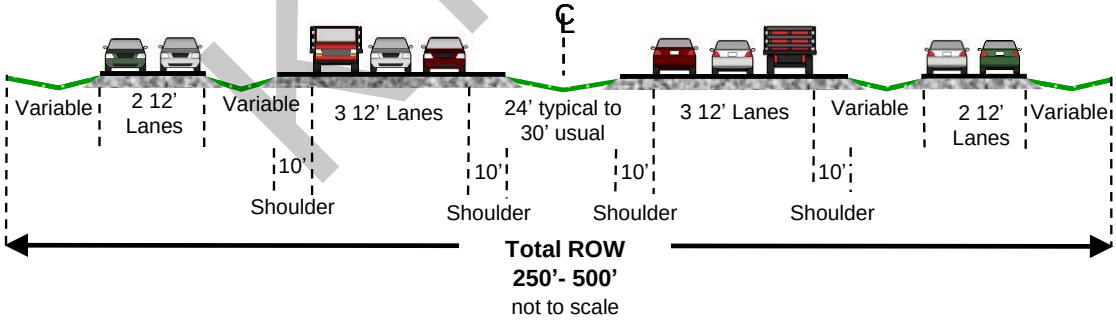
### Controlled-Access Functional Classification

General design standards for Controlled-Access Function Class call for a minimum right-of-way width of 250' for four lanes, with the desirable standard being six lanes and 500'. Design details are determined by TxDOT. Bicycles and pedestrians are prohibited due to the high speeds of these classes of road, so the design of supporting bicycle and pedestrian infrastructure (including shared use of wide shoulders) is not applicable.

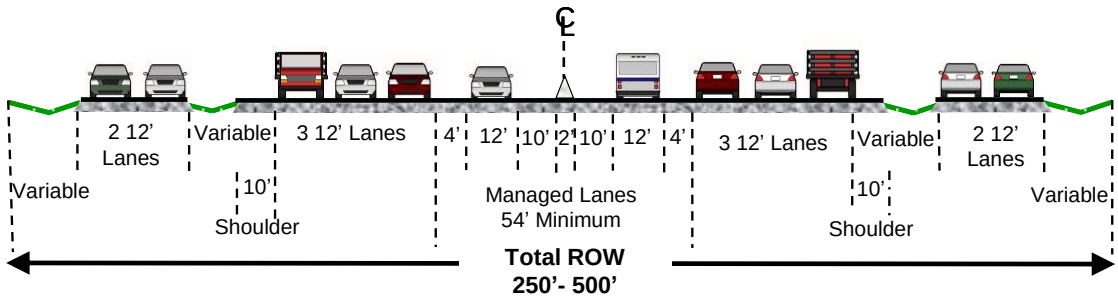
Where a wide grassy median is not desired, a raised concrete median such as a "Jersey barrier" can be installed. The use of Jersey barriers can serve as the base for light standards, sign posts, bases for the retaining walls between the main lanes and the frontage roads.

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

**Controlled Access Facility (4-6 Lanes) with Frontage Roads**




**Controlled Access Facility (4-6 Lanes) with Managed Lanes and Frontage Roads**



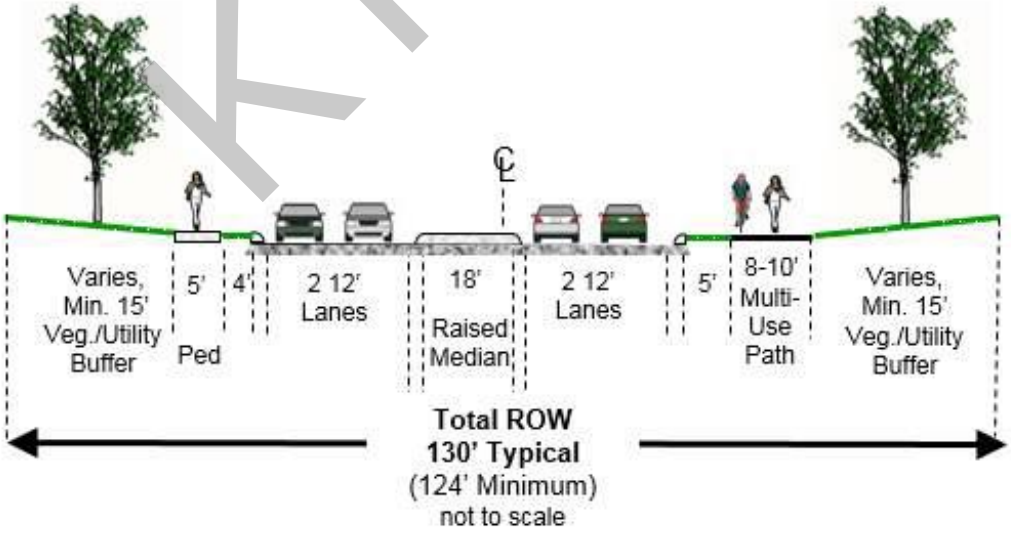
## Major Arterial Functional Class

Major Arterial Functional Class general design standards call for a 130' minimum right-of-way for a four-lane facility, with 160' desirable for six lanes. A travel lane width of 12' as specified is common for existing Major Arterials in the KTMPO region, but Complete Streets and Vision Zero guidance calls for narrowing travel lanes to 11' to slow traffic to speeds that are safer for all road users.

For divided Major Arterials, a minimum median width of 18" is desirable. The median divider can be a permanent feature such as a curb or a raised concrete barrier or can be landscaped. For landscaped medians, a minimum width of 15" is recommended. Typical practice in the KTMPO region has been to install wider grassy medians, with widths of 15' typical for older urban streets such as Ave H in Temple, and 20' to 40' typical for new construction streets in suburban areas such as SH 201 in Killeen and S. 5th Street in Temple.

Bicycle and pedestrian facilities are permitted on Major Arterials and lower Functional Classes. Therefore, the cross sections for typical Major Arterials include sample variations in the different classes of bicycle and pedestrian infrastructure as well as differences in the number of lanes, lane widths, medians, and other road attributes. Typical cross-sections are shown in Exhibit 4.3.

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



## Minor Arterial Functional Class

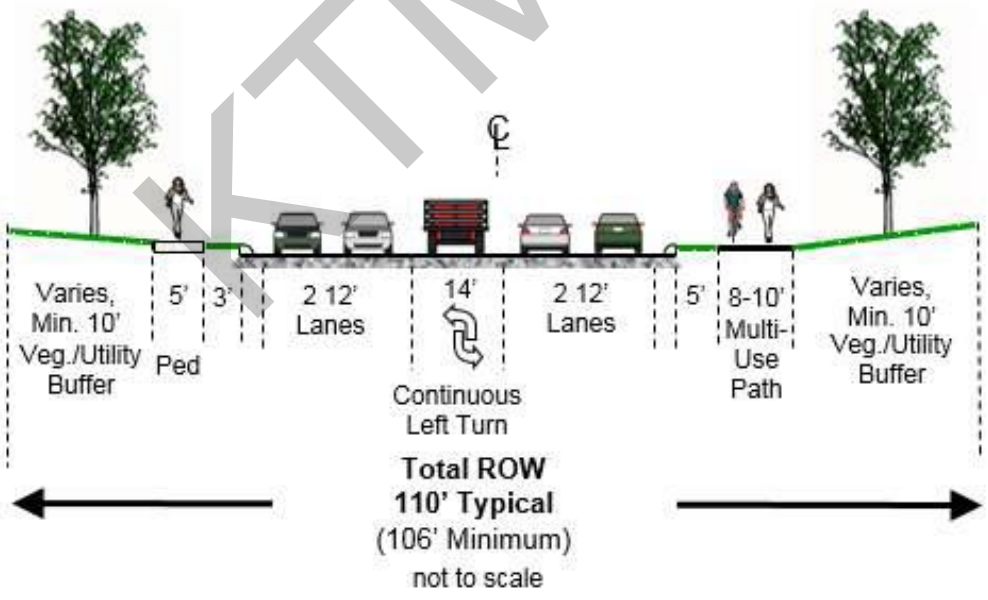
Minor Arterials general design standards call for a minimum right-of-way of 80’ for three lanes, increasing to 110’ for four lanes. The desirable right-of-way is 120’, which will accommodate five lanes.

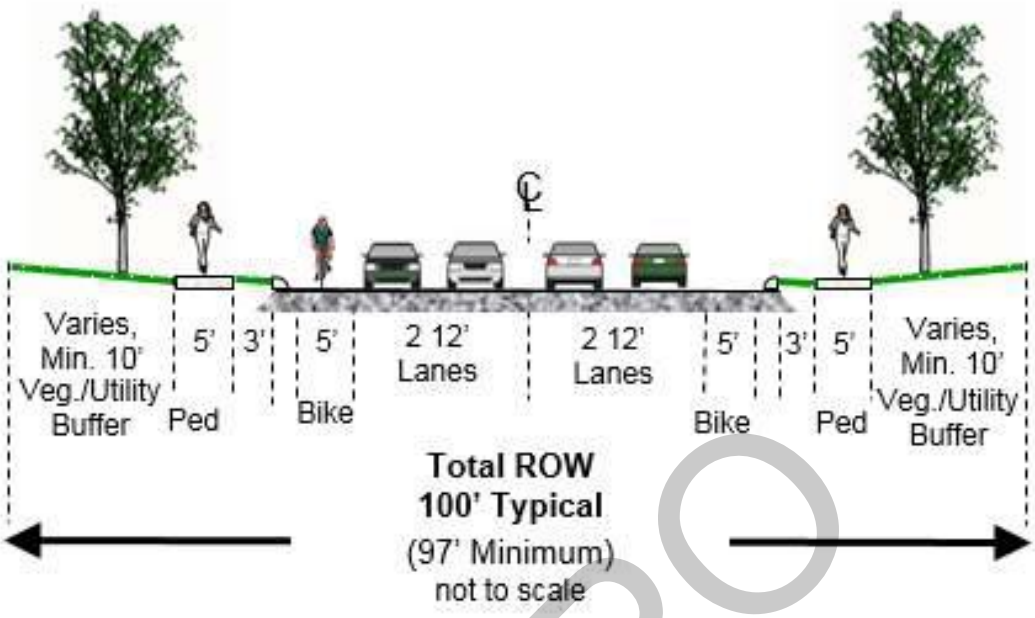
As with Major Arterials, a travel lane width of 12’ is common in the KTMPO region. The Complete Streets and Vision Zero guidance calling for travel lanes of 11’ to slow traffic to speeds that are safer for all road users is even more pertinent for Minor Arterials, given their position in the access/mobility continuum that has greater emphasis on access and on multimodal uses.

A continuous center turn lane has been recommended as an appropriate median treatment for Minor Arterials, with a desirable width of 16’. Landscaped buffer areas on the edges of Minor Arterials are recommended with a 10’ width.

Minor Arterials may have greater accommodations for bicycles and pedestrians than Major Arterials, as they typically have lower speeds, lower traffic volumes, and a smaller percentage of trucks in the traffic stream. Separated off-street paths or sidewalks and a separated off-street multi-use may be included along Minor Arterials.

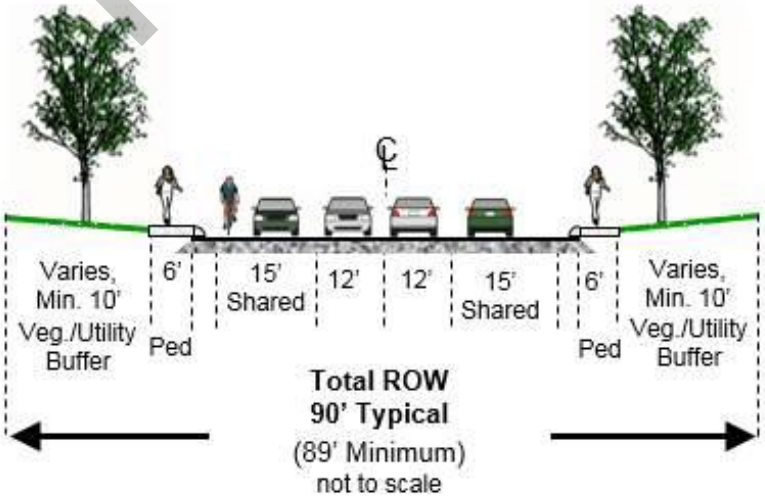
**Exhibit 4.4: Typical Cross-Sections—Minor Arterials**






More extensive bicycle and pedestrian accommodations are shown in the cross section in below. Separated off-street paths or sidewalks and on-street conventional unbuffered bike lanes are shown.

The next cross-section shows a typical four-lane Minor Arterial with wide outside lanes, intended to permit autos and bicycles to safely share a lane. The recommended width of the shared lane is 15'. The wider outside lanes should be carefully marked with visual clues to discourage excessive vehicle speeds and preserve street safety for all users. The width of the street can compromise the safety of the pedestrian crossing, but this can be mitigated by the use of median pedestrian refuges and well-marked crosswalks.



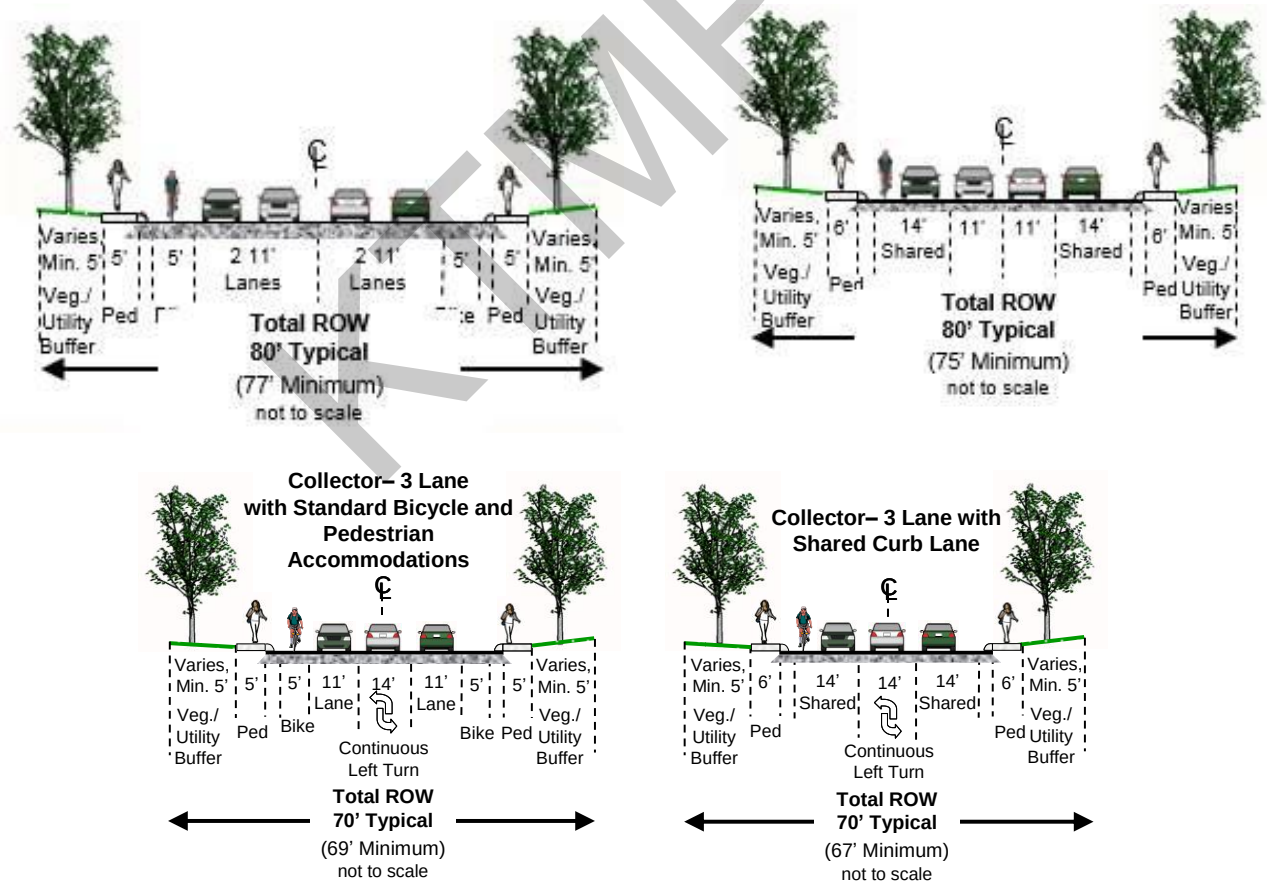
## Collector Functional Class

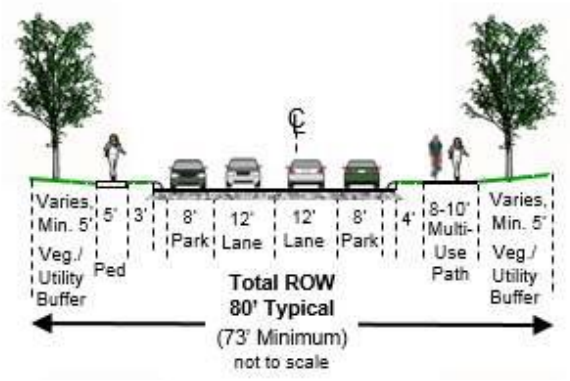
Collector Functional Class is the Functional Class which is most geared to providing access. With mobility as a less critical attribute, narrower lane widths of 11’ are recommended, although widths as narrow as 10’ are cited in Complete Streets and Vision Zero guidelines. Shared auto and bicycle outside lanes may be as narrow as 14’. Minimum right-of-way of 60’ for two lanes and 70’ for three lanes are listed in the guidance. For four lanes, a desirable right-of-way is 80’.

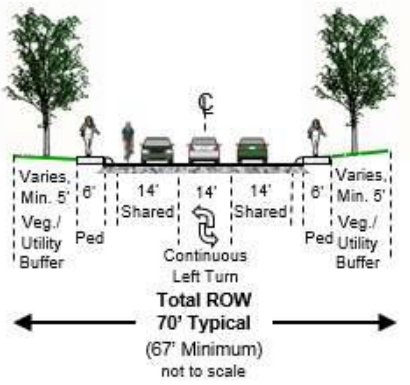
Due to the lower speeds and lower volumes of traffic, continuous center turn lanes on Collector Streets may be as narrow as 14’. Medians and buffers should have a minimum width of 5’.

More extensive bicycle and pedestrian treatments should be expected on Collector Streets.

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





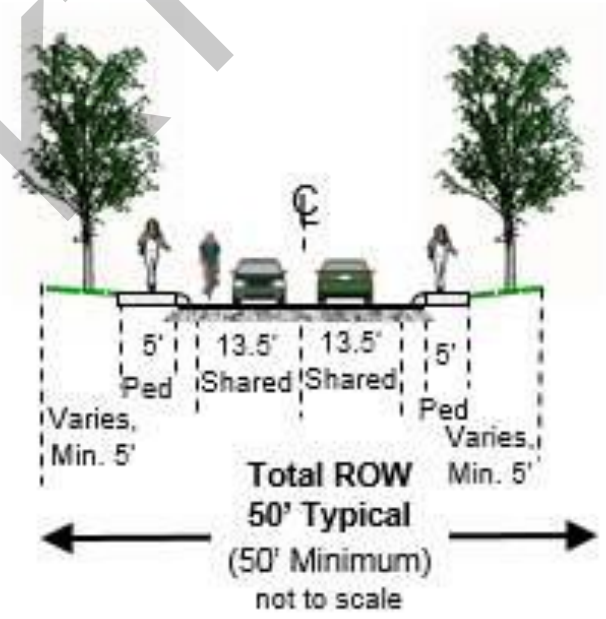




## Local Street Functional Class

Local Functional Class Streets have the lowest speeds and volumes of all the Functional Classes. With these attributes, travel lane widths can consistently be narrower, with 10.5' recommended as a minimum. Widths as narrow as 10' are cited in Complete Streets and Vision Zero guidelines.

A right-of-way width of 50' is recommended for Local streets. The Exhibit 4.6 shows a typical cross section for a two-lane local street. In this illustration, shared lanes of 13.5' are provided. Narrower travel lane widths may be implemented to reduce traffic speeds to levels that are safe for users of all ages and abilities.

**Exhibit 4.6: Typical Cross-Sections—Local Street Functional Class**



The table below summarizes the recommendations for right-of-way (ROW) considerations by street Functional Class. Minimum ROW is based on 4 lanes for Principal Arterials, 3 lanes (two travel lanes and a center turn lane) for Minor Arterials, and 2 lanes for Collectors and Local streets.

**Exhibit 4.7: Summary of ROW Requirements Recommendations by Functional Class**

| Design Element | Controlled-Access | Major Arterial | Minor Arterial | Collector | Local |
|---|---|---|---|---|---|
| **Preferred ROW Width** | Varies up to 500' | 160' | 120' | 80' | 50' |
| **Minimum ROW Width** | 250' | 130' | 80' | 60' | 44' |
| **Typical Pavement Width (BOC to BOC)** | Varies | 82' to 106' | 47' to 75' | 31' to 57' | 23' to 29' |
| **Auto Lane Width** | Minimum 12' | Preferred 12' | Preferred 12' | Minimum 11' | Minimum 10.5' |
| **Median Treatment** | Rural: Minimum 36'<br>Urban: Minimum 10' | Preferred18' | Continuous Center Left Turn Lane Preferred 14' Minimum | Continuous Center Left Turn Lane Preferred 14' Minimum | None |
| **Outside Vegetation/Utility Buffer (minimum)** | Varies | 15' | 10' | 5' | 5' |
| **Notes** | Inside Shoulder: Minimum 4'<br>Outside Shoulder: Minimum 10'<br>Vertical Clearance: Minimum 14' | ROW may be greater with parking, bicycle and pedestrian facilities, bus stops, and intersection treatments. | | | |

**Exhibit 4.8: KTMPO Regional Thoroughfare**

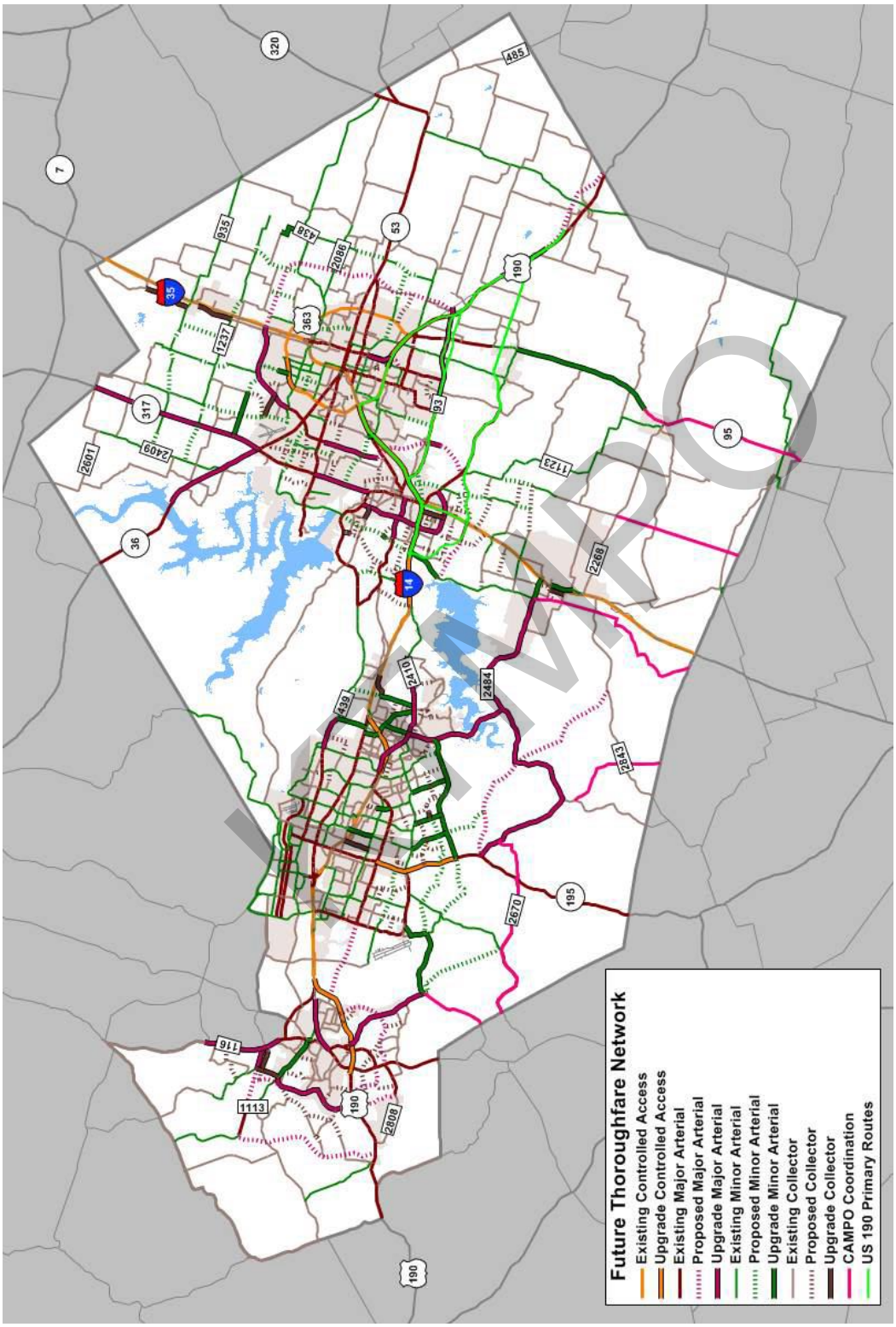


**Exhibit 4.9: KTMPO Regional Thoroughfare (Copperas Cove)**

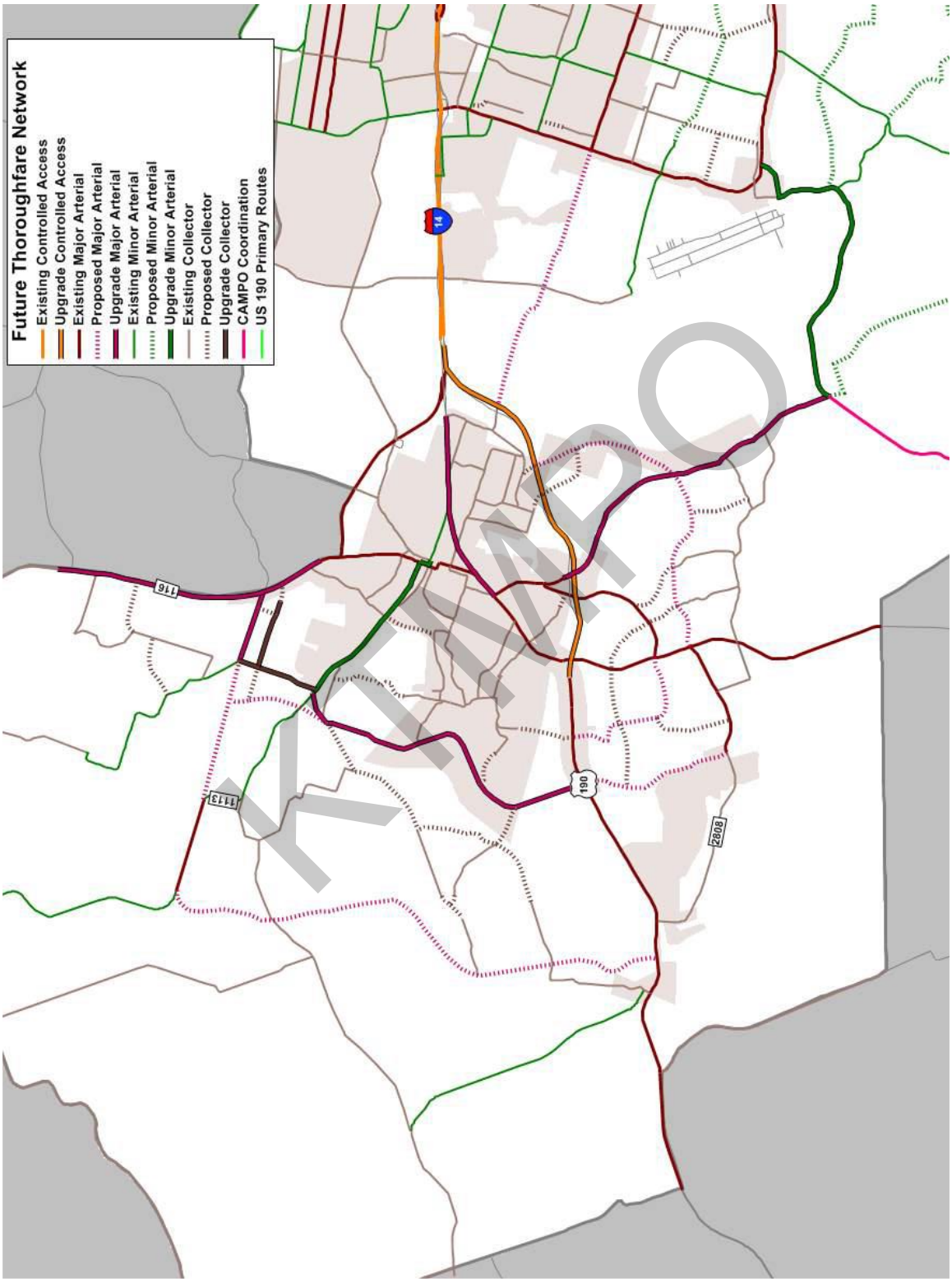


**Exhibit 4.10: KTMPO Regional Thoroughfare (Killeen, Harker Heights, Nolanville)**

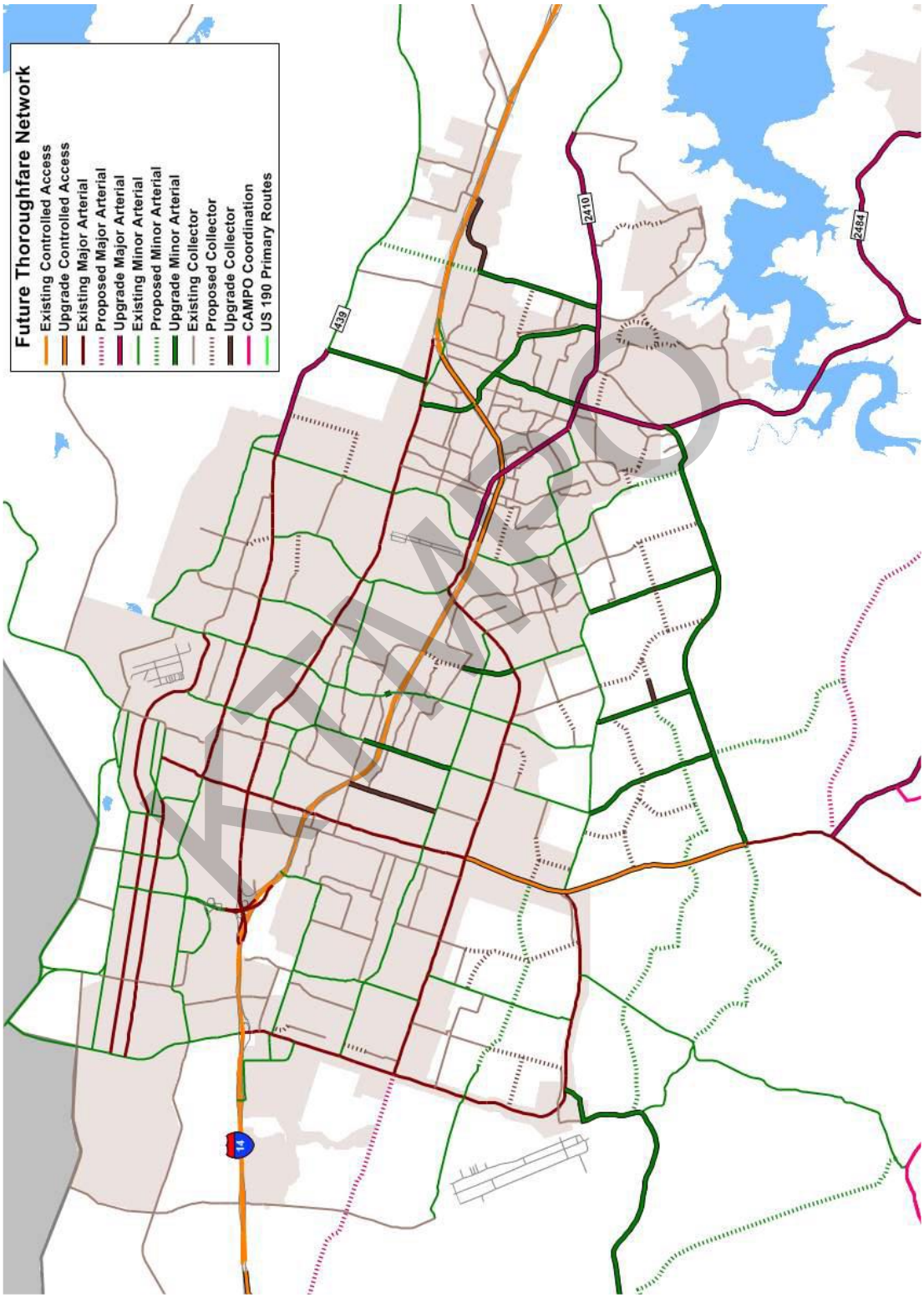


**Exhibit 4.11: KTMPO Regional Thoroughfare (Belton, Salado)**

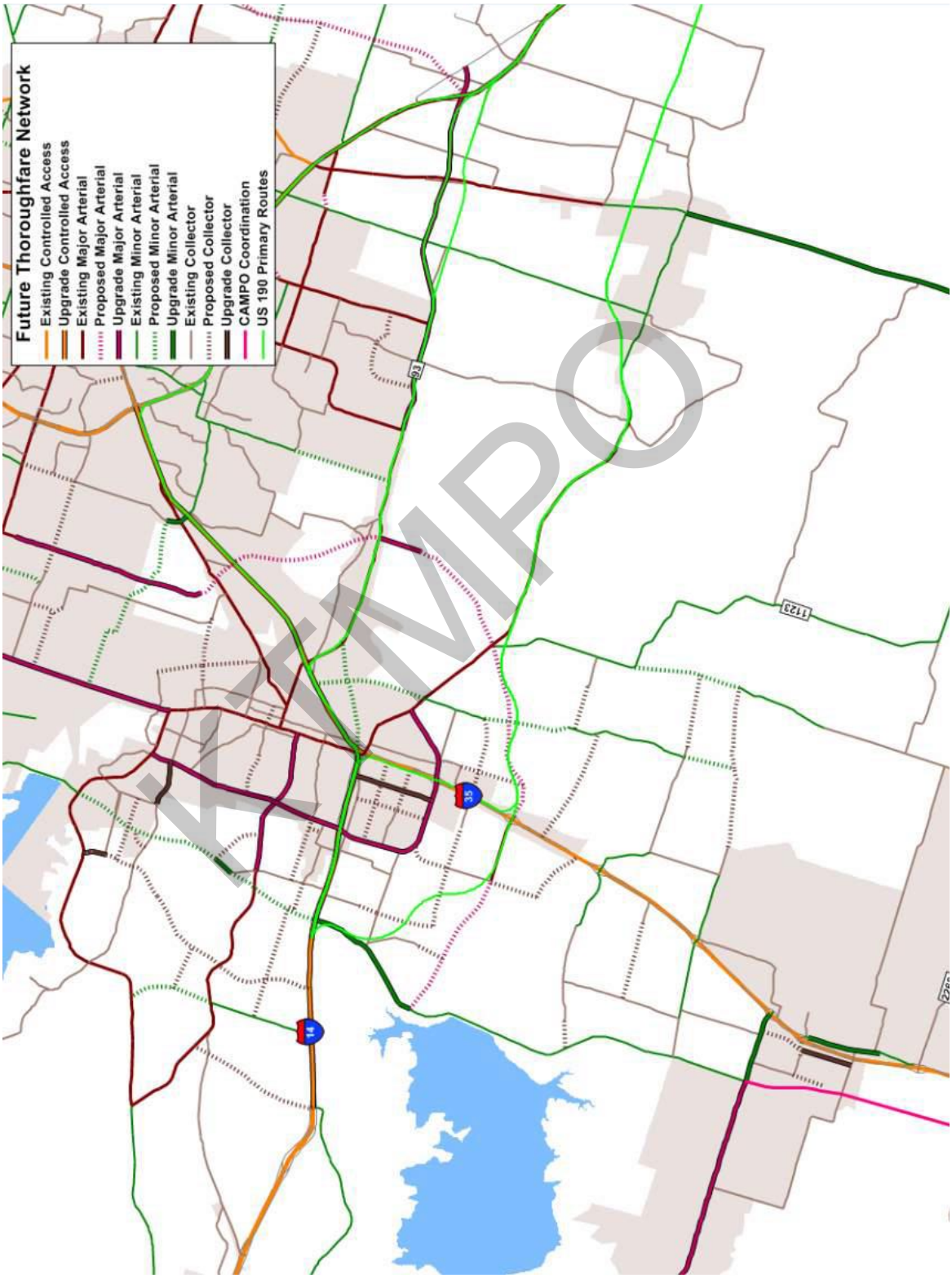
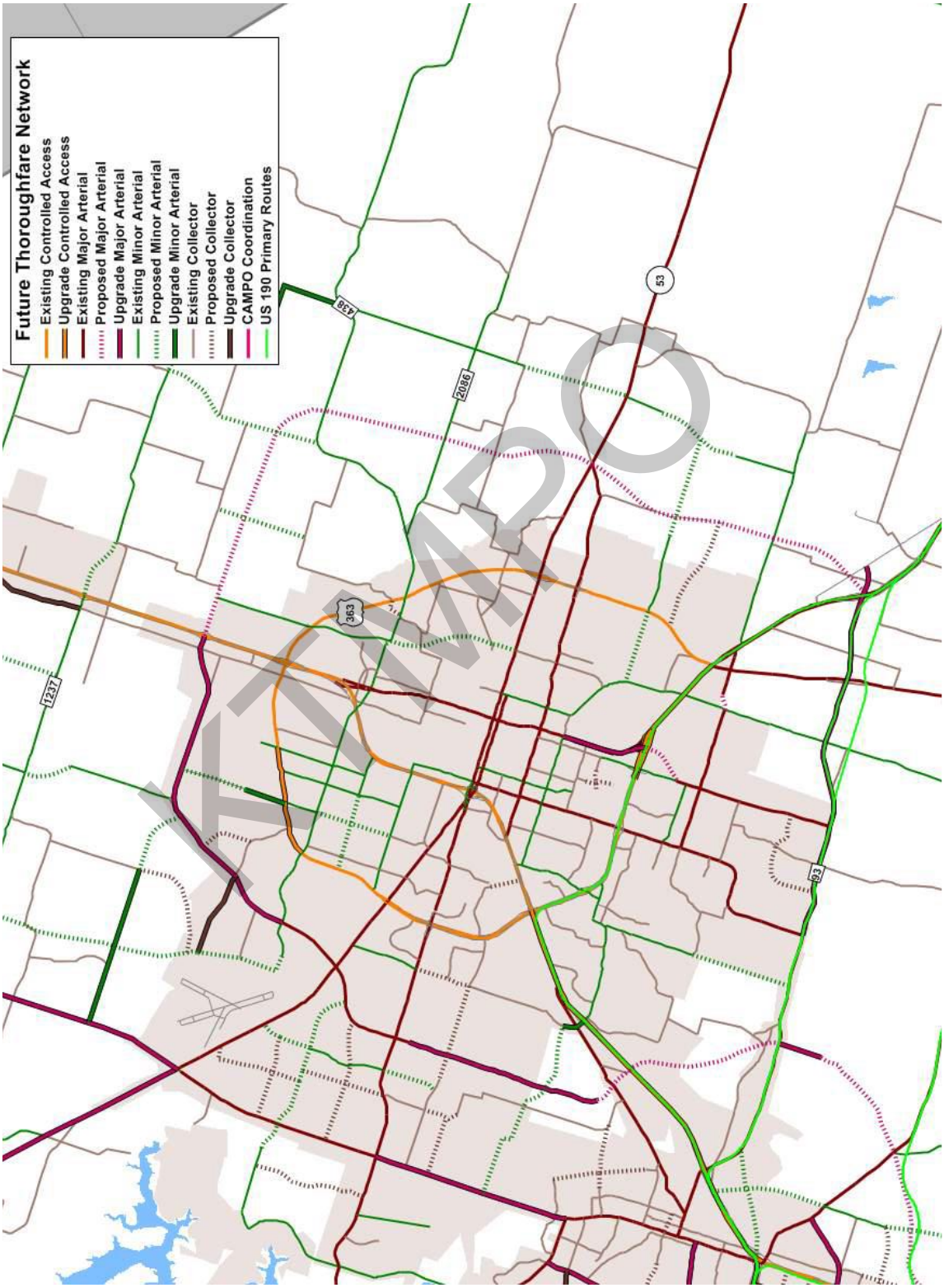


**Exhibit 4.12: KTMPO Regional Thoroughfare (Temple)**



## STREETS AND THOROUGHFARES

The future of the road network in Lampasas involves a thoughtful approach to balancing mobility requirements, location of major thoroughfares and road design based on context and land use character. The Thoroughfare Plan intends to provide an effective balance of mobility and accessibility with variable design features to complement an extensive variety of development types. The Thoroughfare Plan considers improvements or expansions to existing roads and location of proposed roads based on projected development patterns.

The Thoroughfare Plan should be used by City staff, and elected and appointed officials to direct the design and reconfiguration of current roads and sufficiently plan for proposed roads to accommodate new growth. The subsequent pages describe the functionally order of general road types, road design based on character area, and a map for the Lampasas planning area showing current and proposed thoroughfares.

### *Functional Classification*

Roads are usually classified based on their function. The Federal Highway Administration (FHWA) has created a hierarchy of seven functional classifications for streetways, but the application of each of these differs by jurisdiction. For the Lampasas approach, the seven FHWA classifications have been combined into six, with "Interstate" and "Freeway and Expressway" combined to form the "Highway" category.

The functional classification of roads presents varying levels of access and mobility as shown in *Figure 4.2, Mobility and Access Functions*. The roads with the maximum levels of mobility (i.e. highways) have the least access; on the other hand, the roads with the greatest access to adjacent properties (i.e. local streets) have the least mobility. *Figure 4.3, Thoroughfare Functional Classifications*, describes the main purpose of each road category. The road types defined in these figures could take on a different design based on character areas yet purpose and functionality of each type remain.



FIGURE 4.2, MOBILITY AND ACCESS FUNCTIONS

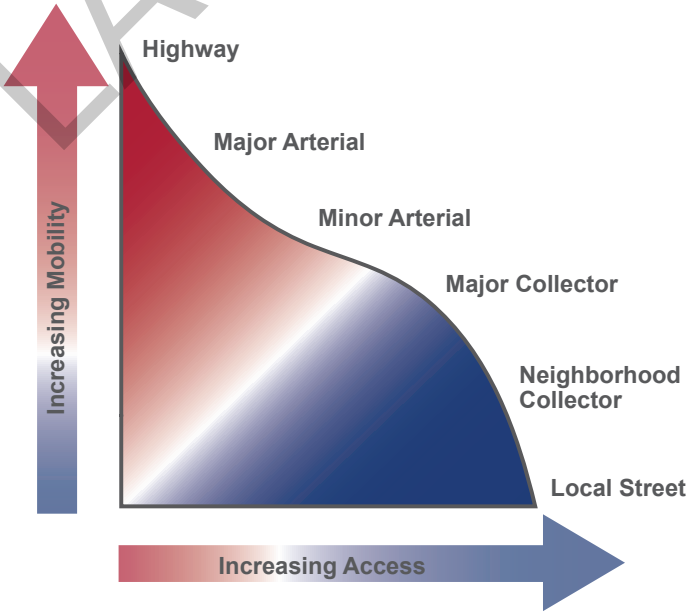


FIGURE 4.3, THOROUGHFARE FUNCTIONAL CLASSIFICATIONS

| Street Type | Primary Purpose |
|---|---|
| Highway | Mobility Between Cities |
| Major Arterial | Mobility Within City |
| Minor Arterial | Moderate Length Trips |
| Community Collector | Connect to Arterials |
| Neighborhood Collector | Connect to Arterials and Collectors |
| Local Street | Property Access |

Source: "Highway Functional Classification Concepts, Criteria and Procedures." (2013)

### *Character Zones*

The design of the proposed roads in Lampasas should be based not solely on capacity and speed but equally based on the existing or envisioned character of the adjacent built environment. This plan identifies the "transportation-land use connection" - the relationship among buildings and the road - as an important part of maintaining or creating neighborhoods, districts, and corridors of unique character.

Anticipated land use and development character should drive road design, while accommodating for the purpose and functionality of automobile movement. Therefore, road design should deliberately be approached to support either current or proposed anticipated growth. The roads presented in the subsequent pages are rooted in the three character zone types established earlier in this chapter - Urban, Suburban, and Rural. These establish a new Future Thoroughfare Map and discuss multi-modal accommodations within the transportation system.

For instance, thoroughfares in an urban setting, although still rooted in functionality and volumetric capacity, are presented with design features that support the desired density and adjacent building character. In the Urban Character Zone, arterial and collector roads are presented here as Urban Avenues that accommodate numerous transportation modes safely and efficiently while pedestrian-focused with streetside amenities. A explanation of Urban Avenues is as follows:

- **Urban Avenues.** Avenues contain volume-intensive arterials and collector roads in function. Avenues could contain on-street parking, bicycle accommodations, and an active streetside area, depending on the context. One example of an Urban Avenue is Key Avenue. Many avenues in Lampasas are contenders for a "road diet," where lane decreases are considered in favor of pedestrian/bike facilities and streetside aesthetic improvements.

### *Urban Streets*

Urban streets should be designed to provide a comfortable and visually attractive built environment that encourages bicyclist and pedestrian activity and should contain active streetsides that serve as community meeting places. Urban street main considerations consist of:

## Urban Street Key Considerations

- Include Complete Street features in a way that accommodate and encourage bicycling, walking, and transit usage.
- Design roads to slow traffic - closely aligning with posted speed limits.
- Include components of active streetsides for community meeting and activity in spaces where pedestrian activity is anticipated.
- Design to include transit infrastructure and encourage fixed-route ridership.
- Decrease lanes in areas where design capacity surpasses traffic volumes in most non-peak times.
- Surround the road with adjacent buildings.
- Encourage on-street parking.
- Maximize road interconnectivity with emphasis on small block size.
- Create a parallel system of automobile access through the use of alleys and cross-access easements.


Buildings next to urban streets should frame the right-of-way.

Urban streets can be candidates for lane reductions. The street above was converted from a four-lane minor arterial street to a three-lane avenue with on-street parking, bicycle lanes, and intermittent medians (above).

Urban streets should have wide streetsides to accommodate pedestrian sidewalks and community meeting areas (above).

## *Suburban Streets*

Streets in the suburban street character zone most closely resemble typical street sections that are currently common in Lampasas. New suburban streets should be designed to encourage bicyclist and pedestrian activity but importance is placed on efficient motor vehicle movement in recognition of land use patterns that are at lower densities and will produce lower amounts of active transportation users among destinations.

### Suburban Street Key Considerations

- Include Complete Streets features in a way that comfortably accommodates bicycling, walking, and transit usage.
- Prioritize bicycle and pedestrian mobility in residential areas where bike-ped trips usually start.
- Maximize road interconnectivity with importance on small-to-medium block size.
- Create larger separations among automobile travel lanes and parallel pedestrian paths.
- Enhance automobile movement by ease of access management design features.
- Include improved traffic stops that separate buses from travel lanes.



Create larger separations between automobile travel lanes and parallel pedestrian pathways.

Suburban streets can have medians (above) as a method of access management, and to create a consistent community character.

Suburban streets

### *Rural Streets*

Rural streets are mainly designed for mobility and access in rural character areas, both in the city limits and ETJ. Important considerations of rural streets and their suitable locations are defined below. Rural street design is suitable in areas designated as Rural Character on page 36 of this chapter.

The application of rural streets assumes that low-density residential development, agricultural land uses, or additional dispersed land uses would stay rural throughout the plan horizon. As the City expands and desired suburban character pushes further out in the planning area, review of rural street design would be suitable. The use of rural street design in suburban areas should be considered carefully by the City but is a choice where contextually fitting, such as estate development. Rural collectors are usually suitable for residential development due to expansive sized lots and minimal access points. With estate subdivisions, usually one acre in size, such lots should not take direct access from Community Collectors in rural areas.

## Rural Street Key Considerations

- Include Complete Street features in a way that comfortably accommodates bicycling, walking, and transit usage.
- Maximize road interconnectivity with importance on small block size.
- Create larger separations among automobile travel lanes and parallel pedestrian paths.
- Enhance automobile movement through ease of access management design features.



Rural streets could have amenities such as soft-surface trails to accommodate pedestrians and cyclists (above).

Rural streets (above) frequently do not employ curb and gutter or integrate ribbon/laydown curbs.

FIGURE 4.4, SUBURBAN STREET DESIGN CHARACTERISTICS

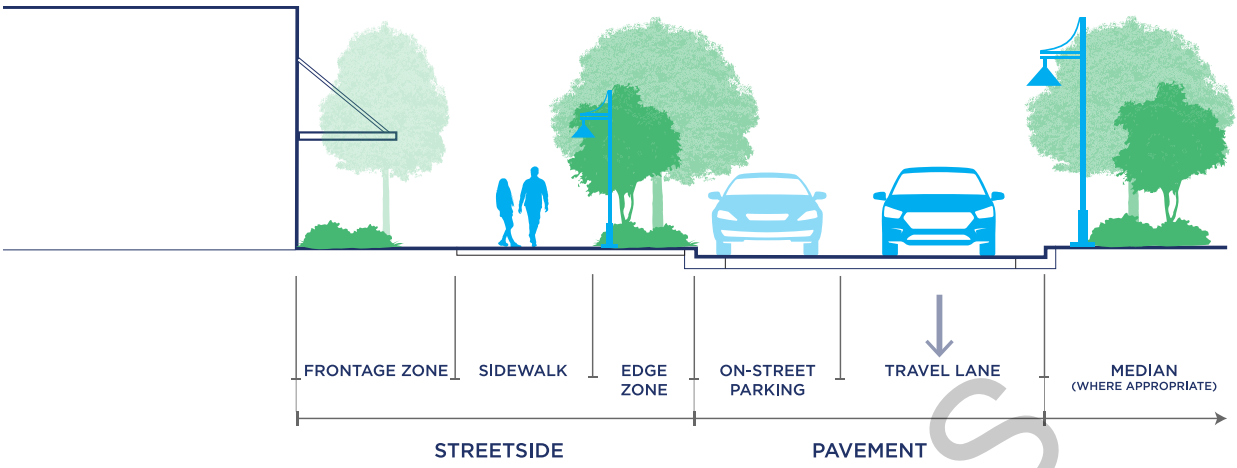
| Attribute | Major Arterial | Minor Arterial | Community Collector | Neighborhood Collector | Suburban Local |
|---|---|---|---|---|---|
| **Function** | | | | | |
| Functional Role | Mobility | Mobility | Provide access between arterials & local streets | Provide access between arterials & local streets | Property access |
| Streetway Continuity | Connects major centers & highways | Connects major arterials to other street types | Continuous between arterials | Generally continuous | Generally discontinuous, but connects to collectors |
| Right-of-Way | 80 - 120 feet | 80 -100 feet | 65 - 75 feet | 50 - 60 feet | 50 feet |
| Desirable Spacing | 2 miles | 1 - 2 miles | 1/4 to 1/2 miles | 800 - 1200 feet | 300 - 800 feet |
| Design Speed | 45 to 55 mph | 40 to 50 mph | 35 to 45 mph | 30 to 40 mph | 20 to 35 mph |
| Traffic Volumes | 20,000 - 40,000 | 12,000 - 24,000 | 4,000 - 15,000 | 1,000 - 5,000 | 80 - 1,000 |
| **Streetway** | | | | | |
| Travel lanes | 4 to 6 lanes | 2 to 4 lanes | 2 to 4 lanes | 2-way vehicular movement, unstriped travel lanes | 2-way vehicular movement, unstriped travel lanes |
| Turn Lanes | Int. turn lanes thru 1 turn lane at most intersections & up to 2 turn lanes at major intersections | Int. turn lanes thru. 1 turn lane at most intersections & up to 2 turn lanes at major intersections | One turn lane at signalized intersections and others as needed. | Not typical | None |
| On-street Parking | Not appropriate | Not appropriate | Type. restricted, but may be appropriate in certain areas | Permitted | Permitted |
| Curb & Gutter | Varies | Typically vertical curb | Vertical curb | Vertical or mountable curb | Vertical or mountable curb |
| Stormwater | Varies | Typically subsurface stormdrain | Subsurface stormdrain | Subsurface stormdrain | Subsurface stormdrain |
| Median | Me. are int. to manage turning mov. & access, provide refuge for ped. crossing, & land. | Me. are int. to manage turning mov. & access, provide refuge for ped. crossing, & land. | Medians are appropriate to improve aesthetics & access management | Medians may be appropriate to improve aesthetics, & traffic calming. | Not recommended. |
| Bikeways[1] | Shared-use paths | Shared-use paths | On-street 4' bike lanes or shared-use paths | Not designated (shared lanes at <30 mph), striped bike lanes or shared-use paths | Not designated (shared lanes at <30 mph) |
| Traffic Calming | Not appropriate | Not appropriate | In limited situations | May be considered | May be considered |
| Designed for Transit | Yes | Yes | Yes | No | No |
| **Streetside** | | | | | |
| Sidewalks | 8' min. on both sides, or 10 ' & 6' | 8' min. on both sides, or 10' & 6' | 6' min. on both sides | 5' min. both sides, or 8' one side | 4' min. one side |
| Edge Zone | Yes, 8-12 feet | Yes, 8-12 feet | Optional. 8-10 feet | Optional. 6-8 feet. | Opt. (Add'l ROW) |
| Street Trees/ Landscaping | Shade trees &/or orn trees in medians & edge zones where appropriate. | Shade trees &/or orn trees in medians & edge zones where appropriate | Shade trees &/or ornamental trees in medians & edge zones where appropriate | Shade trees &/or ornamental trees in medians & edge zones where appropriate | Shade trees in edge zones or outside of right-of-way |
| Residential Driveways | Prohibited | Prohibited | Prohibited | Permitted but limited | Permitted |

FIGURE 4.5, URBAN AND RURAL STREET DESIGN CHARACTERISTICS

| Attribute | Urban Avenue (Thoroughfares) | Urban Local | Rural Collector | Rural Local |
|---|---|---|---|---|
| **Function** | | | | |
| Functional Role | Mobility and access assume equal roles | Property access | Property access and access between arterials and locals | Property access |
| Streetway Continuity | Continuous between arterials within activity centers | Interconnected at frequent intervals | Generally discontinuous, but connects to arterials | Generally discontinuous, but connects to collectors |
| Right-of-Way | 60 - 80 feet | 50-60 feet | 60 - 70 feet | 50 - 60 feet |
| Design Speed | 30 to 35 MPH | 20 MPH | 25 to 30 mph | 20 to 25 mph |
| Traffic Volume (Average Daily Trips) | Varies | 80 - 700 | 300 - 2,600 | 80 - 600 |
| **Streetway** | | | | |
| Travel lanes | 2 to 3 travel lanes, typically two-way movement except for unique circumstances. | 2-way vehicular movement, striped travel lanes | 2 lanes, demarcated travel lanes | 2 lanes, not demarcated |
| Turn Lanes | On occasion, such as the intersection of two arterials or in specific context | None | At major intersections | None |
| On-Street Parking | Both sides preferred. Head-in or parallel, as appropriate. | Both sides. Head-in or parallel, as appropriate. | No | Permitted, limited by width |
| Curb & Gutter | Vertical curb | Vertical curb | Ribbon curb | Ribbon curb |
| Stormwater | Subsurface stormdrain | Subsurface stormdrain | Open channel, culverts | Open channel, culverts |
| Median | Not recommended | Optional | None | None |
| Bikeways | Shared lanes or 4' bike lanes | Yes | Not designated | Not designated |
| Traffic Calming | May be considered | Not typical | Not recommended | Not recommended |
| Designed for Transit | Yes | No | No | No |
| **Streetside** | | | | |
| Sidewalk | 8 feet | Yes | None | None |
| Edge Zone | Yes, 4-6 feet. | Yes, 4-6 feet. | Natural | Natural |
| Street Trees/ Landscaping | Urban street trees should be planted in metal grates in pedestrian areas with adequate growing room. Paired with benches, annuals, and planter boxes. Trees with less than 6' shall be planted with root barriers to allow for optimal root conditions and compatibility with utilities. | Urban street trees should be planted in metal grates in pedestrian areas with adequate growing room. Paired with benches, annuals, and planter boxes. Trees with less than 6' shall be planted with root barriers to allow for optimal root conditions and compatibility with utilities. | None | None |

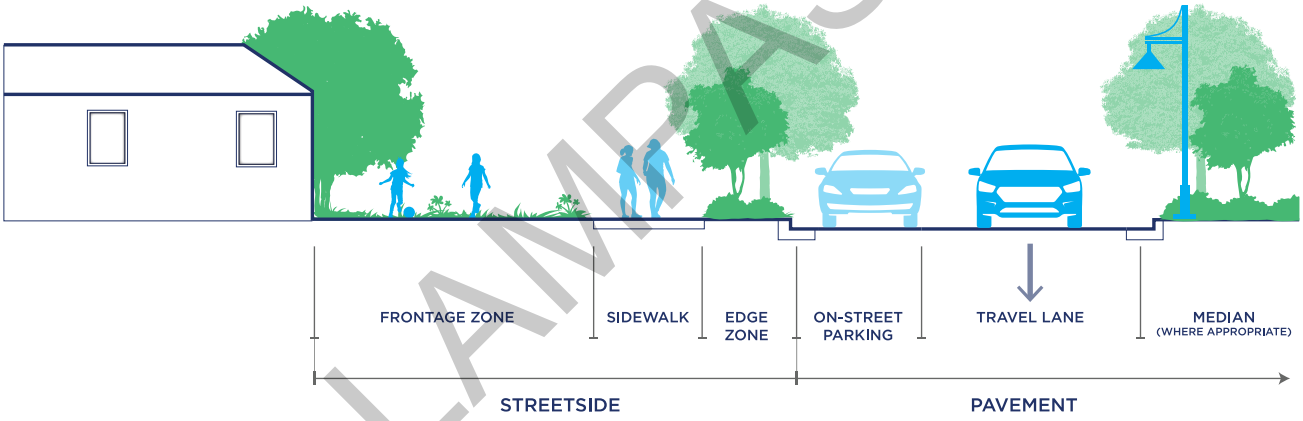
# Typical Urban Street Elements

This section is not to scale. It presents one possible way in which the streetway and streetside elements could be organized in an urban street (half of street displayed).




# Typical Suburban Street Elements

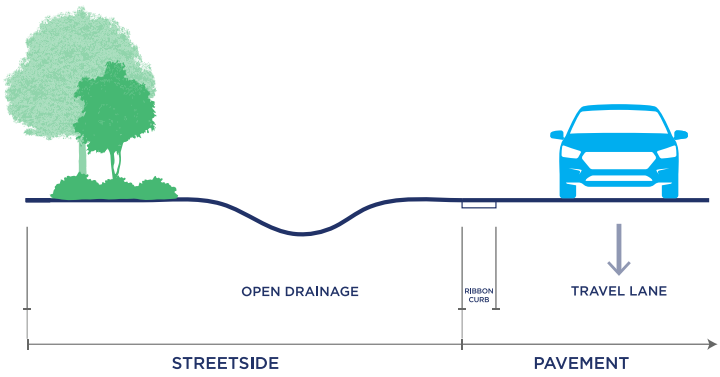
This graphic is not to scale. It presents one possible way in which the streetway and streetside elements could be organized in a suburban street (half of street displayed).






# Typical Rural Street Elements

This graphic is not to scale. It presents one potential way in which the streetway and streetside elements could be organized in a rural street (half of street displayed).



## FUTURE THOROUGHFARE PLAN

The Thoroughfare Plan in Lampasas shows where road extensions, new roads, and possible expansion/reconfigurations are desired to accommodate the City's expected growth. *Map 4.3, Lampasas Thoroughfare Plan*, represents the suggested future thoroughfare network in the planning area for Lampasas.

### *Using the Future Thoroughfare Plan*

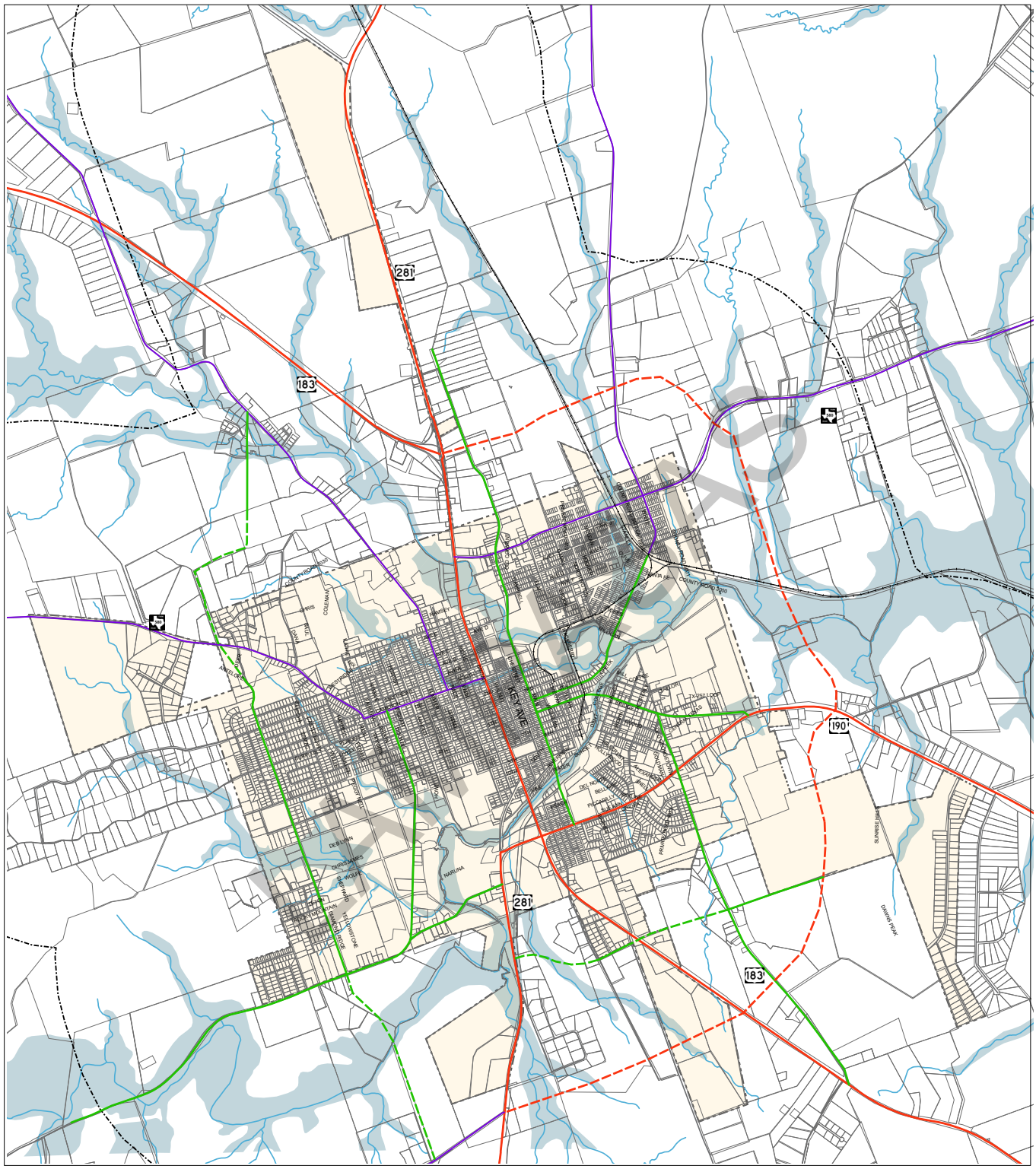
The location of proposed thoroughfares on the map is conceptual, showing the "rough" alignment. Actual alignments and design will be determined by development, physical design considerations, funding, etc. The need for accommodating appropriate rights-of-way for these thoroughfares should be provided for in the Zoning Ordinance, represented by minimum standards. This provides certainty and clarity for property-owners and the developers to ensure that thoroughfares are accounted for as properties develop. Responsibility of costs and timing of construction for these thoroughfares shall be determined in these modifications and should consider the impacts of new development to the overall network.

### *Amendments and Adjustments*

As Lampasas continues to grow, new growth could warrant the identification and expansion of thoroughfares that are not shown on *Map 4.3. This* will require approval of a thoroughfare plan amendment. In similar manner, substantial changes such as re-alignments or re-classifications should be discussed and approved to ensure clarity. Minor changes to alignments of thoroughfares will not involve formal adjustments to the map but should be graphically changed on the map to represent the new alignments. The Planning Director shall determine whether a modification is minor - impacts to adjacent property-owners and constructibility of road projections are significant considerations of such a determination.

As additional refined alignments of thoroughfares are determined (by concept plan, planned development, plat or site plan), it is required to make modifications to the Lampasas Thoroughfare Plan to clearly represent the road network. This helps property-owners, developers, utility providers, and governmental entities plan for public infrastructure, access, and development. Approvals of such alignments should be accompanied by formal language guiding staff to make necessary modifications to publicly-depicted thoroughfare maps.

MAP 4.3, LAMPASAS THOROUGHFARE PLAN




**LEGEND**

- Major Arterial - Existing
- Major Arterial - Proposed
- Minor Arterial - Existing
- Collector - Existing
- Collector - Proposed
- Railroads
- Lampasas City Limits
- Lampasas ETJ
- Watercourses
- Floodplain

# IMPLEMENTATION

## General Transportation Network Characteristics

A transportation network is the system of infrastructure that allows movement of people or freight on private or public property. In Copperas Cove, the total network is comprised of roadways, railways, sidewalks, bikeways, and transit. Each element in the network serves a specific purpose, primarily the movement of either freight, vehicles, or people. This movement is guided by land use patterns and the interconnection of the various pieces. The characteristics of a transportation network falls somewhere between two ends of a range. On one end is ***mobility*** -- this is the ability to make trips efficiently either by moving high volumes of traffic or shortening travel times. On the other end of the range is ***access*** -- the ability to connect a destination to the network. All elements on a network must, by their very purpose, achieve a balance of mobility and access. For example, interstate highways move large numbers of vehicles quickly, but have exits spaced about a mile apart. This is one end of the range - high mobility but limited access. On the other end of the range, a local residential street will have driveways spaced just feet apart, granting high access, but has travel speeds of less than 30 miles per hour, limiting mobility.

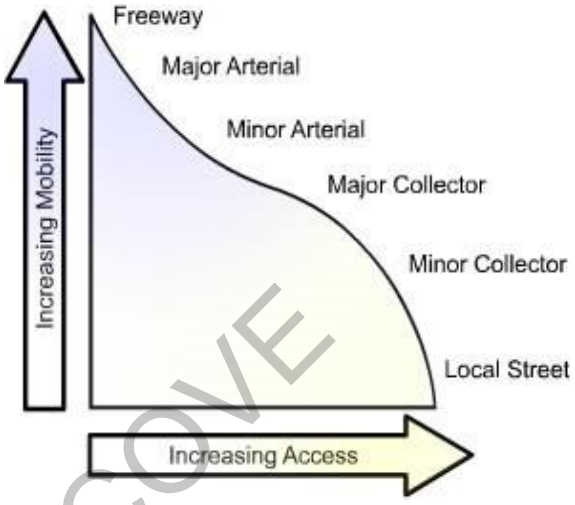



*Chart 6 – Transportation Network Characteristics*

A transportation network must be about more than simply the need for speed. The appropriate balance of access and mobility is the key to creating an effective transportation network that maximizes usability, livability, and economic vitality.

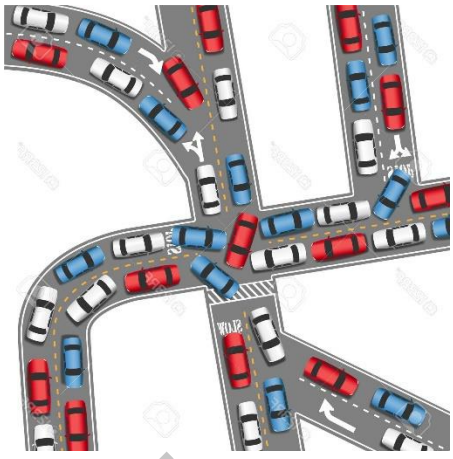
## Copperas Cove Network Characteristics

The existing transportation network is a natural evolution of the City's growth, heavily influenced by decades of land use changes. As time has passed, areas have developed and the infrastructure grew either in response to growth or to promote further growth. At the time of these developments, most considered the impact of specific portions of the City. However, little evidence suggests that they were planned and implemented with the entire City in mind. Looking at the whole network allows projects to be understood and prioritized in relationship to each other. It also ensures centralized purpose behind improvement choices. Currently, all the subnetworks have their strengths and weaknesses. Determining what works and what needs to be improved will ensure smart future growth.

**The City's Road Network**

Spontaneous growth does not consider the effects that changing roadways will have on the shortest routes across a city. This can create traffic along certain streets that were not designed to handle through trips. Additionally, the surrounding land use may not be compatible with such high volumes, e.g. residential areas or places with little available right-of-way from nearby buildings. To better understand this, two overlays of classification are created. The first is the current network by usage. This classification is based on the volume of traffic and the path that traffic is taking across the City. Whether desired or not,

it shows how roadways are behaving in the overall network. These functional classes are shown on the Active Transportation Network map in **EXHIBIT A**. What this current classification tells us is that there are certain streets that are not acting as they should, given the network as a whole. Either they are not carrying a large enough volume of traffic or, more likely, they are attracting more traffic than is desirable, given the access needs.



*Graphic 2 – Streets not acting as they should*

Correcting these traffic effects can be done in two possible ways. The first is to increase roadway capacity. This decreases congestion, but may be undesirable due to the effect on pedestrian safety and neighborhood cohesion. Further, there is diminishing returns in the investment needed to increase capacity. Once capacity is increased, demand will again slowly reach capacity. Once congestion reappears, the cost of increasing capacity is exponentially higher than the original increase. This process of incrementally increasing capacity to match increasing demand becomes unsustainable.

The second method is to divert demand from one route to another. This is accomplished through roadway network planning and roadway design. On a network planning level, a desired shortest path is determined based on a balance of mobility and land access. On the roadway design level, construction plans are designed to the appropriate design speeds. This promotes safety where necessary and diverts the existing traffic to what is laid out on a planning level. This transition is best seen through the proposed classification network. The proposed core network, shown as **EXHIBIT A**, redefines roads based on how they should fit into the paths that cross the City. The locations where the operational classification differs from the desired classification are locations of potential future capital improvement projects.



**The Road Network**

Roads create the foundation of the transportation network. Due to the significant amount of public space they occupy, they require the largest amount of public capital investment. Roadways are also the most complex element of the transportation network, so it is important to divide them into understandable categories. There are many descriptions of roadways, but classifying mobility versus access can be accomplished through four categories: major arterials, minor arterials, collectors, and local streets. Understanding and applying the appropriate roadway categories is important in determining the correct speeds and design parameters in handling the traffic volumes being generated.

## Major Arterials

**General Description**

These are the largest and busiest roadways in a network. Named after the cardiovascular system, these roads move the largest volume of traffic into and around a network. A major arterial typically represents the roadway with the highest mobility and the lowest access.

Within the major arterial classification, there are two types present in Copperas Cove. The first is a primary corridor. It is the roadway with the largest number of businesses and recreation locations. Many trips within the City either start or end on this road. Major arterials typically are one of the oldest routes in a city. This means they usually provide access to either the city center or primary points of interest and the city has developed around it. Also, major arterials carry high volumes of commuter traffic to areas beyond the city limits in addition to traffic generated by citizens within the City. One of the primary concerns in

planning primary corridors is balancing the need to move vehicles through the network while still providing access to the existing businesses.

The second type of major arterial is a congestion reliever that goes around the city center, commonly called a bypass. These trips can begin and end in the City, go around the City altogether, or involve coming to or leaving the City. Either way, this type of arterial is meant to provide very high mobility. Typical characteristics are lack of signalization, ramps instead of intersection, and high design speeds.

## Major Arterials in Copperas Cove

There are three major arterials in Copperas Cove. The first is Business 190. As one of the older streets in the City, businesses have developed along its length. This has led to the progressive widening of the roadway over time. Such widening did not alleviate the high level of congestion along this primary route to Ft. Hood. As such, the other two major arterials were constructed. The new US Hwy 190 serves as a bypass primarily for traffic traveling between Ft. Hood to the east and the various municipalities to the west. It also gives a secondary route for neighborhoods in the southern part of town, alleviating traffic along Business 190. The third major arterial is the SH 9 bypass on the northern portion of town.


*East and west bound commuters traveling along Business 190*

The recent future land use plan changes in the City have occurred along Lutheran Church Road and along FM116 to the north. In all, these roadways are serving their primary purposes, but are being improved to distinguish the two types more thoroughly. The current plans for Business 190 are focused on improving the access of the neighboring businesses while still maintaining an acceptable traffic flow. The planned widening on US Hwy 190 to its originally designed capacity will further increase the mobility along the corridor and divert more through trips from Business 190. The improvement to the SH 9 and FM116 intersection is also for the improvement of mobility and to divert through traffic out of downtown as well as handle the projected increase in traffic from continued development to the north.


*New development along Lutheran Church Rd and FM 116*

## Minor Arterials

**General Description**

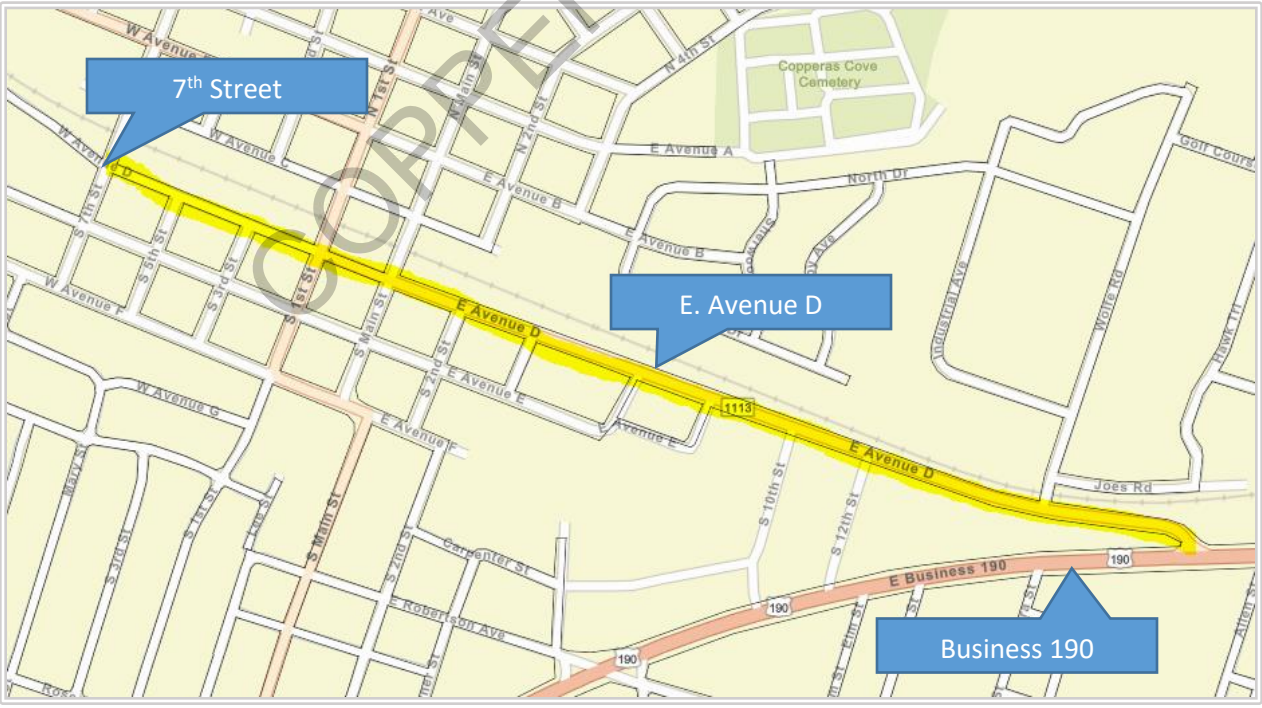
This smaller classification of arterials known as minor arterials share the same primary purpose of the major arterials and that is to move larger volumes of traffic. The difference is that minor arterials generally do not run through the center of the City or bypass it. Rather, minor arterials feed into the major arterials and generally run from the outskirts of a network to its center. This is by intent and design, primarily due to the desired lower design speed. A low speed is required since there is typically more access points and constraints on the corresponding right-of-way. This is the primary challenge in minor arterials – dictating an appropriate vehicle speed while still allowing the free movement of traffic.

Arterials can also have different design characteristics based on whether they pass through a developed, urban area or whether they pass through more rural areas.

**Minor Arterials in Copperas Cove**

FM116 is the largest minor arterial in the City. It connects neighborhoods in the north and in the south with the City center, Business 190, and the US Hwy 190 bypass. Along its length, it varies from urban to rural characteristics. Further, in the City center between Avenue D and Business 190, it stops being an artery and instead functions as a collector. Also providing rural access to the City center are the two farm-to-market roads in the south, FM2657 and FM3046. The last minor arterial is East Avenue D from 7th Street to Business 190. This stretch provides a large amount of mobility in the City center and connects to a major arterial at one of the key intersections in the City. These roadways are operating as desired. They guide traffic into the desired locations and have sufficiently limited access to prevent traffic congestion.






*Map 14 – Minor Arterial in Copperas Cove-Avenue D*

## Collectors

**General Description**

These streets serve as the intermediaries in the roadway network. The primary difference between these roadways and minor arterials is the interaction with neighborhoods. Minor arterials will pass through many neighborhoods and provide inter-neighborhood connectivity, while collectors will run through a single or a few connected neighborhoods and do not facilitate trips from one neighborhood to another. This is again by design to ensure appropriate speeds and right-of-way usage. Instead, these streets connect neighborhoods to the arterials that cross the City.

**Collectors in Copperas Cove**

There are many collectors across the network. They can be found in almost every neighborhood, connecting areas to the roads mentioned above. Avenue B between 7th Street and Bermuda Street serves a high volume of traffic leading to and from the City center. However, it is limited to one through lane in each direction which limits overall capacity. It has a sufficient volume and enough access locations to warrant its improvement from collector to a minor arterial. The two-way center turn lane is likely unnecessary given the trip routing along the roadway. Adjusting the center-lane, altering the shoulder, and a minor purchase of right-of-way will prove sufficient space to expand to two through lanes in either direction, with turning bays at certain intersections if a more detailed study deems necessary.

A second area of note is the stretch of roadway including Colorado Drive, Skyline Drive, and Veterans Avenue running through the western portion of the City. These streets are part of the shortest route to the City center and Ft. Hood for many western neighborhoods including the recent Skyline Drive extension. This travel pattern causes volumes and speeds aligned with that of a collector street. However, the access needs and residential density of these roads require that they be local streets. Design and planning decisions are intended to reduce the traffic volume to acceptable levels by diverting traffic to other, more preferable options. The exact road chosen for each trip is dependent upon where final destination lies. This encouragement is done through improving travel time by adding vehicle capacity on these routes and by improvements to specific areas such as the new railroad crossing at Grimes Crossing and Bea Powell Road.

## Local Streets

**General Description**

The remainder of streets fall into this classification. They have the lowest vehicle volumes, but also constitute most of the network by mileage. Their primary purpose is access with low speeds due to high volumes of pedestrians and many vehicles stopping and turning. Through trips on local streets are highly discouraged to ensure lower speeds.

There are two primary types of local streets. The first type is found in residential areas. These provide access to individual homes and often schools and churches. As such, there are more pedestrians and cyclists. For these streets, a primary concern is maintaining the lower speeds to ensure the safety of those outside of vehicles and for vehicles making frequent stops and turns.

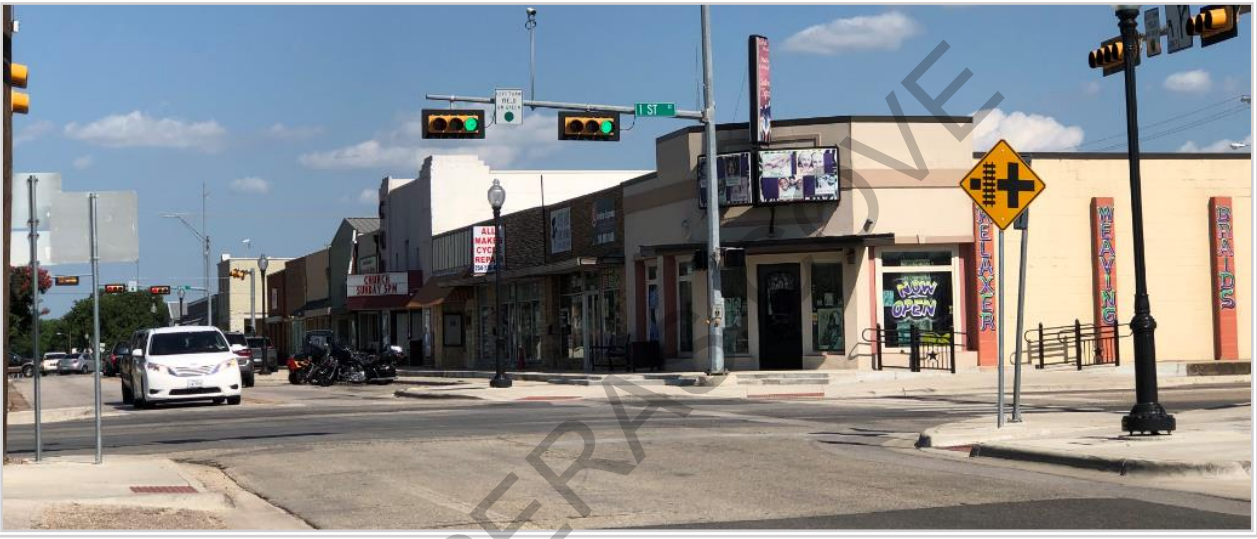
The second type of local streets are found in a centralized business district. Such roads have a high density of access points and trips being made for both business and recreational reasons. The economic vitality of the area can be improved through specific design decisions. Choices made with the entire district in mind attract patrons to the area rather than to a specific business. Those attracted to a certain area are

likely to spend more than those whose trip is based around a single purchase at a single location.

To promote this, commercial local streets have high pedestrian accommodations, aesthetic elements, efficient parking, and a strong sense of location identity.

**Local Streets in Copperas Cove**

The vast majority of Copperas Cove's streets are local streets. All streets in the historic downtown area, with the noted exception of Avenue B, fall into this category. They provide access to many businesses, but some are congested due to the high volume of through trips from the northwest portion of town. Improvement to the capacity and flow of such commercial intersections is complicated, because some changes may harm the attractiveness of the area to potential business. As such, major alterations to this specific area of the City are best done as part of a holistic update to the Downtown Master Plan.




*Historic Downtown at Avenue D and 1st Street*



## The Railway Network

The BNSF Railway's Lampasas subdivision line is the only current rail network in the City. This line creates special issues. Being privately owned limits the municipality's influence over it, as ownership sets specific design standards and requirements for crossings. Further, the rail line creates a strong physical barrier between neighborhoods in a community, and impacts both the roadway and active transportation networks.


*BNSF Railway through Copperas Cove*

*At Grade Railroad Crossing at 1st Street*

In considering rail in the context of an overall transportation network, it is crossings that are most important. These can be at-grade or grade separated. Grade separated is safer, but more costly and harder to implement in flat terrain. At-grade intersections are cheaper, but require a large amount of coordination with the railroad to ensure safety and traffic flow. Determining the correct type of crossing, additional crossings, or closure of crossings should be considered within the context of the overall transportation network.

## Active Transportation Network

**General Description**

This subnetwork is made up of sidewalks, bikeways, and transit and is collectively called the active transportation network. In short, it is the elements which a person can travel without the use of a personal automotive vehicle. The need for such a network is multifaceted, but the primary concept is promoting livability. Livability can be defined as how a network promotes the well-being of residents and improves the quality of life of its residents.

There is a known portion of the population that has specific mobility needs making them dependent on such a network. These include the elderly, the disabled, and those unable to afford an automobile. For them, a viable active network connects three primary areas of interest. The first is their residences, which may be scattered across the City. The second is necessities such as grocery stores and municipal services. The third is recreational areas such as parks, shopping, and meeting halls. An active transportation network should connect these locations as much as possible.

**EXHIBIT A** provides a map of the core roadways that are part of the Active Transportation Network.

*Photo Showing Sidewalk Gap*

**Active Network in Copperas Cove**

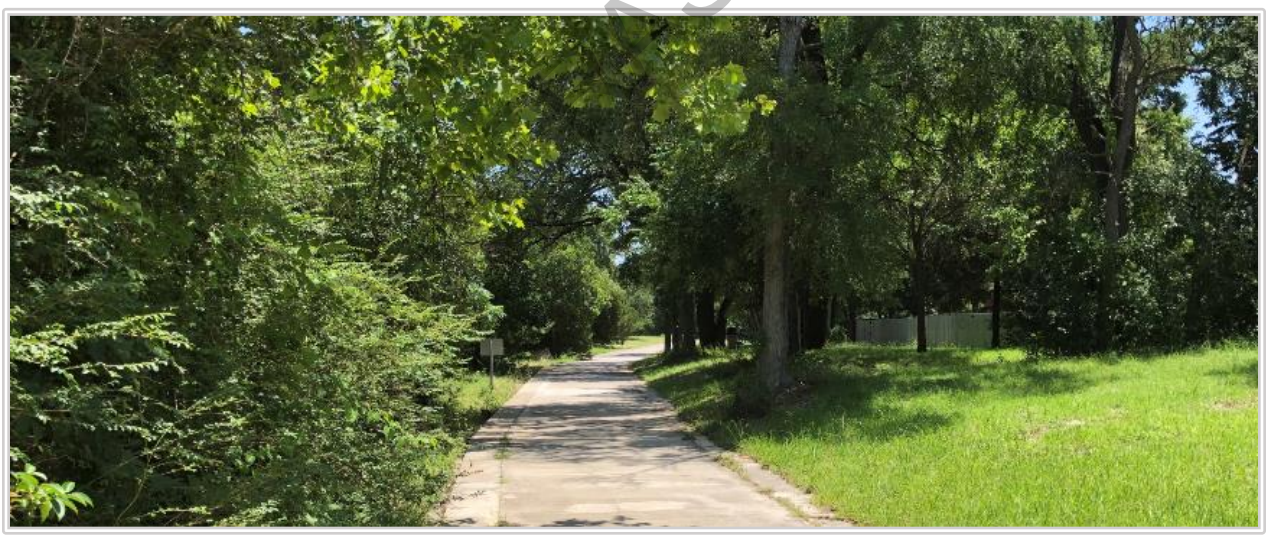
The largest amount of infrastructure in the active transportation network is sidewalks. The City's natural growth over the last half century shows great differences in sidewalk connectivity across different neighborhoods. Newer areas show consistency in the installation of sidewalks, whereas in areas of older housing, sidewalk construction appears more on a lot-by-lot basis. This leads to the sidewalk network as shown on the Active Transportation Sidewalk Network map in **EXHIBIT B**. Within this sidewalk network, gaps can also be found around specific schools. Likely, the schools filled the location at the time and paved the sidewalks on school grounds, but did not include new sidewalks on adjacent properties. Also, there is a distinct lack of sidewalks on collectors and arterials, which effectively divides the network along neighborhoods.

Coinciding with this sidewalk network is the transit system. Copperas Cove is served by the HOP which runs a local route and a connector route between the City and the greater Killeen-Temple System. This system primarily serves captive riders, those for whom personal automobile travel is not an option, i.e. the elderly and disabled. As such, the stops are located around services oriented towards them. A single route runs through these stops. Such stops are WalMart and HEB, the VFW, the Department of Housing, and the Park. These bus routes, along with their stops and stop types, are shown on the Transit Network map in **EXHIBIT C.**

The map shown in **EXHIBIT D**, the Active Transportation Primary Routes map pulls together the primary active routes and the transit stops. This map shows the primary active routes, bus stops, as well as parks and schools -- important destinations for active transportation.

An effective active transportation network serves four primary purposes. The first is to be continuous, there should be no isolated portions. The second is to promote pedestrian and cycling activity to specific areas, i.e. schools, parks, and downtown. The third is to connect to as many transit stops as possible to provide safe multimodal connections. The fourth is to penetrate every neighborhood with an access point, providing an option to as many people as possible.

To accomplish these four primary purposes, a proposed core active transportation network is shown on the Active Transportation Network map in **EXHIBIT A**. This map shows how this proposed active transportation network will be incorporated with the existing sidewalk network to increase the overall connectivity between the neighborhoods. On this map is an additional facility that is not already present in Copperas Cove. The area to the northwest will be served by a new multi-use path connecting the newer neighborhoods with the City Park. This network provides the high degree of connectivity.



*Multi-use path along Clear Creek to South Park*

The map in **EXHIBIT A** shows the core roadways that are on the active network and which ones are not on the active network.

Another primary concern is in providing for short trips, those less than two miles. As the length of a trip shortens, the number of such trips increases. Such short duration trips are very common and are often done without an automobile. For example, children who regularly walk to school. Such trips are common and require extra safety attention. This consideration is currently under discussion at the national, state,

and regional level. Programs like the Safe Routes to School provide education and funding for promoting an active transportation program that encourages these trips.

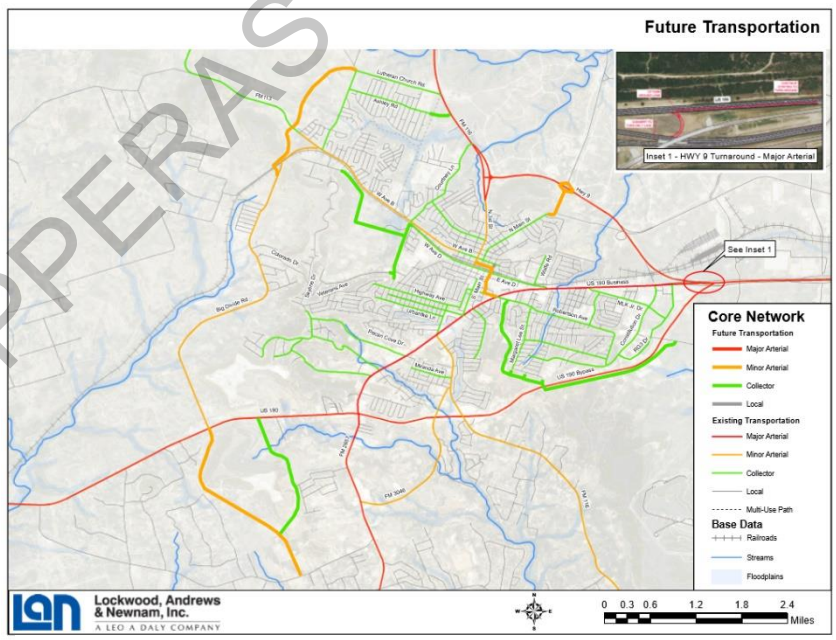
A well-designed network is also a benefit to the local economy. In residential areas, active infrastructure increases the feeling of community and impacts home values. In commercial areas, people walking or biking creates a feeling of vibrancy that attracts investors. Also, there is a positive correlation between foot traffic and consumer spending.

For these reasons, an active transportation network is a necessity in a livable community. The network requires investment, but there are many resources to aid in this investment. In creating this subnetwork, it is important to connect the specific points of interest. Along with this, a good active transportation network enhances the feeling of community within a city. Promoting pedestrian and cycling trips creates vibrancy. This directly translates into a healthier housing market and higher spending at retail and leisure locations.

## Future Transportation Network

**General Description**

Planning the City's Future Transportation Network serves a vital role to meet the future transportation demands of population, employment and economic growth. Future updates of the Transportation Master Plan should consider all transportation modes including roadway expansion, high-occupancy vehicle lanes (HOV), transit options and bicycle/pedestrian facilities. The future transportation network should be considered the ultimate roadway vision as best known today. The network shows existing and planned arterials, collectors and local streets for the ultimate growth of the City. These functional classes are shown on the map in **EXHIBIT F**.




*Map 15 - Future Transportation*

The future transportation plan network does encompass the active transportation system within the City limits as well as the extraterritorial jurisdiction (ETJ).

To maintain the quality of life enjoyed by the citizens of Copperas Cove, extensive future planning for the City's transportation infrastructure is essential. An adequate transportation network is considered by many as the backbone to organized growth in any community. The total development of land within the present City limits, as well as, the ETJ at a certain time in the future is a reasonable conclusion from studying the development of communities that are similar to Copperas Cove. By planning for the ultimate growth of the City, the Future Transportation Plan establishes the ultimate roadway network and protects adequate rights-of-way to meet future transportation needs. The plan also provides property owners with a tool to minimize conflicts during development.

# DESIGN STANDARDS GUIDELINE

## Roadway Cross Sections

The proposed roadway classifications in combination with the active transportation network determine the applicable cross section for any given segment. The Plan does not specify exact design elements, but provides a guideline to design the roadway to fit the land use context of the development and to serve all the potential users of that roadway. **Table 3** lists the road classifications along with the core active transportation network. This list provides roadway design options that might be applied to best fit the given land use and proposed development. A description of the commonly used roadway cross sections is discussed below. Typical cost per mile for cross section listed is provided in **Table 5** on page 50.

| Classification | Typical Section | Note |
|---|---|---|
| Major Arterial | P8D (Per TxDOT) | TxDOT class 8-lane arterial section with 12' lanes |
| Major Arterial | P6D (Per TxDOT) | TxDOT class 6-lane arterial section with 12' lanes |
| Minor Arterial | P4D (Bike or Park) | 12' lanes with 8' dedicated lanes for bikes or parking |
| Minor Arterial | P4D (MUP) | 12' lanes with 12' multi-use path for hike or bike trail segments |
| Minor Arterial | P4D | Basic 4-lane arterial section for high speed roads (>40 mph) |
| Collector & Minor Arterial | C5U | 4-lane section with two-way left-turn lane |
| Collector & Minor Arterial | C4D (Bike or Park) | 2 striped outside lanes for bikes or parking |
| Collector & Minor Arterial | C4D | Basic 4-lane arterial section with no on-street parking |
| Collector | C4U (Bike or Park) | 2 striped outside lanes for bikes or parking |
| Collector | C4U | Basic 4-lane collector section |
| Collector | C3U | 2-lane section with two-way left-turn lane |
| Collector | C2U | Wider section for residential or commercial areas; outside lanes for parking |
| Collector | C2U (Bike or Park) | Wider section for residential or commercial areas; 2 outside lanes for bikes or parking |
| Local | L2U (Major) | Wider 2-lane section for residential, commercial or industrial areas |
| Local | L2U (Urban) | Basic 2-lane section for direct lot access in urban areas |
| Local | L2U (Rural) | Basic 2-lane section for direct lot access in rural areas |
| Multi-Use Path | MUP | 12' bi-directional multi-use path |

*Table 4: Typical Section Summary*
*P = Principal, C = Collector, L = Local, # = Number of lanes, U = Undivided, D = Divided*

| Typical Section | ROW | Cost Estimate (per Mile) | |
|---|---|---|---|
| | | w/o ROW Cost | w/ ROW Cost |
| P8D - Major Arterial | 150' | $11,800,000 | $27,600,000 |
| P6D - Major Arterial | 130' | $10,300,000 | $24,000,000 |
| P4D - Minor Bike or Park | 110' | $9,000,000 | $20,600,000 |
| P4D - Minor MUP | 110' | $8,700,000 | $19,000,000 |
| P4D - Minor Arterial | 105’ | $8,300,000 | $17,500,000 |
| C5U | 80' | $7,600,000 | $16,000,000 |
| C4D – Bike or Park | 90' | $8,500,000 | $18,000,000 |
| C4D | 80' | $7,400,000 | $15,800,000 |
| C4U – Bike or Park | 80' | $7,700,000 | $16,100,000 |
| C4U | 70' | $6,700,000 | $14,100,000 |
| C3U | 60' | $6,300,000 | $12,600,000 |
| C2U | 60' | $6,100,000 | $12,400,000 |
| C2U - Bike or Park | 60' | $6,200,000 | $12,500,000 |
| L2U - Major | 54' | $5,500,000 | $11,800,000 |
| L2U - Urban | 50' | $5,500,000 | $11,800,000 |
| L2U - Rural | 64' | $3,600,000 | $7,400,000 |
| MUP | 24' | $900,000 | $3,400,000 |

*Table 5 - Typical Section Cost Estimate*



**Major Arterials**

The roadways classified as major arterials in the Plan are roadways that are maintained and operated by Texas Department of Transportation (TxDOT). The cross section and design elements of these roadways are controlled by the TxDOT *Roadway Design Manual.* As future opportunities to improve these roadways occur, the City will work with TxDOT to determine the roadway cross section required and the detail design elements. The primary function of an arterial road is to deliver traffic from collector roads to freeways or expressways, and between urban centers at the highest level of service possible. As such, many arteries are limited-access roads, or feature restrictions on private access.

**Major Arterials Four Lane Undivided and Divided Highways**

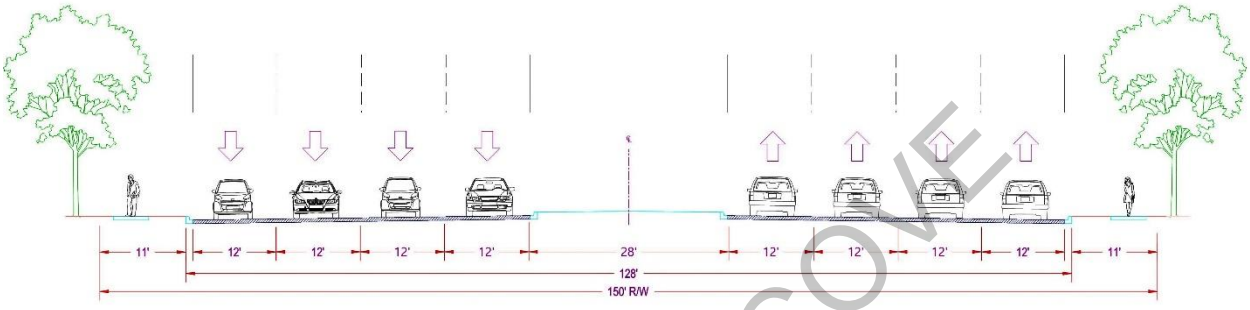
A four-lane undivided highway (not depicted) is the most common rural major arterial cross section by TXDOT. This design has a specific lack of signalized intersections in favor of access ramps. Lanes are usually 12 feet to 14 feet to accommodate freight traffic and high free flowing speeds. This design also includes a hard shoulder on either side. These facilities are typical of a Texas Department of Transportation with restricted access cross section which are often characteristic of Farm to Market (FM) roadways.

Likewise, a four-lane divided highway is similar to the undivided one, but is notably safer due to the lower incidence of head-on collisions. Its implementation is more heavily dictated by the availability of right-of-

way. These facilities are typical of a Texas Department of Transportation full access freeway cross section. This type of highway is represented by the I-14 bypass and SH 9 bypass.

**TxDOT Class Eight-Lane Divided Highway**

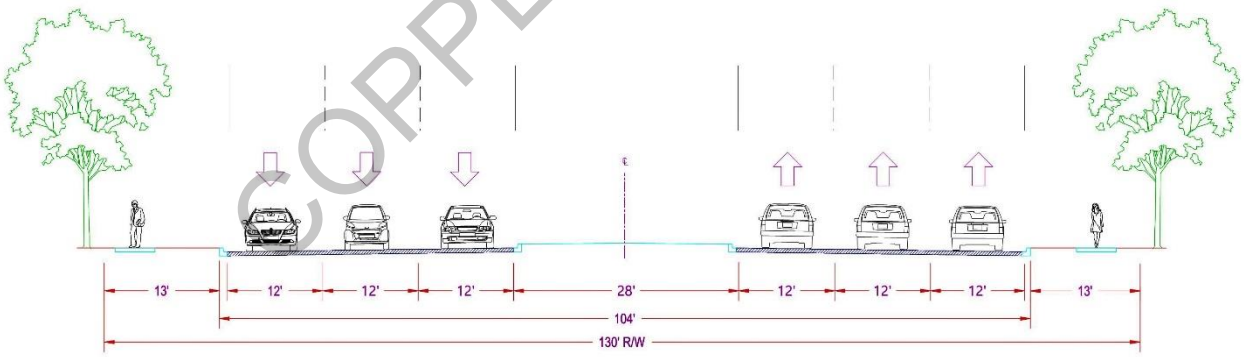
The eight-lane divided highway is similar to the undivided one, but is notably safer due to the lower incidence of head-on collisions. Its implementation is more heavily dictated by the availability of right-of-way. These facilities are typical of a Texas Department of Transportation full access freeway cross section.




*Major Arterial being a principal roadway with 8 lanes and raced median.* ***(P8D)***

**TxDOT Class Six-Lane Divided Highway**

Likewise, the six-lane divided highway is similar and is notably safer due to the lower incidence of head-on collisions. Its implementation is less dictated by the availability of right-of-way. Also, these facilities are typical of a Texas Department of Transportation full access freeway cross section.



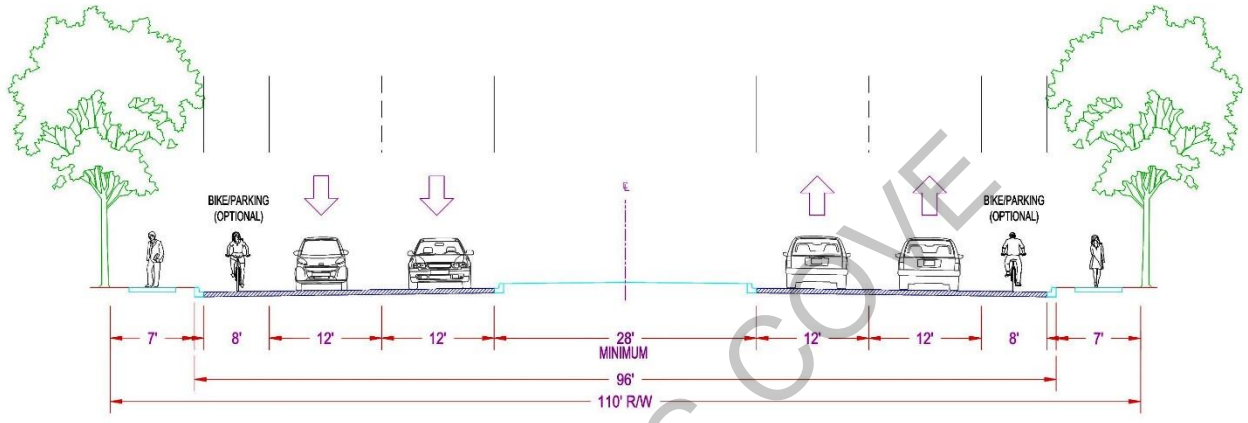

*Major Arterial being a principal roadway with 6 lanes and raced median.* ***(P6D)***

**Minor Arterials**

Minor arterials are those streets that provide the primary access from major arterial streets to collector streets or from the points of interest within the City such as downtown to the surrounding neighborhood areas. These streets are the largest traffic handling streets within the City's transportation system, provided they are not in the TxDOT network.

**Four-Lane Divided Street on Active Network, Bike Lanes**

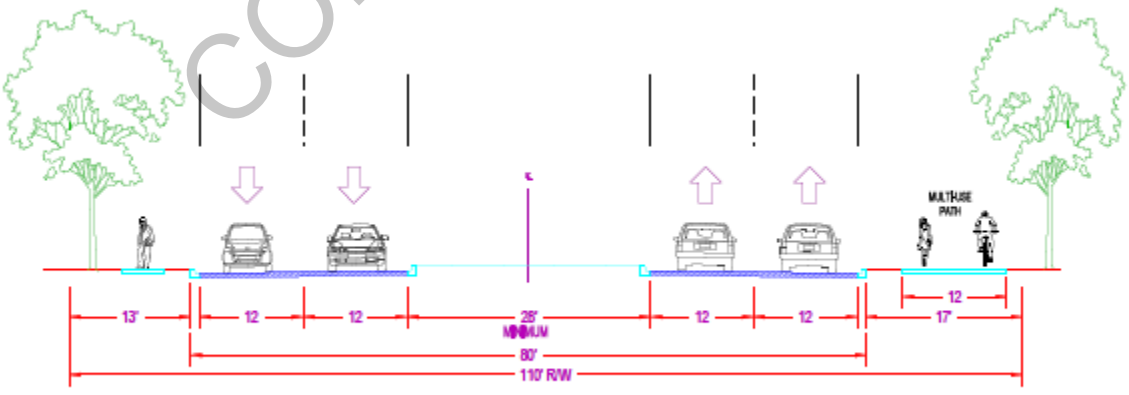
On the active network, the most preferred urban solution is dedicated bike or parking lanes on a four-lane street. A separate sidewalk is offset far as the right-of-way allows to ensure pedestrian comfort. This can include an additional center two-way turning lane or turning bays as necessary and space allows at major intersections. The lane widths are 12 feet to accommodate moderate speeds, buses, and the occasional heavy vehicle.




*Minor Arterial being a principal roadway with 4 lanes, divided median and bike path.* ***(P4D - Bike)***

**Four-Lane Divided Street on Active Network, Multi-Use Path (MUP)**

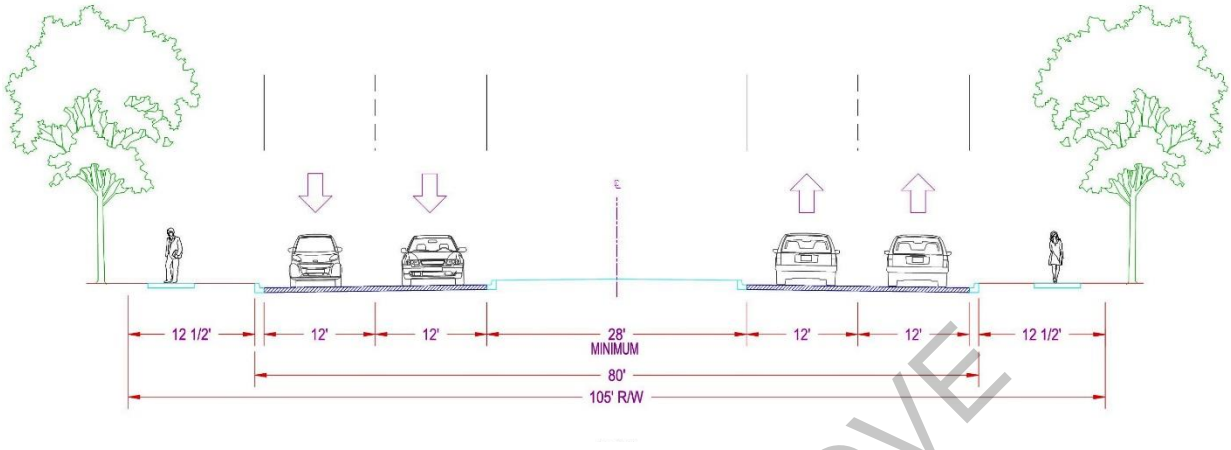
This cross section is similar to the previous section, but is driven by a difference in right-of-way availability. In locations where right-of-way is cheaper on one side of the street versus the other side, a single path for bicyclists and pedestrians is a viable option. However, it is generally not preferable over active transportation options on both sides of the street. The multi-use path should be between 8 feet and 10 feet wide to allow bidirectional traffic of cyclists and wheelchairs, per the American's With Disabilities Act.




*Minor Arterial being a principal roadway with 4 lanes, divided median and multi-use path.* ***(P4D - MUP)***

**Four-Lane Divided Street off of Active Network**

This cross section is similar to the previous sections, but is located off of the active network, reducing the need for bike lanes and width of right-of-way.



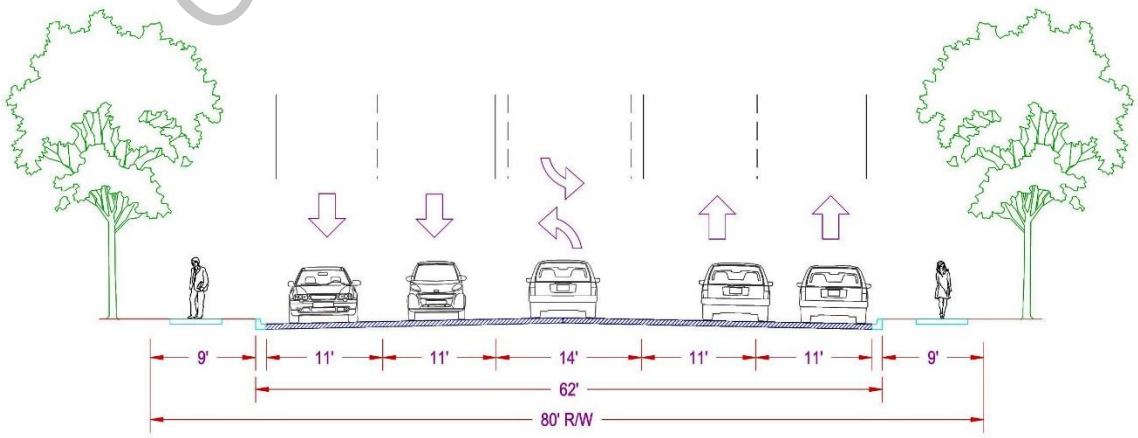

*Minor Arterial being a principal roadway with 4 lanes and divided median for higher speeds >40 mph.* ***(P4D)***

**Collectors & Minor Arterials**

The cross sections below can be used for either smaller minor arterial or larger collector streets. These sections are recommended to provide some additional options to enable the City some flexibility in working with topography and available right-of-way.

**Four-Lane Section with Two-way Turn Lane off of Active Network**

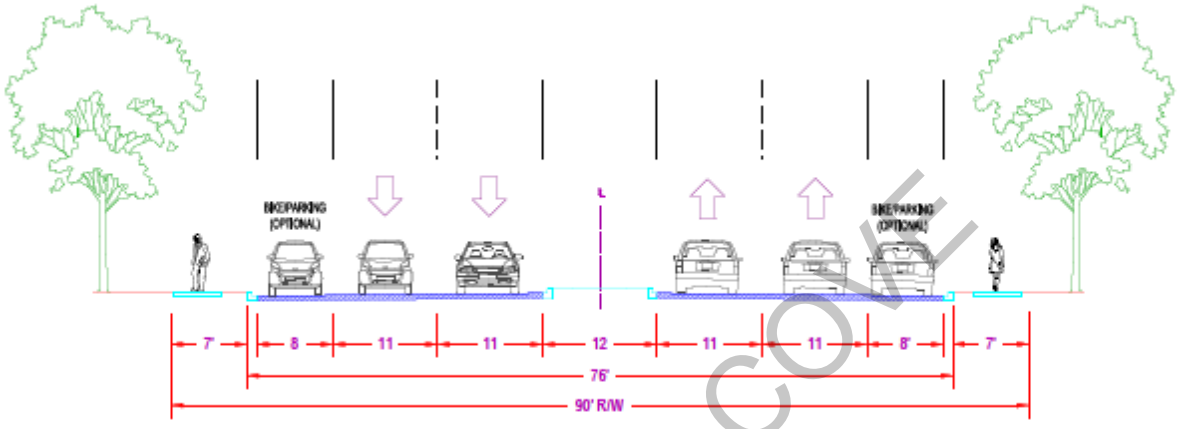
Similar to the previous cross section, this cross section is also found in areas with lower desired design speeds than the previous divided median cross sections. However, active transportation elements are not as critical to achieving network goals or are cost prohibitive. The presence of a center turn lane is to provide increased access for business areas or points of interest within the City while balancing the mobility requirements of a minor arterial or collector. The use of a center turn lane will require some analysis as the potential for car accidents is notably increased over controlled access such as medians.




*Collector & Minor Arterial roadway with 4 lanes and two-way left-turn lane.* ***(C5U)***

**Four-Lane Divided Street off of Active Network**

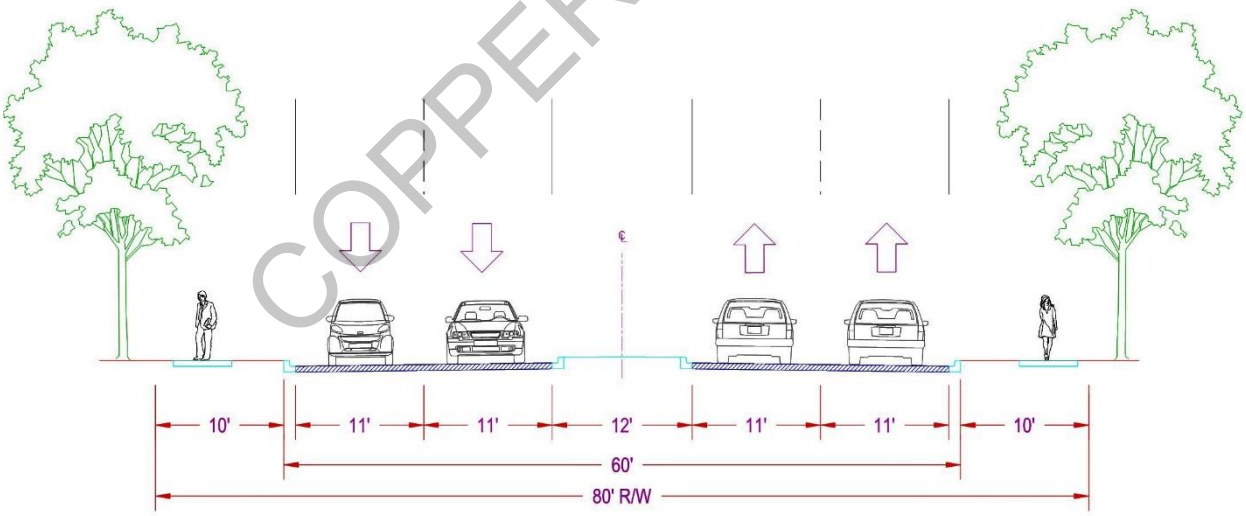
This cross section is often found in areas with lower desired design speeds than the previous minor divided median cross sections. This means that the lanes and medians can be reduced to accommodate the lower speeds. The presence of active transportation elements is in keeping with the direction of the Complete Streets Policy. As with the divided median cross sections, the addition of a two-way turning lane or a turning bay may be warranted.




*Collector & Minor Arterial roadway with 4 lanes, divided median and parking.* ***(C4D - Park)***

**Four-Lane Divided Street off of Active Network**

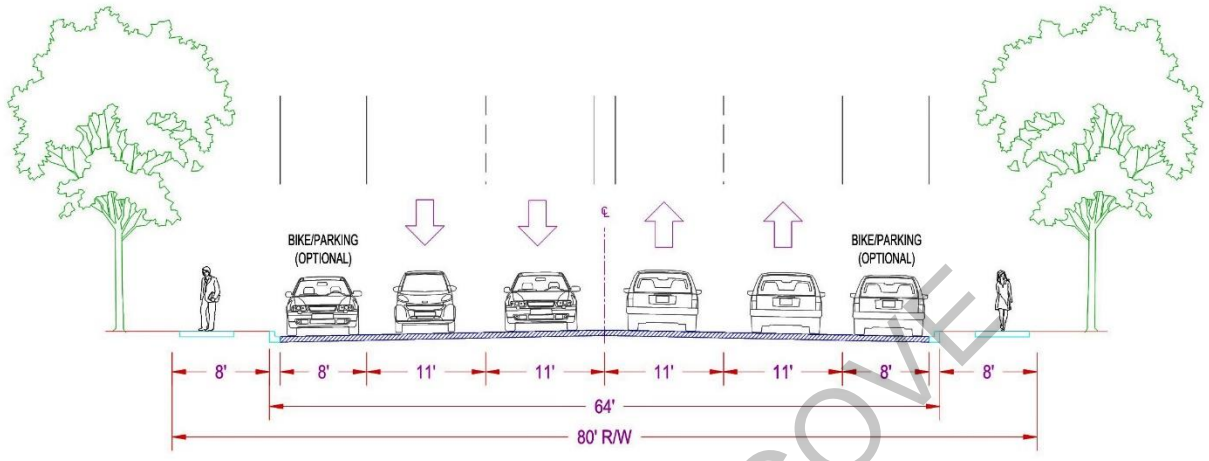
This cross section is similar to the previous section with a divided median but no parking lanes.




*Collector & Minor Arterial roadway with 4 lanes and divided median.* ***(C4D)***

**Four-Lane Undivided Street on Active Network**

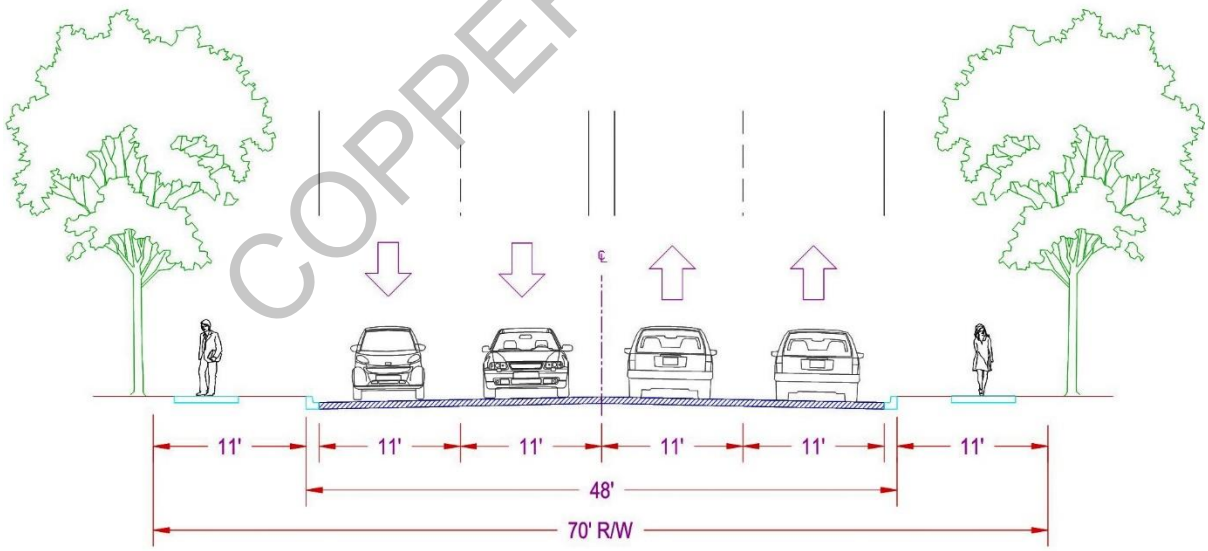
This cross section is a basic four-lane collector section, with outside lanes dedicated for bikes or parking. This section is intended for even lower design speeds than the previous sections, with the reduced lane widths and lack of a center dividing device such as a median or turning lane.




*Collector roadway with 4 lanes undivided and park.* ***(C4U - Park)***

**Four-Lane Undivided Street off of Active Network**

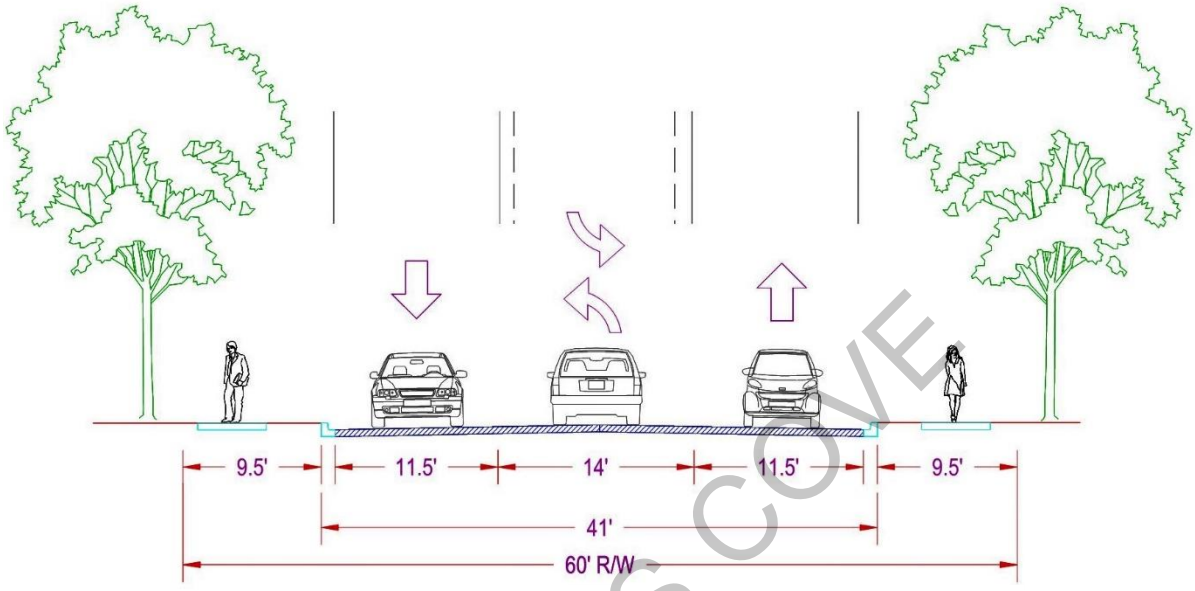
This cross section is a basic four-lane collector section off of the active network. The outside bike or parking dedicated lanes have been removed, reducing the right-of-way width requirement.




*Collector roadway with basic 4 lanes undivided.* ***(C4U)***

**Four-Lane Undivided Street with Two-way Turn Lane off of Active Network**

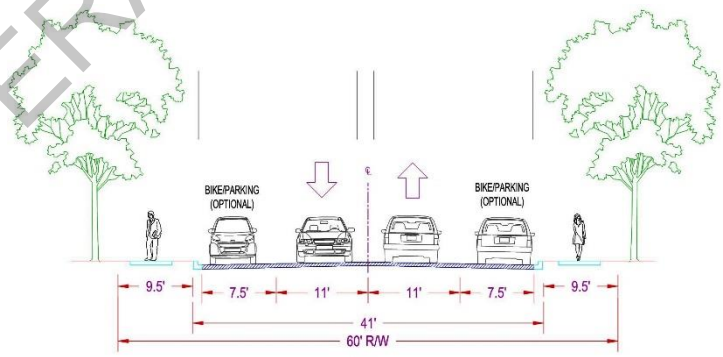
This cross section is a basic two-lane collector section with a two-way turn lane for increased access. This street section is for areas such as business parks, commercial strips, or areas with similar access requirements.




*Collector roadway having 2 lanes with two-way left-turn undivided.* ***(C3U)***

**Two-Lane Street on Active Network**

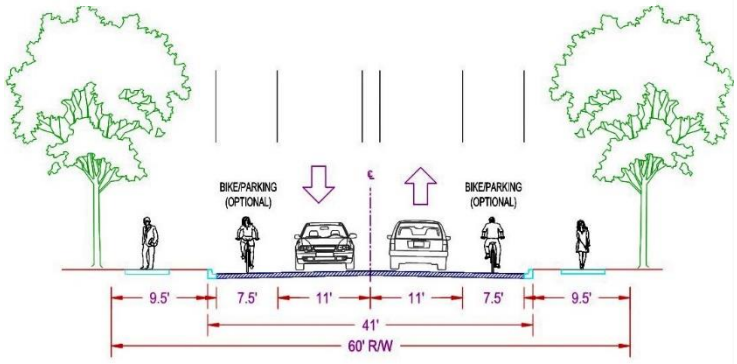
This section is for active network areas where the traffic density is such that a two-lane roadway is adequate. When space does not permit dedicated bike facilities, shared vehicle and bicycle lanes are acceptable. On-street parking on these sections is not recommended to prevent a cyclist from riding between a parked car and a faster moving vehicle.




*Collector roadway with basic 2 lanes undivided.* ***(C2U)***

**Two-Lane Street on Active Network with Bike Lanes.**

Along such collectors, there can be a conflict between cycling paths and parked vehicles. These sections have typically wider lane widths to ensure the comfort of the driver and cyclist. Depending on the density of residential access points along these roadways, if the street side parking is of lower necessity it can be converted to a dedicated bike lane, if desired.

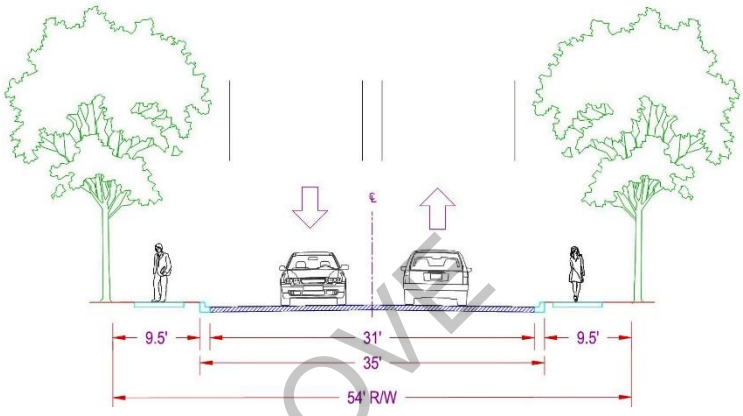



*Collector roadway with basic 2 lanes undivided.* ***(C2U - Bike)***

**Local Street**

The local street differs primarily from the collector in the presence of on-street parking and the lack of through trips. For these streets, the total volume of vehicles is low enough to allow the sharing of a bike lane and a parking lane. The likelihood of a cyclist being passed while also passing a parked vehicle is much smaller than on a collector street.

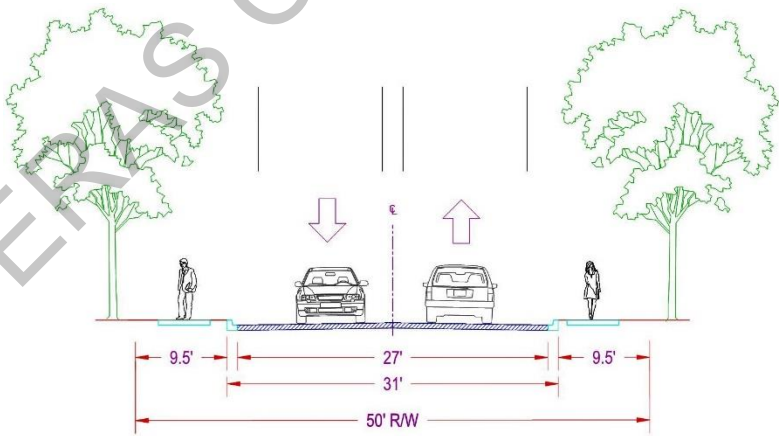
When off the core active network, bike lanes are unnecessary, but space for sidewalks is still required in urban areas. This cross section should not be made more than one lane in either direction as this could lead towards higher free-flow speeds when balanced against the access needs. Intermediate parking lanes are acceptable if there is available space.




*Local street with wider 2 lanes for heavier use.* ***(L2U - Major)***

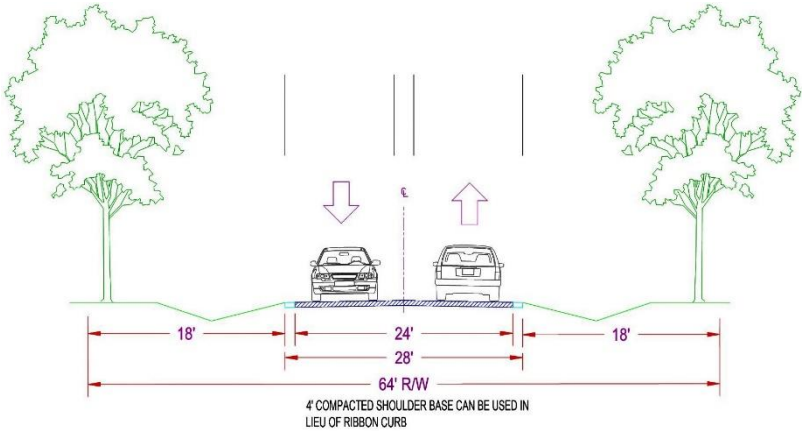
**Local Major** – This is applicable to residential, commercial and/or industrial areas. This street provides movement from the nearest collector street or higher classification and attract low traffic volumes of up to two thousand (2,000) vehicle trips per day.

**Local Urban** - This is the most common street by mileage. Its design is typical to what is already present in most of the City. Heavily dictated by right-of-way and adjacent housing, major changes to the cross section are not typical. However, such segments in the older portion of the City lack sidewalk connectivity and therefore a sidewalk implementation plan is important.




*Local street with 2 lanes regularly used.* ***(L2U - Urban)***

**Local Rural** - Off the active transportation network, the local rural roadway cross section may be appropriate for the surrounding land use context. This section has a larger right-of-way to accommodate open channel drainage.

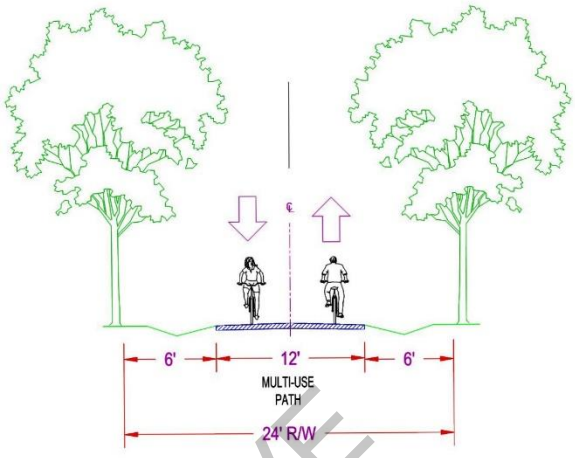



*Local street with 2 lanes in rural areas.* ***(L2U - Rural)***

**Multi-Use Pathway**

The City transportation network will also include shared pathways. These pathways may be located adjacent to streams, floodways or railways. This network element can serve both cyclist and pedestrians for travel or for recreation. Often, they connect to points of interest, such as the downtown area, parks or schools, but may also be constructed to serve as an alternative transportation option to major regional employers, such as Ft. Hood.

For two-way traffic, each lane should be 6-feet wide to provide a minimum of 12-feet of pavement. Two-foot shoulders should be provided to permit cyclist to safely pass a pedestrian or jogger, or allow pedestrians to walk side-by-side and not cross over into the oncoming lane.




*Multi-Use Path.* ***(MUP - Bike)***

## SUMMARY

This Transportation Master Plan update recommends three basic roadway classifications and develops a set of possible roadway cross sections that may be applied based on the planned land use. The TMP does not specify exact design elements, but provides a guideline to design the roadway to fit the land use context of the development and to serve all the potential users of that roadway. The TMP classifies existing roadways based current traffic demand and connectivity in the network. This map provides a guide for future capital improvement projects. The Plan also identifies near term roadway and sidewalk improvements at the regional level that impact the City transportation system.

| | | |
|---|---|---|
| Arterials | Major | Active |
| | | Non-Active |
| | Minor | Active |
| | | Non-Active |
| Collectors | Active | |
| | Non-Active | |
| Locals | Active | |
| | Non-Active | |
| Multi-Use Pathway | | |

*Chart 7 – Basic Roadway Classifications*

The Plan also meets state and federal transportation planning requirements for projects to be included in the regional Transportation Improvement Program (TIP) and qualify for financial assistance to complete.

As previously mentioned, **Table 5** of page 50 can be used to assist with the planning process for future Capital Improvement Program projects. The Typical Section table provides a guide to determine the estimated cost per mile of roadway that may be applied for a proposed development. TxDOT's average annual bid item cost for the full year of 2016 was used to develop these costs.

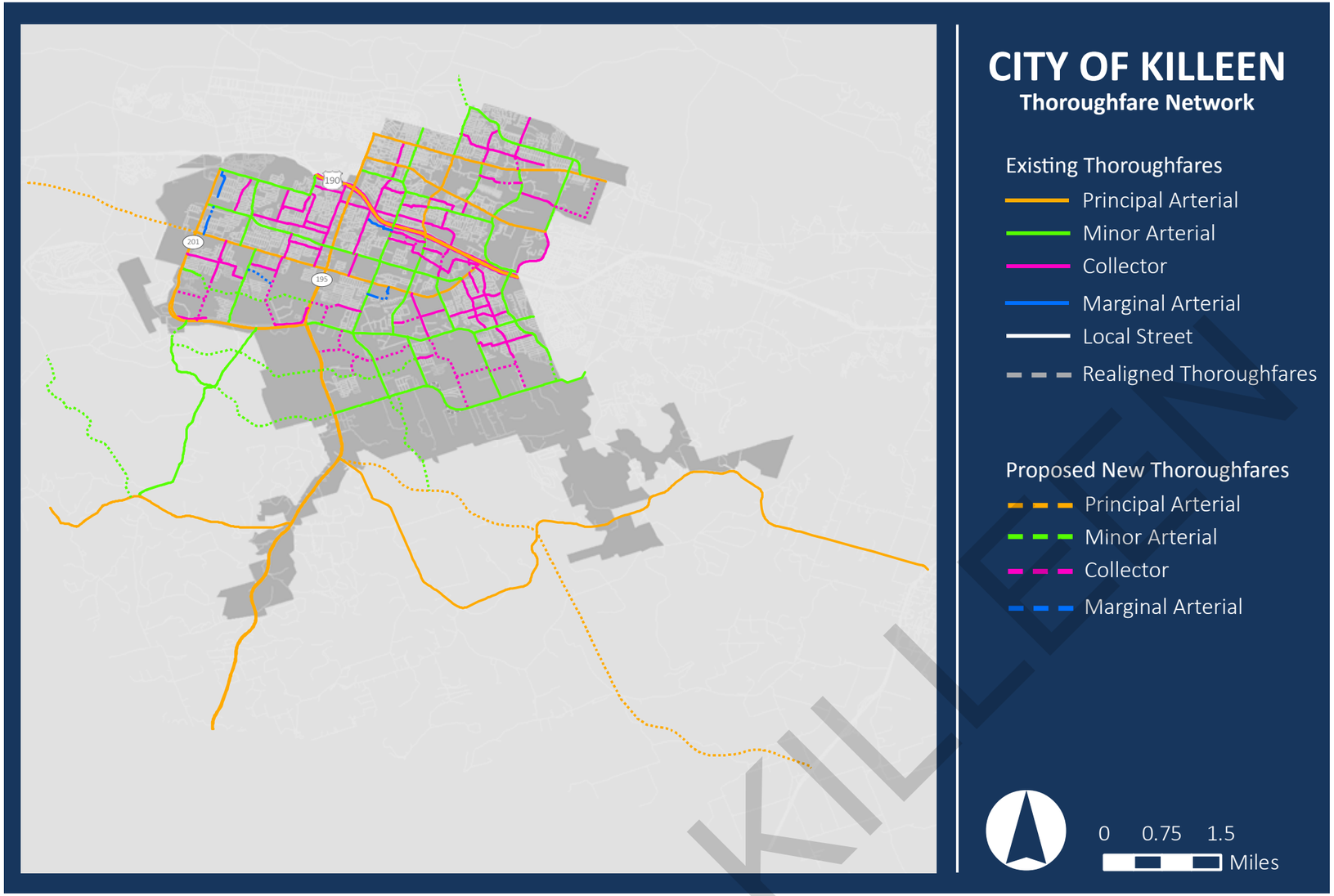



*Figure 21: 2015 Thoroughfare Plan Roadway Network*

Development of the 2015 Thoroughfare Plan builds on the activities described in previous sections, including the analysis of existing conditions, future development patterns, projected travel needs and system performance, and community goals. The plan proposes a network of existing, upgraded, and proposed roadways intended to meet the long-term needs of the community as it grows and changes over time. The primary products of the thoroughfare planning effort are a thoroughfare network, a functional classification system, and typical cross-sections by functional class.

The thoroughfare plan will guide future investments in the roadway network, including projects funded by the public sector through the Capital Improvements Program (CIP), as well as the private sector through the land development process. The thoroughfare plan is intended to be used as a framework for future growth, not a blueprint for development. As conditions change over time, the thoroughfare plan should be revisited and revised. Specific roadway alignments and implementation timelines should reflect the most up-to-date information regarding development potential, environmental constraints, project readiness, and opportunities for cost sharing.

## THOROUGHFARE NETWORK

The thoroughfare network, shown in **Figure 21**, was developed using the 2010 network as a base line and updating the plan to include new roadway segments and major improvements identified in local and regional plans. Changes to the existing network included omitting several proposed roadways that were either no longer feasible due to the development of the surrounding land, or were no longer desirable based on development trends and feedback from the public and local stakeholders. Alignments of several of the roadways were adjusted to account for environmental constraints that had not been factored into the previous plan. Additionally, projects from the updated KTMPO MTP, Mobility 2040, were incorporated into the thoroughfare network.

### Constraints Analysis

A high level constraints analysis was performed to identify any obvious potential environmental constraints to proposed new roadways and ensure that in developed areas, roadways are sensitive to the context of adjacent neighborhoods and in undeveloped areas, roadways are consistent with and support future land use plans.

Water features, topography, built features, and parcel boundaries were examined in relationship to the proposed thoroughfare network, and adjustments were made accordingly. However, the analysis was performed at a high level, and more detailed studies may be necessary to refine the alignments as growth patterns become more certain. Project implementation, development of subdivision plats or site plans that include the thoroughfares in this plan should be done in collaboration with and under the review of the City Engineer.

Several roadways for which further study is necessary are of particular note. In the southwest portion of the City's ETJ, south of the S.H. 201 and west of S.H. 195, there are topographical challenges related to the terrain and abundance of creeks. Of particular note are the proposed future east-west arterial from Ivy Mountain Road to S.H. 195, and Mayberry Park Road from Ivy Mountain Road to S.H. 195. Both alignments will require a route study to determine how the roadway will traverse the terrain. In particular, it is recommended that both segments be further evaluated for horizontal radii compliant with design speed requirements. Furthermore, attention should be given to how each roadway will intersect with Maxdale Road, given challenges related to proximity of Reese Creek, terrain features that will likely reduce approach tangent sections, and sight distance due to the need for potentially significant cut requirements.

Similarly, the extension of West Trimmier Road, south of Chaparral Road, and the proposed alignment of S.H. 201 will require further analysis to assess connectivity to F.M. 2484. The alignment of S.H. 201 south of the Lampasas River will require further evaluation of the terrain, floodplains, and any environmental and/ or utility issues, and should be modified as necessary.

# FUNCTIONAL CLASSIFICATION

In addition to defining a thoroughfare network, a classification system was assigned to area roadways based on thoroughfare type. Functional classification is the process by which local and regional roadways are grouped into hierarchal categories according to the transportation objectives they are intended to provide. This process identifies the role each roadway serves in the context of the larger transportation system, and facilitates planning for logical and efficient routing of traffic through the roadway network. Functional classification was mandated by the Federal-Aid Highway Act of 1973 and remains in effect today.

## Purpose

Transportation systems are designed to serve a diverse range of travel needs, from long-distance travel between cities to local trips between home and the grocery store. Assigning a functional class to each roadway in the system helps ensure that the transportation system can serve the diverse travel needs of users in a logical and efficient manner. Functional classifications provide a basis for selecting appropriate speed and geometric design criteria for a given roadway. However, this does not mean that the functional classification for a given roadway prescribes specific design criteria. Instead, the actual configuration of roadways is subject to review and adjustment to ensure facility design is coordinated with adjacent development, and takes into account other community goals and objectives.

A context sensitive approach that takes into account the compatibility of thoroughfare types with surrounding land uses, in addition to the efficient movement of traffic, was used for designating functional classifications for the City of Killeen Thoroughfare Plan. The proposed functional classifications were determined by weighing mobility versus access needs, the surrounding land uses, and the facility characteristics of existing roadways.

### *Mobility versus Access*

The two primary travel needs served by roadways are mobility, or the ability to move people or goods efficiently between locations, and access, or the ability to reach numerous desired destinations. While all roadways serve these two needs to at least some degree, by design certain types of roadways serve one need better than the other. Highways, for example, provide a high degree of mobility, facilitating long-distance travel between destinations by providing minimal traffic conflicts and few opportunities to enter/exit the roadway. Such roadways are classified as Principal Arterials under the Killeen functional classification system (described in more detail in the next section). Neighborhood streets, on the other hand, provide a high degree of access (to homes, shopping centers, etc.), but offer lower mobility due to the presence traffic signals, lower speeds and other design characteristics. These roadways are classified as Local streets under the Killeen functional classification system.

**PRINCIPAL ARTERIAL**

*Example: Stan Schlueter Loop (FM 3470) (Source: Google Earth)*

**MINOR ARTERIAL**

*Example: W Trimmier Road (Source: Google Earth)*

**COLLECTOR**

*Example: Chantz Drive (Source: Google Earth)*

**MARGINAL ACCESS**

*Example: Lions Park Road (Source: Google Earth)*

**LOCAL STREET**

*Example: Aquamarine Drive (Source: Google Earth)*

***Mobility***

***Access***

### *Facility Characteristics*

The physical characteristics of the roadway also determine its functional classification. High posted speed limits and a limited number of access points, for example, typically characterize principal arterials. Local streets, on the other hand, are characterized by the presence of driveways, crosswalks and intersecting streets, and therefore have lower speed limits than Arterials.

### *Surrounding Land Uses*

The type and degree of development surrounding each roadway influences the functional class of that roadway. Local streets and collector roadways, which are generally characterized by smaller roadway widths, lower design speeds, and the presence of driveways and crosswalks, are appropriate for residential land uses, and are intended to provide access to and from residential areas to more intense land uses. Local streets maximize safety in areas where residents may by walking, children may be playing, and where noise pollution from traffic should be reduced to protect neighborhood character.

Minor arterials typically serve civic land uses, smaller retail and commercial developments, and both light and heavy industrial land uses, whereas principal arterials provide access to regional destinations such as shopping malls, large-scale employers, and special event facilities. As such, arterials are typically characterized by wider roadway widths, a greater number of travel lanes, higher design speeds, and fewer driveways and crosswalks.

## City of Killeen Functional Classifications

The functional classification system outlined by the previous Thoroughfare Plan map categorized roadways into five (5) different functional classes. This update to the Thoroughfare Plan uses these same classifications, which are defined below. Note that in the context of the mobility versus access continuum, higher functional classes (e.g. principal arterials) serve mobility while lower classes (local streets) prioritize access.

### *Principal Arterials*

Principal arterials  provide a high degree of mobility by serving travel between major destinations or activity centers, as well as long-distance traffic that goes through or bypasses an area. They are designed to minimize travel time by providing high posted speed limits, offering physical separation from other roadways (e.g. few at-grade intersections) and providing a limited number of access/egress points (e.g. on- and off- ramps).

### *Minor Arterials*

Minor arterials are intended to connect traffic into and between the principal Arterial system. They can serve trips of moderate length by connecting smaller geographic areas. While minor arterials provide slightly less mobility benefit than principal arterials, overall they are characterized by relatively high travel speeds and low interference from cross traffic.

### *Collectors*

Collectors provide a balance between mobility and access, primarily serving to "collect" traffic from local streets and provide connections to arterials. In urban areas, collectors provide traffic circulation in residential areas or commercial districts, while in rural areas they primarily serve travel within the county (i.e. trips shorter than those served by arterials). Due to the large number of collector roadways and the diversity of adjacent land uses, appropriate context subcategories were defined for collector roadways.  These categories include residential, commercial, and mixed-use collectors.

### *Marginal Access*

Marginal access roads balance land access and traffic circulation by providing access to abutting properties, particularly commercial developments, that otherwise may result in traffic congestion along arterials and long queues at intersections. Marginal access roads are characterized by lower speeds and few intersections.

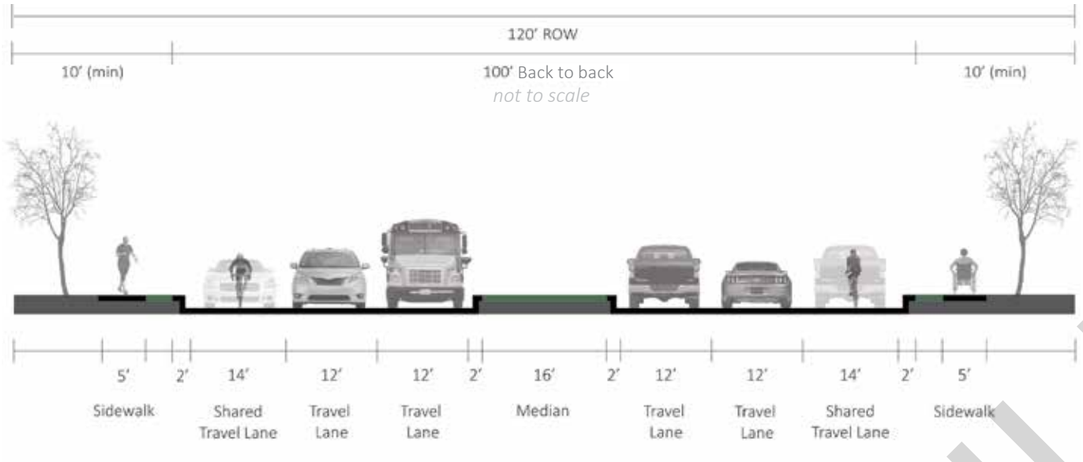
### *Local Streets*

Local streets offer lower mobility than other functional classes but provide the highest degree of access to adjacent land. They discourage through traffic with low posted speed limits and the use of traffic calming features. Local streets make up the bulk of the transportation system in terms of mileage.

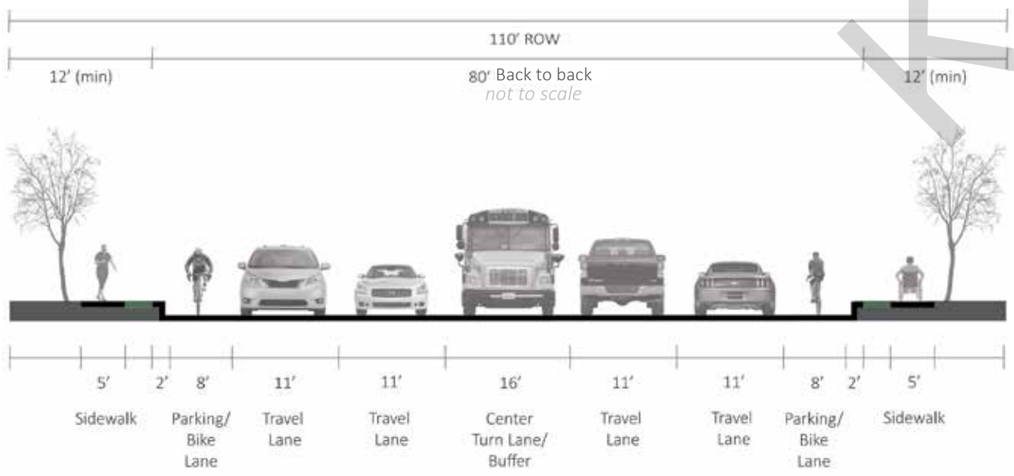
# TYPICAL ROADWAY CROSS SECTIONS

As a general guideline for roadway design, typical roadway cross sections are defined for each functional classification, including standard right-of-way widths, number of lanes, medians, and bicycle and pedestrian facilities. The conceptual diagrams below take into account standards identified in the City of Killeen Infrastructure Design and Development Standards Manual, as well as cross sections adopted in the KTMPO Regional Thoroughfare Plan. As noted in the design manual, lane widths are approximate, and variances are allowed only as approved by the City of Killeen Department of Public Works. The actual configuration of roadways is subject to review and adjustment by the city engineer to ensure facility design is coordinated with adjacent development and existing roadways.

## Principal Arterial

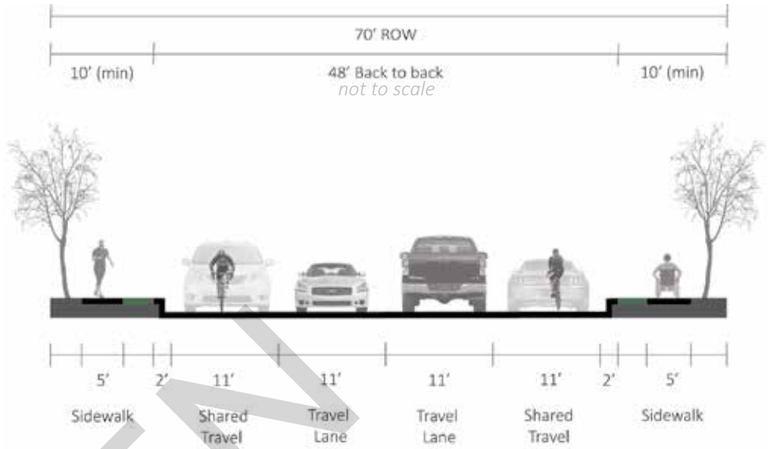



## Minor Arterial

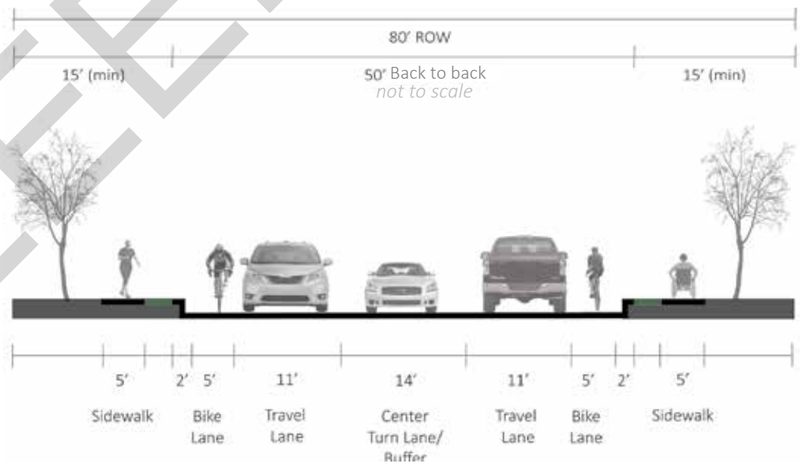



## Collectors

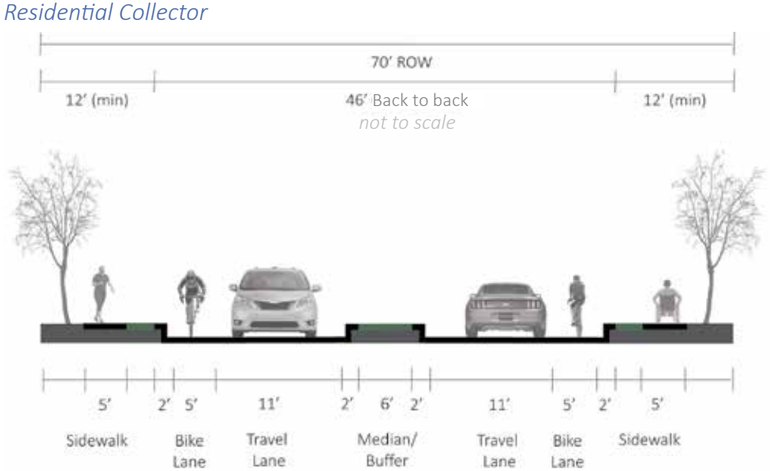
### *Commercial Collector*



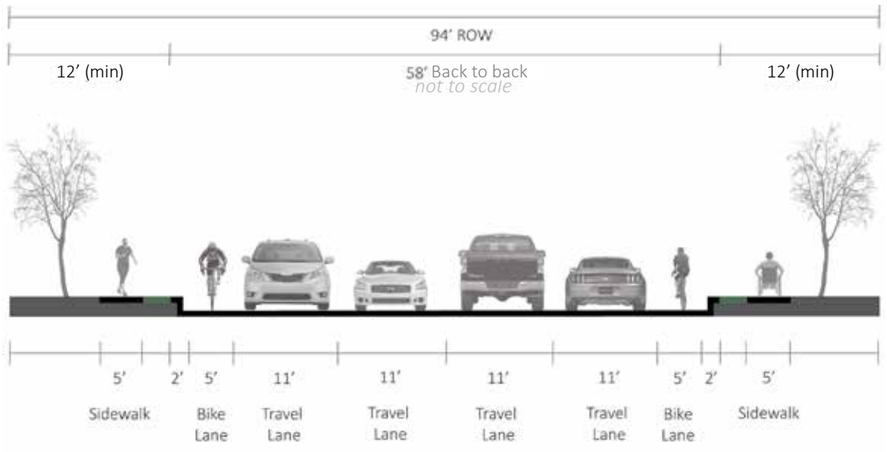

### *Mixed Use Collector*



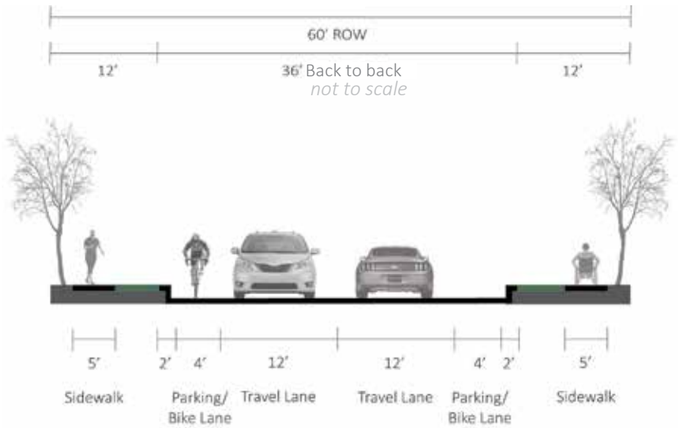

### *Residential Collector*



## Marginal Access




## Local Streets



## PROPOSED ROADWAY CROSS SECTIONS

The functional classification system used in the current Thoroughfare Plan was utilized for the proposed Thoroughfare Plan, with modifications to the right-of-way for each classification, and includes:

- Major Arterial (120' ROW)
- Minor Arterial (100' ROW)
- Major Collector (80' ROW)
- Minor Collector (60' ROW)

Some of the roadway cross sections shown in the following sections provide adequate right-of-way for the development of a single left-turn lane at major intersections or traffic generators. For those cross sections where adequate right-of-way is not provided for a single left turn lane at a major traffic generator or intersection, or where dual left turn lanes or a right turn lane is needed, the roadway would need to be widened and additional right-of-way acquired to provide the additional lane(s). For each functional classification, alternative concepts are provided in order to select the most appropriate configuration as part of the development process. The alternative layouts presented under this designation include the presence of individual/shared bike lanes and a 10 foot hike and bike trail on one side. Sidewalks are shown in these typical sections for reference purposes only and are not a requirement of the Thoroughfare Plan.



Major Arterial (120' ROW)

The Major Arterial designation is a six-lane divided roadway within a 120 foot wide right-of-way with geometric options shown in **Figure 7**. The primary purpose of this facility is to provide mobility for long and intermediate trip lengths and general connectivity within and to areas outside of Belton. The alternative layouts presented under this designation include the presence of individual bike lanes, shared bike lanes and a 10 foot hike and bike trail on one side. A sidewalk is shown on both sides of the roadway under all alternatives.

Minor Arterial (100' ROW)

The Minor Arterial designation is a four-lane divided roadway within a 100 foot wide right-of-way with geometric options shown in **Figure 8**. The primary purpose of this facility is to provide mobility for longer trip lengths and general connectivity to areas outside of Belton. The alternative layouts presented under this designation include the presence of individual bike lanes and a 10 foot hike and bike trail on one side. A sidewalk is shown on both sides of the roadway under all alternatives.

A rural Minor Arterial cross section is also a four-lane divided roadway within a 100 foot wide right-of-way with geometric options shown in **Figure 9**. This roadway cross section is intended for rural areas where open drainage channels are provided (no curb and gutters), although particular locations may require an engineered swale with underground pipes. The alternative layouts presented under this designation include the presence of individual bike lanes, shared bike lanes and a 10 foot hike and bike trail on one side. A sidewalk is shown on both sides of the roadway under all alternatives. For these rural sections, pavement can be provided in the center of the road to provide a five-lane section (left turn lane) at an intersection.

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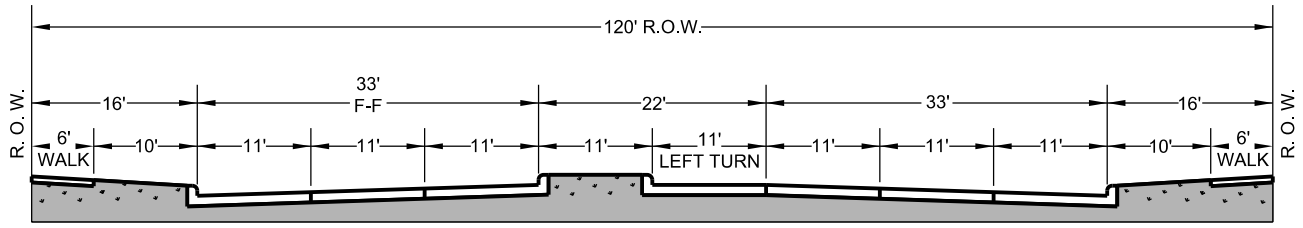


Major Arterial - 6 lane divided roadway, no bike lanes, 6' sidewalks

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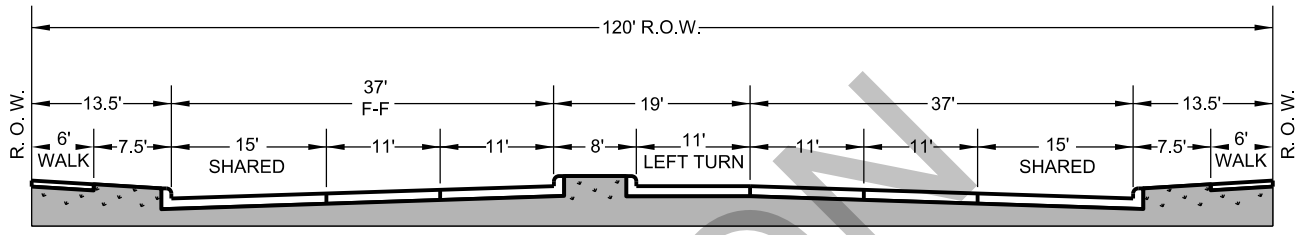


Major Arterial - 6 lane divided roadway, shared bike lanes, 6' sidewalks

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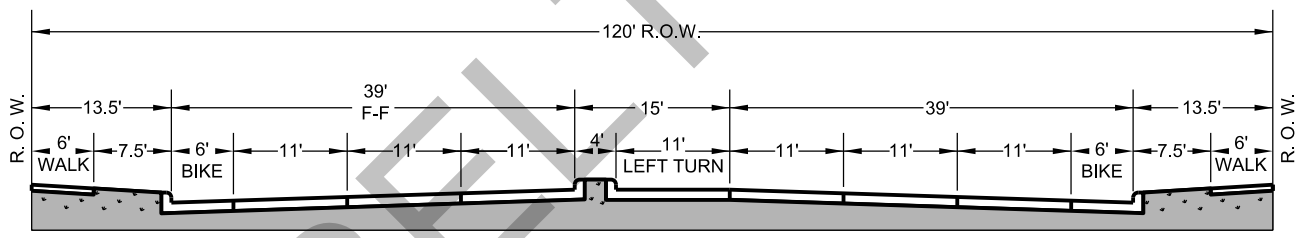


Major Arterial - 6 lane divided roadway, 6' bike lanes, 6' sidewalks

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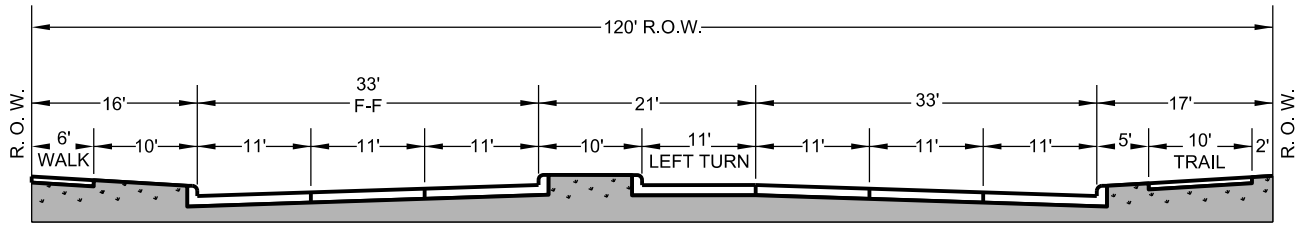


Major Arterial - 6 lane divided roadway, no bike lanes, 6' sidewalk on one side,
10' hike and bike trail on other side



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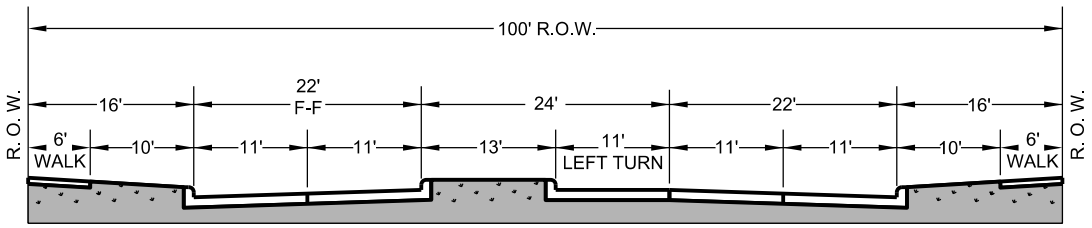
Major Arterial (120' ROW)

Figure 7

Ⓐ




Minor Arterial - 4 lane divided roadway, no bike lanes, 6' sidewalks

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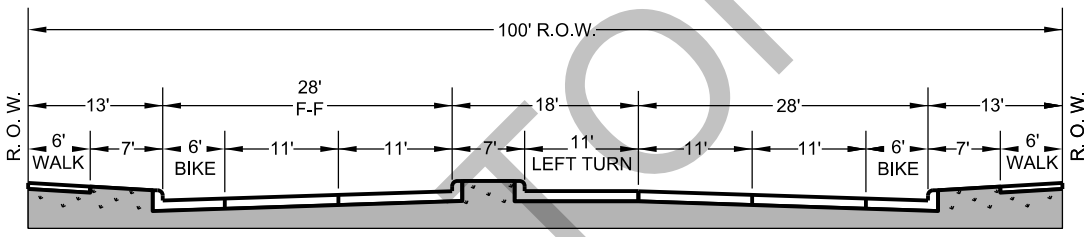


Minor Arterial - 4 lane divided roadway, 6' bike lanes, 6' sidewalks

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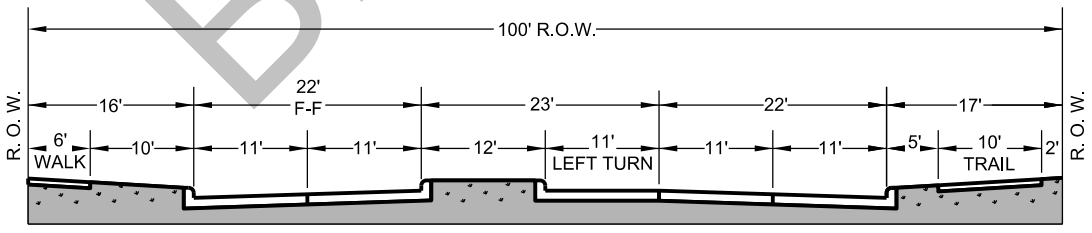


Minor Arterial - 4 lane divided roadway, no bike lanes, 6' sidewalk on one side,
10' hike and bike trail on other side



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Minor Arterial (100' ROW)

Figure 8

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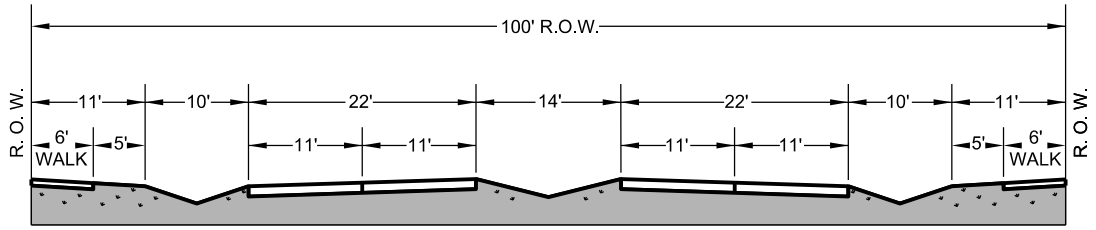


Minor Arterial (rural cross section) - 4 lane divided roadway, no bike lanes, 6' sidewalks

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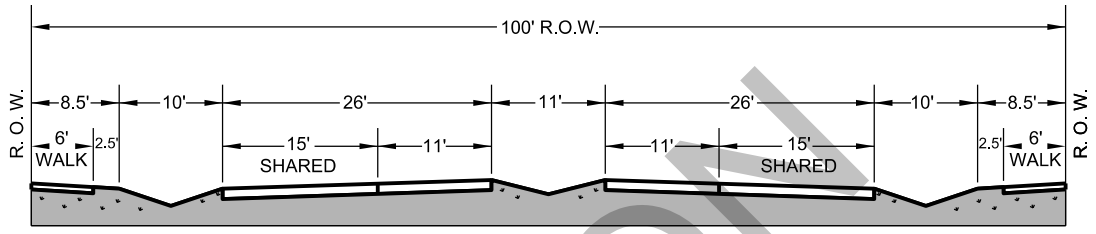


Minor Arterial (rural cross section) - 4 lane divided roadway, shared bike lanes, 6' sidewalks

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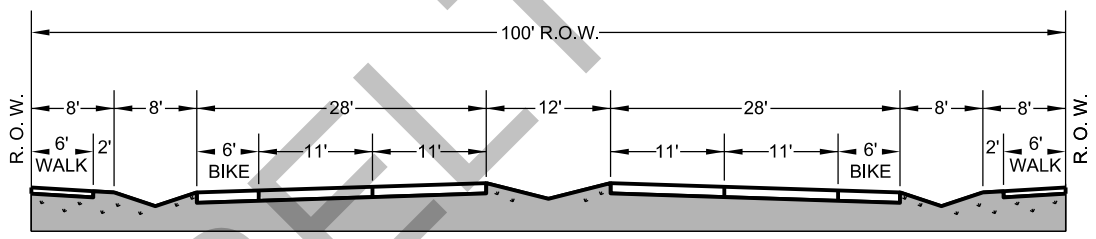
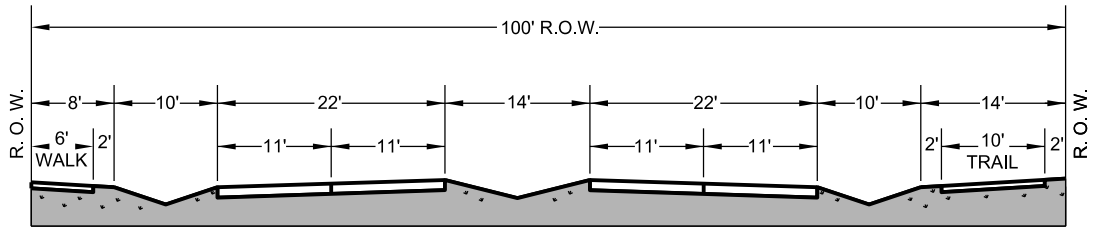



Minor Arterial (rural cross section) - 4 lane divided roadway, 6' bike lanes, 6' sidewalks

Ⓓ




Minor Arterial (rural cross section) - 4 lane divided roadway, no bike lanes, 6' sidewalk on one side, 10' hike and bike trail on other side



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Minor Arterial - Rural (100' ROW)

Figure 9

Major Collector (80' ROW)

The Major Collector designation consists of a four-lane undivided roadway with an 80 foot wide right-of-way and is shown in **Figure 10**. This facility serves the primary purpose of collecting trips within subareas of Belton and providing access to arterials or other collectors throughout the City. The alternative layouts presented under this designation include the presence of individual bike lanes, shared bike lanes and a 10 foot hike and bike trail on one side. A sidewalk is shown on both sides of the roadway under all alternatives.

Minor Collector (60' ROW)

The Minor Collector designation consists of two separate cross sections within a 60 foot wide right-of-way and is shown in **Figure 11**. The first cross section provides a two-lane undivided roadway section while the second cross section includes a center two-way left turn lane (TWLTL) between the two through lanes. This facility serves a similar purpose as the major collector, collecting trips within subareas of Belton or within a residential subdivision and providing access to the larger network of streets throughout the City. Traffic volumes on these roadways are typically lower than Major Collectors.

Local Roadway (50' ROW)

The Local Roadway cross section, which is not shown on the Thoroughfare Plan, lies outside the Arterial and Collector classification and primarily serves residential neighborhoods, with houses fronting these roadways and with sidewalks shown on both sides. The cross section for a Local Roadway is contained within a 50 foot wide right-of-way and is shown in **Figure 12**.

Designation of the classification (arterial, collector, or local) of new roads not shown on the current City of Belton Thoroughfare Plan shall be made by the City Engineer.

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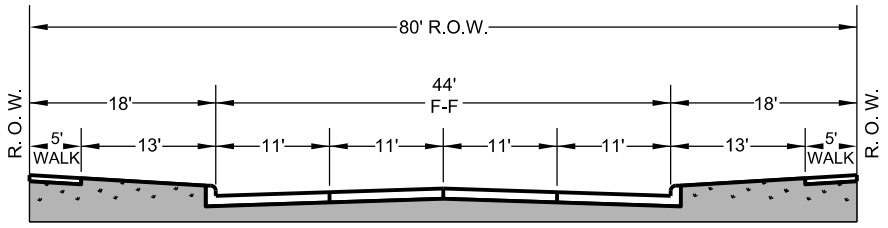


Major Collector - 4 lane undivided roadway, no bike lanes, 5' sidewalks

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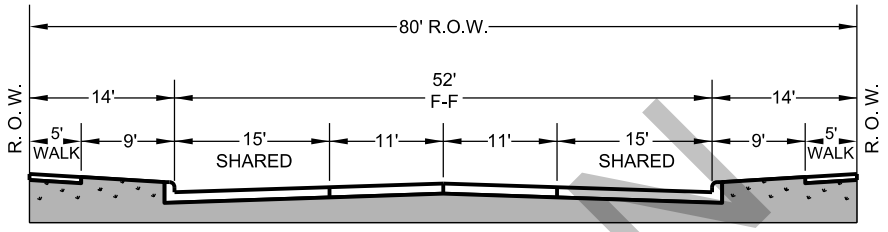


Major Collector - 4 lane undivided roadway, shared bike lanes, 5' sidewalks

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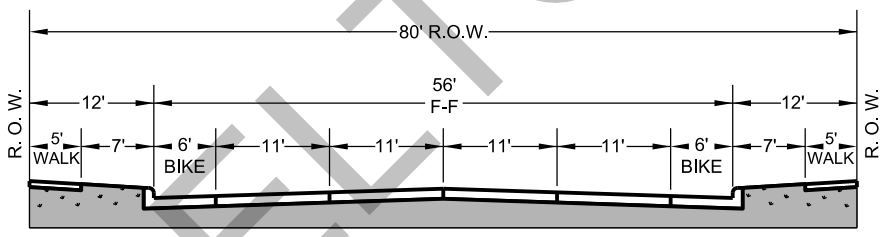
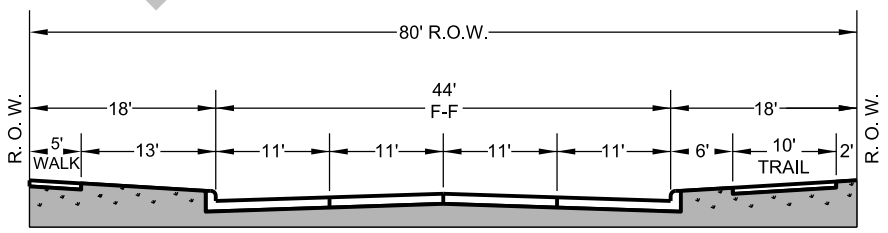



Major Collector - 4 lane undivided roadway, 6' bike lanes, 5' sidewalks

Ⓓ




Major Collector - 4 lane undivided roadway, 5' sidewalk on one side,
10' hike and bike trail on other side



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Major Collector (80' ROW)

Figure 10

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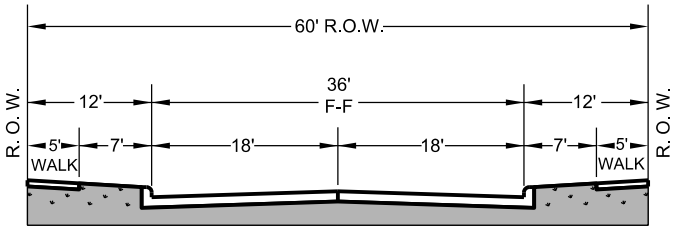


Minor Collector - 2 lane undivided, shared bike lane, 5' sidewalks

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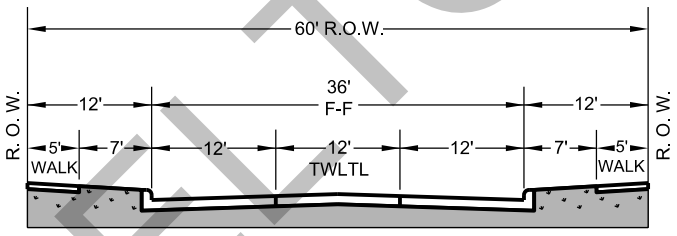


Minor Collector - 2 lane undivided w/ two-way left-turn lane (TWLTL),
no bike lanes, 5' sidewalks



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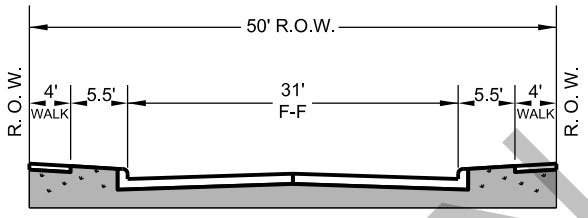



Local Roadway - 2 lane undivided, 4' sidewalks



Last Updated: October 10, 2014

3030 LBJ FREEWAY
SUITE 1660
DALLAS, TEXAS 75234
972-248-3006 FAX 972-248-3855
TBPE FIRM F-450
LEE ENGINEERING

Local Roadway (50' ROW)

Figure 12

## PROPOSED MASTER THOROUGHFARE PLAN

The proposed thoroughfare plan for the City of Belton is shown in **Figure 13**. Proposed roadways shown in undeveloped areas are not intended to indicate precise configurations or alignments.

The Major Arterials form the primary framework of the proposed roadway system, and are intended to carry the longest trips and the highest traffic volumes. The proposed Major Arterials, as shown in Figure 13, are:

- SH 317 (Main Street)
- Loop 121
- FM 439 (Lake Road)
- FM 93 (2nd Avenue)
- FM 93 (6th Avenue)
- FM 817 (Waco Road)
- FM 436 (Holland Road)

Old Waco Road, including a proposed segment connecting to Witter Lane, is also shown as a Major Arterial, based on the City of Temple Thoroughfare Plan. Old Waco Road does not fall within the City of Belton city limits or extra-territorial jurisdiction (ETJ).

# STREETS AND THOROUGHFARES

The future of Temple's street network requires a thoughtful approach to balancing mobility needs, location of major thoroughfares and street design based on context and land use character. The Thoroughfare Plan aims to provide an effective balance of mobility and accessibility with variable design features to complement a wide range of development types. The Plan also accounts for improvements or expansions to existing streets and location of future streets based on projected growth patterns.

The Thoroughfare Plan should be used by City staff, and elected and appointed officials to guide the design and reconfiguration of existing streets and adequately plan for future streets to accommodate new development. The following pages describe the functionaly hierarchy of general street types, street design based on character area, and a map fo the Temple planning area depicting existing and future thoroughfares.

## Functional Classification

Streets are traditionally classified based on their function. The Federal Highway Administration (FHWA) has established a hierarchy of seven functional classifications for streetways, but the application of each of these varies by jurisdiction. For the Temple approach, the seven FHWA classifications have been consolidated into six, with "Interstate" and "Freeway and Expressway" combined to create the "Highway" category.

The functional classification of streets presents varying levels of access and mobility as represented by Figure 4.11, *Mobility and Access Functions*. The streets with the highest levels of mobility (i.e. highways) have the least access; conversely, the streets with the most access to surrounding properties (i.e. local streets) have the least mobility. Figure 4.12, *Thoroughfare Functional Classifications,* defines the primary purpose of each street type. The street types described in these figures may take on differing design based on character areas yet purpose and functionality of each type remain.

FIGURE 4.11: MOBILITY AND ACCESS FUNCTIONS

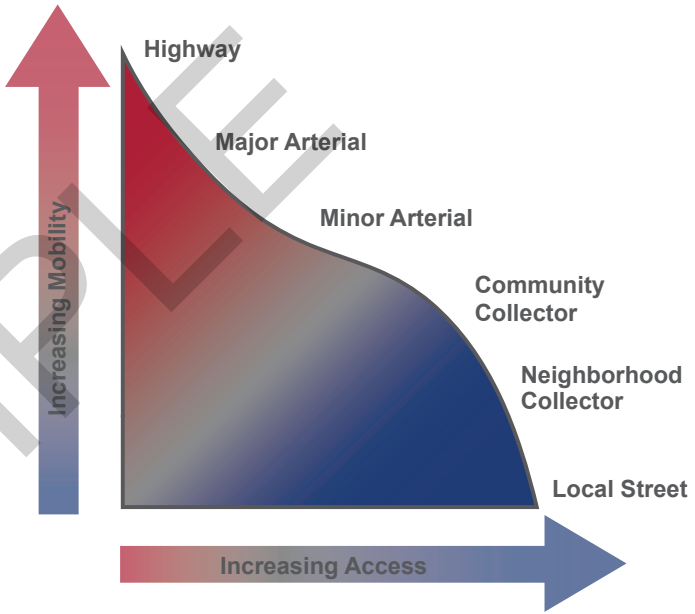



FIGURE 4.12: THOROUGHFARE FUNCTIONAL CLASSIFICATIONS

| Street Type | Primary Purpose |
|---|---|
| Highway | Mobility Between Cities |
| Major Arterial | Mobility Within City |
| Minor Arterial | Moderate Length Trips |
| Community Collector | Connect to Arterials |
| Neighborhood Collector | Connect to Arterials and Collectors |
| Local Street | Property Access |

Source: "Highway Functional Classification Concepts, Criteria and Procedures." (2013)

W. Central Ave. in Temple

## Character Zones

The design of Temple's future streets should be based not purely on volume and speed but equally based on the current or intended character of the surrounding built environment. This plan recognizes the "transportation-land use connection" - the linkage between buildings and the street - as a critical component of maintaining or creating neighborhoods, districts, and corridors of unique character.

Desired land use and development character should drive street design, while accommodating for the purpose and functionality of vehilcle movement. Thus, street design should intentionally be approached to support either existing or future desired development. The streets introduced in the following pages are rooted in the three character zone types established earlier in this chapter - Urban, Suburban, and Rural. This chapter also establishes a new Future Thoroughfare Map, and discusses multi-modal accommodations within the transportation system.

For example, thoroughfares in an urban environment, while still rooted in functionality and volumetric capacity, are presented with design characteristics that support the desired density and adjacent building character. In the Urban Character Zone, arterial and collector streets are presented here as Urban Avenues that accommodate various transportation modes safely and efficiently while pedestrian-focused with streetside amenities. A description of Urban Avenues is as follows:

- ***Urban Avenues.*** *Avenues include volume-intensive arterials and collector streets in function. Avenues may include on-street parking, bicycle accommodations, and an active streetside area, depending on the context. Examples of avenues include Adams and Central, 3rd Street, Avenue H and 31st Street, among others. Several avenues in Temple are candidates for a "road diet," where lane reductions are considered in favor of pedestrian/bike facilities and streetside aesthetic enhancements.*

## Urban Streets

Urban streets should be designed to provide a comfortable and aesthetically pleasing built environment that encourages bicyclist and pedestrian activity and should include active streetsides that serve as public gathering spaces. Urban street key considerations include:

### URBAN STREET KEY CONSIDERATIONS

- *Incorporate Complete Street features in a way that accommodate and encourage bicycling, walking, and transit use.*
- *Design streets to slow traffic - closely aligning with posted speed limits.*
- *Incorporate components of active streetsides for public gathering and activity in areas where pedestrian activity is expected.*
- *Design to incorporate transit infrastructure and encourage fixed-route ridership.*
- *Reduce lanes in areas where design capacity exceeds traffic volumes during most non-peak periods.*
- *Frame the street with adjacent buildings.*
- *Promote on-street parking.*
- *Maximize street interconnectivity with emphasis on small block size.*
- *Create a parallel system of vehicle access through the use of alleys and cross-access easements.*


Buildings adjacent to urban streets should frame the right-of-way.

Urban streets can be candidates for lane reductions. The street above was converted from a four-lane minor arterial street into a three-lane avenue with on-street parking, bicycle lanes, and intermittent medians (above).

Urban streets should have wide streetsides to accommodate pedestrian sidewalks and public gathering spaces (above).

## Suburban Streets

Streets within the suburban street character zone most closely resemble standard street sections that are common in Temple today. New surburban streets should be designed to promote bicyclist and pedestrian activity but emphasis is placed on efficient motor vehicle flow in recognition of land use patterns that are at lower densities and will generate lower volumes of active transportation users between destinations.

Create greater separations between vehicle travel lanes and parallel pedestrian pathways.

Suburban streets may have medians (above) as a method of access management, and to create a consistent community character.

### SUBURBAN STREET KEY CONSIDERATIONS

- *Incorporate Complete Streets features in a way that comfortably accommodates bicycling, walking, and transit use.*
- *Prioritize bicycle and pedestrian mobility in residential areas where bike-ped trips typically originate.*
- *Maximize street interconnectivity with emphasis on small-to-medium block size.*
- *Create greater separations between vehicle travel lanes and parallel pedestrian pathways.*
- *Improve vehicle flow through ease of access management design features.*
- *Incorporate enhanced traffic stops that separate buses from travel lanes.*

Suburban streets

## Rural Streets

Rural streets are primarily designed for mobility and access in rural character areas, both within the city limits and ETJ. Key considerations of rural streets and their appropriate locations are described in the sidebar to the right. Rural street design is appropriate in areas designated as Rural Character on page 5 of this chapter.

The application of rural streets assumes that low-density residential development, agricultural land uses, or other dispersed land uses would remain rural during the plan horizon. As the community grows and desired suburban character pushes further out in the planning area, reconsideration of rural street design would be appropriate. The use of rural street design in suburban areas should be considered sparingly by the City but is an option where contextually appropriate, such as estate development. Rural collectors are typically appropriate for residential development due to large size lots and minimal access points. With estate subdivisions, typically one acre in size, such lots should not take direct access from Community Collectors in rural areas.

### RURAL STREET KEY CONSIDERATIONS

- *Incorporate Complete Street features in a way that comfortably accommodates bicycling, walking, and transit use.*
- *Maximize street interconnectivity with emphasis on small block size.*
- *Create greater separations between vehicle travel lanes and parallel pedestrian pathways.*
- *Improve vehicle flow through ease of access management design features.*



Rural streets may have amenities such as soft-surface trails to accommodate pedestrians and cyclists (above).

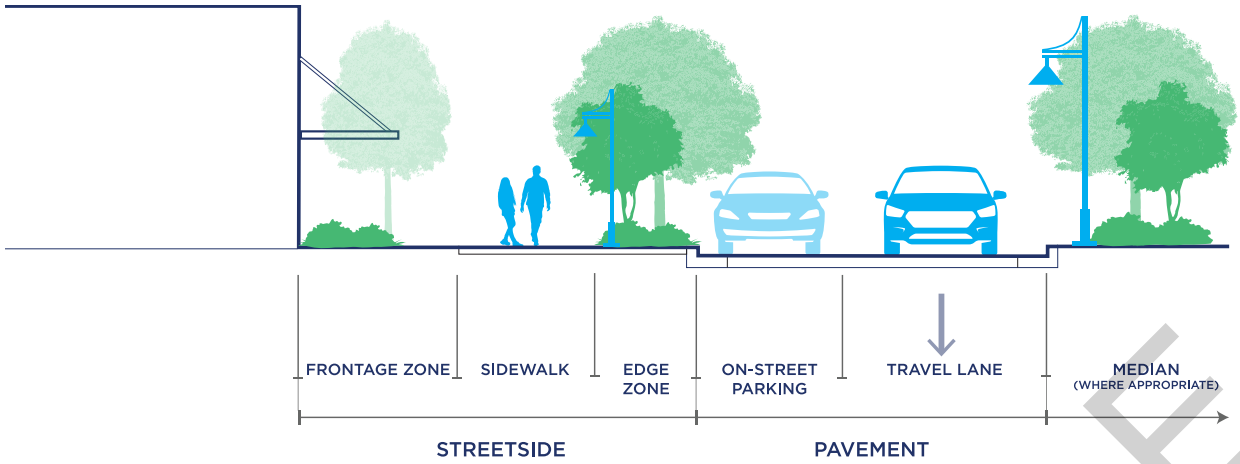
Rural streets (above) often do not employ curb and gutter or integrate ribbon/laydown curbs.

FIGURE 4.13: SUBURBAN STREET DESIGN CHARACTERISTICS

| Attribute | Major Arterial | Minor Arterial | Community Collector | Neighborhood Collector | Suburban Local |
|---|---|---|---|---|---|
| **Function** | | | | | |
| Functional Role | Mobility | Mobility | Provide access between arterials and local streets | Provide access between arterials and local streets | Property access |
| Streetway Continuity | Connects major centers and highways | Connects major arterials to other street types | Continuous between arterials | Generally continuous | Generally discontinuous, but connects to collectors |
| Right-of-Way | 80 - 120 feet | 80 -100 feet | 65 - 75 feet | 50 - 60 feet | 50 feet |
| Desirable Spacing | 2 miles | 1 - 2 miles | 1/4 to 1/2 miles | 800 - 1200 feet | 300 - 800 feet |
| Design Speed | 45 to 55 mph | 40 to 50 mph | 35 to 45 mph | 30 to 40 mph | 20 to 35 mph |
| Traffic Volumes | 20,000 - 40,000 | 12,000 - 24,000 | 4,000 - 15,000 | 1,000 - 5,000 | 80 - 1,000 |
| | | | | | |
| Travel lanes | 4 to 6 lanes | 2 to 4 lanes | 2 to 4 lanes | 2-way vehicular movement, unstriped travel lanes | 2-way vehicular movement, unstriped travel lanes |
| Turn Lanes | Intermittent turn lanes throughout. 1 turn lane at most intersections & up to 2 turn lanes at major intersections | Intermittent turn lanes throughout. 1 turn lane at most intersections & up to 2 turn lanes at major interesections | One turn lane at signalized intersections and others as needed. | Not typical | None |
| On-street Parking | Not appropriate | Not appropriate | Typically restricted, but may be appropriate in certain areas | Permitted | Permitted |
| Curb & Gutter | Varies | Typically vertical curb | Vertical curb | Vertical or mountable curb | Vertical or mountable curb |
| Stormwater | Varies | Typically subsurface stormdrain | Subsurface stormdrain | Subsurface stormdrain | Subsurface stormdrain |
| Median | Medians are intended to manage turning movements and access, provide refuge for pedestrians crossing, and landscaping | Medians are intended to manage turning movements and access, provide refuge for pedestrians crossing, and landscaping | Medians are appropriate to improve aesthetics and access management | Medians may be appropriate to improve aesthetics, and traffic calming. | Not recommended. |
| Bikeways[1] | Shared-use paths | Shared-use paths | On-street 4' bike lanes or shared-use paths | Not designated (shared lanes at <30 mph), striped bike lanes or shared-use paths | Not designated (shared lanes at <30 mph) |
| Traffic Calming | Not appropriate | Not appropriate | In limited situations | May be considered | May be considered |
| Designed for Transit | Yes | Yes | Yes | No | No |
| **Streetside** | | | | | |
| Sidewalks | 8 feet minimum on both sides, or 10 feet and 6 feet | 8 feet minimum on both sides, or 10 feet and 6 feet | 6 feet minimum on both sides | 4-5 feet minimum on both sides or 6-8 feet on one side | Strategic locations only (neighborhood entrances or adjacent to multi-family or non-residential uses) |
| Edge Zone | Yes, 8-12 feet | Yes, 8-12 feet | Optional. 8-10 feet | Optional. 6-8 feet. | Optional (Additional ROW) |
| Street Trees/ Landscaping | Shade trees and/or ornamental trees in medians and edge zones where appropriate. | Shade trees and/or ornamental trees in medians and edge zones where appropriate | Shade trees and/or ornamental trees in medians and edge zones where appropriate | Shade trees and/or ornamental trees in medians and edge zones where appropriate | Shade trees in edge zones or outside of right-of-way |
| Residential Driveways | Prohibited | Prohibited | Prohibited | Permitted but limited | Permitted |

FIGURE 4.14: URBAN AND RURAL STREET DESIGN CHARACTERISTICS

| Attribute | Urban Avenue (Thoroughfares) | Urban Local | Rural Collector | Rural Local |
|---|---|---|---|---|
| **Function** | | | | |
| Functional Role | Mobility and access assume equal roles | Property access | Property access and access between arterials and locals | Property access |
| Streetway Continuity | Continuous between arterials within activity centers | Interconnected at frequent intervals | Generally discontinuous, but connects to arterials | Generally discontinuous, but connects to collectors |
| Right-of-Way | 60 - 80 feet | 50-60 feet | 60 - 70 feet | 50 - 60 feet |
| Design Speed | 30 to 35 MPH | 20 MPH | 25 to 30 mph | 20 to 25 mph |
| Traffic Volume (Average Daily Trips) | Varies | 80 - 700 | 300 - 2,600 | 80 - 600 |
| **Streetway** | | | | |
| Travel lanes | 2 to 3 travel lanes, typically two-way movement except for unique circumstances. | 2-way vehicular movement, striped travel lanes | 2 lanes, demarcated travel lanes | 2 lanes, not demarcated |
| Turn Lanes | On occasion, such as the intersection of two arterials or in specific context | None | At major intersections | None |
| On-Street Parking | Both sides preferred. Head-in or parallel, as appropriate. | Both sides. Head-in or parallel, as appropriate. | No | Permitted, limited by width |
| Curb & Gutter | Vertical curb | Vertical curb | Ribbon curb | Ribbon curb |
| Stormwater | Subsurface stormdrain | Subsurface stormdrain | Open channel, culverts | Open channel, culverts |
| Median | Not recommended | Optional | None | None |
| Bikeways | Shared lanes or 4’ bike lanes | Yes | Not designated | Not designated |
| Traffic Calming | May be considered | Not typical | Not recommended | Not recommended |
| Designed for Transit | Yes | No | No | No |
| **Streetside** | | | | |
| Sidewalk | 8 feet | Yes | None | None |
| Edge Zone | Yes, 4-6 feet. | Yes, 4-6 feet. | Natural | Natural |
| Street Trees/Landscaping | Urban street trees should be planted in metal grates in pedestrian areas with adequate growing room. Paired with benches, annuals, and planter boxes. Trees with less than 6’ shall be planted with root barriers to allow for optimal root conditions and compatibility with utilities. | Urban street trees should be planted in metal grates in pedestrian areas with adequate growing room. Paired with benches, annuals, and planter boxes. Trees with less than 6’ shall be planted with root barriers to allow for optimal root conditions and compatibility with utilities. | None | None |

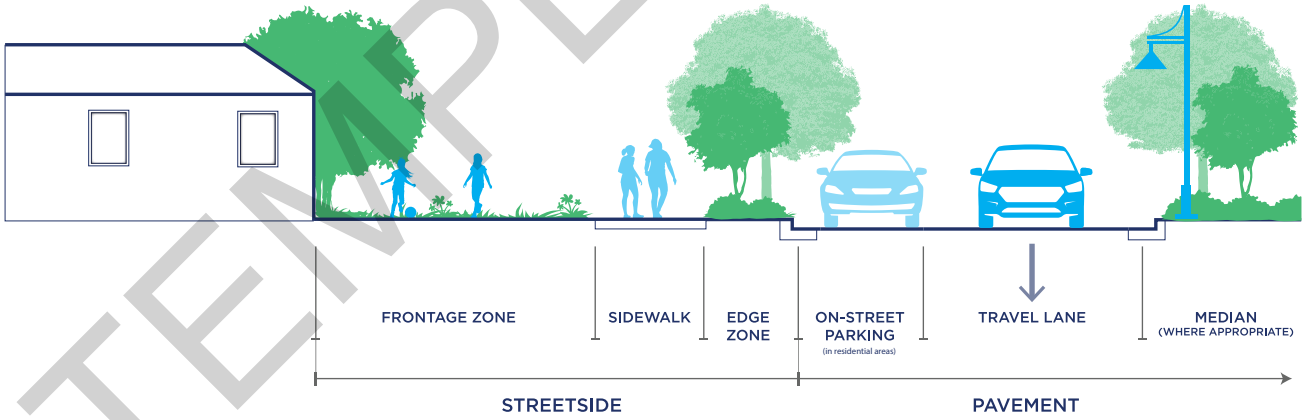


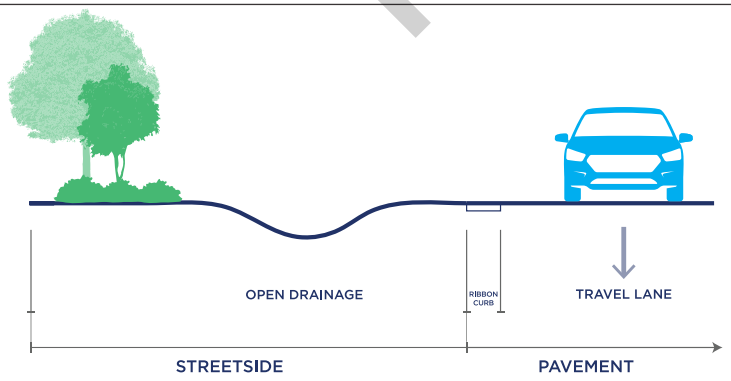

## TYPICAL URBAN STREET ELEMENTS

This image is not to scale. It presents one possible way in which the streetway and streetside elements may be arranged within an urban street. (half of street shown)

## TYPICAL SUBURBAN STREET ELEMENTS

This image is not to scale. It presents one possible way in which the streetway and streetside elements may be arranged within a suburban street. (half of street shown)




## TYPICAL RURAL STREET ELEMENTS

This image is not to scale. It presents one possible way in which the streetway and streetside elements may be arranged within a rural street. (half of street shown)

# FUTURE THOROUGHFARE PLAN

Temple's Thoroughfare Plan depicts where street extensions, new streets, and potentially expansion/reconfigurations are needed to accommodate the City's anticipated growth. Map 4.3, *Temple Thoroughfare Plan*, represents the recommended future thoroughfare network throughout Temple's planning area.

## Using The Future Thoroughfare Plan

The placement of proposed thoroughfares on the map is conceptual at this point in time, representing "approximate" location. Actual locations and design will be determined by development, physical design considerations, funding, etc. The necessity for accommodating appropriate rights-of-way for these thoroughfares should be provided for in the UDC, represented by minimum standards. This provides certainty and clarity for landowners and the development community to ensure that thoroughfares are accounted for as properties develop. Responsibility of costs and timing of construction for these thoroughfares shall be determined in these UDC adjustments and should consider the impacts of new development to the overall network.

## Amendments and Adjustments

As growth continues in Temple, new development may warrant the identification and development of thoroughfares that are not depicted on Map 4.3, which shall require approval of a thoroughfare plan amendment. In similar fashion, significant changes such as re-alignments or re-classifications should be discussed and approved to ensure clarity. Minor adjustments to alignments of thoroughfares shall not require formal amendment to the map but should be graphically changed on the map to represent the new alignments. The Planning Director shall determine whether a change is minor - impacts to adjacent landowners and construct-ability of street projection are important considerations of such a determination.

As more refined alignments of thoroughfares are determined (by concept plan, planned development, plat or site plan), it is necessary to make adjustments to the Temple Thoroughfare Plan to clearly represent the street network. This helps landowners, developers, utility providers, and governmental entities plan for public infrastructure, access, and development. Approvals of such alignments should be accompanied by formal language directing staff to make necessary adjustments to publicly-depicted thoroughfare maps.