Stephenville Thoroughfare Plan

Stephenville
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Acknowledgements

Thank you to the following for their participation and involvement in the development of this report.

City Staff

Wayne McKethan, Interim City Administrator
Jeremy Allen, MBA, Deputy City Administrator
Noah Cullis, MBA, Director of Planning and Building Services
Nick Williams, PE, CFM, Director of Public Works
Gene Calvert, PE, PTOE, City Engineer

City Council

Kenny Weldon, Mayor
Mark McClinton, Place 1
Carla Trussell, Place 2
Doug Svien, Place 3
Brady Pendleton, Place 4
Rhett Harrison, Place 5
Alan Nix, Place 6
Sherry Zachery, Place 7
Jerry Warren, Place 8

Freese and Nichols

Dan Sefko, FAICP
David Paine, PTP, AICP
Spencer Maxwell, PE, PTOE
Kevin St. Jacques, PE, PTOE, PTP
Chelsea Irby

Approved and Adopted, April 2017

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Executive Summary

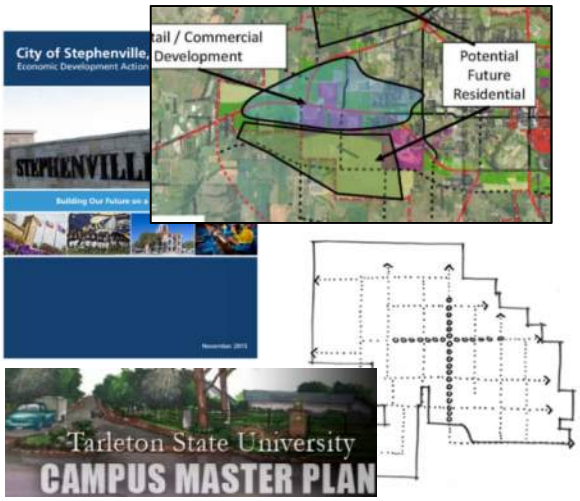
The Thoroughfare Plan for Stephenville provides a framework for a transportation system to offer choices in how residents travel, and includes recommendations for corridor alignments to preserve mobility and add connectivity as the community grows. This plan also serves as a blueprint for transportation investment decisions and includes opportunities to address current, near term and long term needs. It is envisioned that the majority of the network laid out in this document will be provided through the development process at the time of subdivision, using this document as a guide. The plan builds on the adopted Stephenville Comprehensive Plan 2030 goals and objectives and has specific, supporting themes of:

1. **Provide Access and Mobility for Residents**
2. **Fiscal Stewardship**
3. **Preserve Local Character Preference**

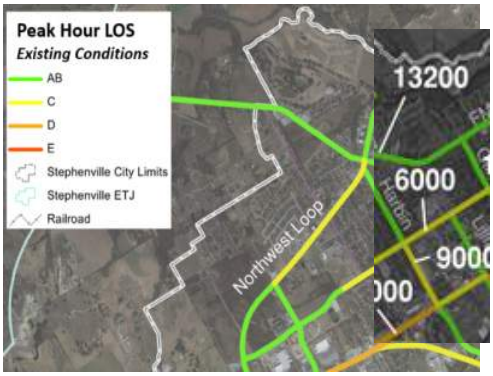
Using public resources in an efficient and effective manner includes anticipating growth and making reasonable allowances for coordination. The City will need to improve its network of roads and corridors as growth occurs, and balance expansion with maintenance and operation of the existing system in order to preserve the ability to reach desired goods, services and activities. Lastly, care is being taken in implementation, seeking to balance between the need to accommodate growth, yet retain what is distinctive to preserve the community character and best suit the Stephenville community. This plan reflects the input and direction given during its development and is responsive to the concerns raised, while still providing a framework to allow for growth of the community and the transportation network.

Plan Development and Agency Coordination

The plan effort was developed with input from stakeholders and existing plan efforts, including the Texas Department of Transportation, the North Central Texas Council of Governments, Erath County, Tarleton State University, and the Stephenville Economic Development Action Plan. Updates were given to the City Council at key stages of the planning process to gain input and guidance. The public commented on an early draft map and was able to participate in the public hearing process.



Roadway volumes, capacities, crash locations and frequencies were evaluated at to identifiy trends and project growth needs based on the future land use and economic development plans. System needs are summarized on page 24, and include enhancements to the existing network, focused intersection



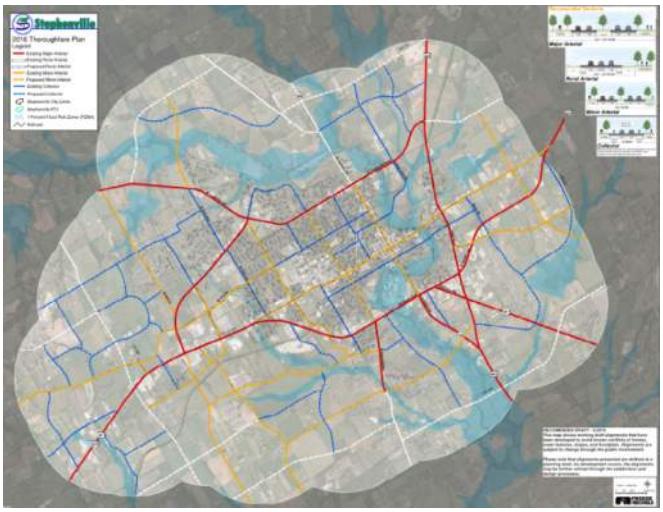
Traffic analysis and volumes. Image from Public Open House.

improvements to maintain capacity and better defined pedestrian and bike routes to TSU. Mid-term needs include expanded capacity in the western-center area of the City which has the greatest concentration of daily trips between homes, schools, and commerce.

Critical flaws were identified from planned alignments of the existing thoroughfare plan, and alternatives were developed, resulting in an extension of the thoroughfare grid network. Alignments were selected so as to avoid existing development, significant water features, steep slopes, and minimize floodplain and rail corridor areas which add to the cost of building and can prohibit implementation of road corridors. Non-auto considerations are also included, with selective bike and pedestrian elements added to link areas with vulnerable users and areas of higher recreation and economic activity. An equestrian-appropriate trail extension of the Bosque River Trail was also added, to connect known areas of active horseback-oriented transportation activities. Draft alternative alignments and near-term recommended improvements were shared with the stakeholders for comment at an open house. Comments were reviewed with the Council Public Works committee, and revisions addressed based on feedback.

Thoroughfare Network

The updated thoroughfare network provides for long-term added mobility and connectivity needs to serve the community, and alternatives for a reduced dependency on the automobile. These are alignments free from known critical flaws and existing development, that should be preserved for connections through the subdivision process or by careful implementation from The City, or through partnership with Erath County or TxDOT at such time as they are considered necessary. Thoroughfare plan recommendations are part of a continuity of plan efforts, and as needs change, the plan should continue to be amended to reflect updated information for the preservation of long term community needs.



Recommended Thoroughfare Plan Map.

Candidate Short-Term Projects

The plan includes recommendations that can be implemented to address current and short-term needs identified through the thoroughfare plan analysis and stakeholder input. The list of potential improvements are summarized as follows:

Recommended Near Term Projects.

1. Conduct an **access management study** by TxDOT of Washington Street (US 377) and US Business 377 from Graham Street (FM 108) to Northwest Loop in order to identify improvements for traffic, safety, and non-auto considerations to update this critical, central roadway corridor. This roadway currently has a high number of crashes and traffic congestion that would benefit from focused improvements resulting from a focused engineering study. The Study should include consideration of a shared-use path on the north side connecting the business district to the TSU campus.

Excessive driveway access on busy arterial.

2. **Northwest Loop and FM 8 intersection:** Increase capacity and reduce delay at this critical intersection by adding northbound channelized right turn.
3. **Northwest Loop at Harbin Drive:** Evaluate the intersection for potential intersection improvements to reduce delays and associated problems from the close spacing to the FM 8 and North Loop Intersection.
4. **Northwest Loop at US 377:** Increase capacity at this critical intersection by adding a southbound channelized right turn lane.
5. Advance to construction the TxDOT project for a **Super-2 highway configuration on US 281** to increase capacity and safety along this key corridor (Bids opened 9/2016).
6. **Washington Street (US Business 377) and Lillian:** Restriping and signal timing modifications to improve pedestrian crossing as a temporary improvement in anticipation of longer-term, more permanent reconfiguration by TxDOT and TSU.
7. Consider peak traffic-period left-turn restrictions along **Northwest Loop south of Harbin Drive** to maintain flow and reduce crashes.
8. Conduct **traffic signal warrant studies** for potential traffic signal control to improve flow and safety at: FM 8 and Ollie, Harbin and W. Frey, and W. Frey and Wolfe Nursery Road.

The planned network overall and these projects, specifically, have been identified based on short-term need for the transportation network, and are improvements to key locations with the highest existing travel volumes and significant concentrations of public activity.

Basis for the Plan

Introduction

Stephenville is a growing rural city located in the Cross Timbers section of North Central Texas. Home to Tarleton State University, a thriving rodeo circuit, light industry and agricultural concerns, the City is actively engaged in considering and guiding growth opportunities while maintaining the character that so many of its residents and neighbors identify with. In 2015 the City Council saw the need to update the thoroughfare plan adopted as part of the 2008 Stephenville Comprehensive Plan to address structural changes that had occurred since the plan's adoption, to reflect an updated view from the community, and to more specifically guide the development of a transportation network outlined in the comprehensive plan.

The thoroughfare network is one of the most visible and permanent elements of a community and it is experienced by residents daily as they make choices of how to connect with where they live, work, and play. This plan provides a framework for a more balanced transportation system to offer choices in how people travel, and includes assessment of traffic volumes and crash statistics, corridor design, and a recommendation for a Thoroughfare Plan with functional classifications and multimodal components. This transportation plan serves as a blueprint for transportation investment decisions.

Guiding Principles, Goals, and Objectives

The 2016 Thoroughfare Plan builds on the foundation of the Comprehensive Plan, and the goals and objectives adopted through its vision and goals that were developed with the community. The Thoroughfare Plan offers the opportunity to carry the prior plan goals forward, as modified through the update process. Goals and objectives from the Comprehensive Plan form the basis of action for the Thoroughfare Plan. The following are the transportation-related Goals and related Objectives referenced from the adopted Stephenville Comprehensive Plan 2030 in summary form being addressed, or incorporated:

- ***Access for Residents***
  - » Use funds on streets to benefit community as a whole
  - » Determine where arterial and collector streets are needed

- ***Minimize negative impact on residential neighborhoods***
  - » Re-evaluate functional classifications of roads periodically

- ***Entry and Identity***
  - » City entrance signs
  - » Setbacks, preserve trees, plant additional ones

- ***Access and Circulation***
  - » Upgrade Ollie/Alexander to a Collector Street
  - » Extend Wolfe Nursery, Harbin Drive

- ***Alternative Transportation Modes***
  - » Trails, Sidewalks, Crosswalks
  - » On-, and off-street bike routes

Ultimately the Thoroughfare Plan attempts to balance these goals and inform public decision making on the Thoroughfare Plan based on this framework. Based on existing plans, Council, and community input, the Thoroughfare Plan actions build on the Goals and Objectives noted above, and focus on three areas, expanded on below with specific objectives:

1. **Provide Access and Mobility for Residents**
2. **Fiscal Stewardship**
3. **Preserve Local Character Preference**

Goal #1: Provide Access and Mobility for Residents

A critical goal for any thoroughfare plan is the ability to reach desired goods, services and activities. The provision of transportation options to reach destinations in Stephenville will grow as the City does. This principle is represented in Stephenville through a network of roads and corridors, efficient system management and operations, and through context sensitive street designs providing transportation choices. An expanding multi-modal network will provide connections to where residents work, live, and play, whether in central Stephenville or at the expanding periphery, through a system offering opportunities to drive, walk, and bike.

Goal Vision: Provide efficient and effective mobility to, from and within Stephenville by providing a network of thoroughfares that include multi-modal options of connectivity to meet existing and anticipated needs.

Objective M1. Provide mobility options for people who live, work and visit Stephenville, including efficient connections to regional communities.

Objective M2. Maintain a hierarchy of thoroughfare classifications that will provide for safe and convenient flow of traffic throughout the community. Maintain a thoroughfare planning process to ensure efficient and desirable connections between major arterials and other thoroughfares.

Objective M3. Invest in improvements to the arterial and collector street network to support the balanced mobility of motorists, pedestrians, bicyclists and commerce.

Objective M4. Provide a network of bicycle and pedestrian facilities, including sidewalks, bike routes, bike lanes and multi-use paths tied in to the Bosque River Trail, which provide active mobility options, connectivity and increase recreational opportunities for healthy living.

Objective M5. Promote and preserve convenient connections between neighborhoods, schools, access to commercial areas, and neighborhood assets to provide alternatives, and reduce trip lengths for neighborhood connectivity.

Goal #2: Fiscal Stewardship

Stephenville strives to provide a roadmap of actions for transportation infrastructure preservation and investments to maximize the benefits for residents in a way that is fiscally responsible. Investments will include: input from the community and the priorities as identified through ongoing dialog with stakeholders, supporting economic vitality that promotes economic growth, and using resources in an efficient and effective manner. These fiscally sound efforts are intended to maintain a growing, vibrant local economy with a strong tax base, thus reducing the future fiscal burden on residents to provide city services.

Goal Vision: Optimize the use of City of Stephenville funds and actions, and leverage additional resources from partner agencies and institutions to maximize the public return on investment for the community in transportation infrastructure and operations.

Objective F1. Plan for and preserve rights-of-way and other real property for future multimodal transportation and supporting infrastructure investments in advance of economic development.

Objective F2. Prioritize maintenance, rehabilitation, safety and reconstruction of existing networks by maintaining streets, sidewalks, utilities, storm water systems and other infrastructure facilities.

Objective F3. Balance roadway congestion and increase mobility and safety for all roadway users through targeted intersection enhancements, operational improvements and promotion of alternative means of transportation first, then select-link capacity enhancements.

Objective F4. Coordinate and manage corridor access to enhance the long-term corridor viability through coordinated driveway sharing, cross access easements, intersection control and as applicable, coordinated median applications or turn-lane gap spacing.

Objective F5. Continue coordination with Erath County to ensure appropriate transportation system connections and, as necessary, coordinated response to shared system needs.

Objective F6. Coordinate with the Texas Department of Transportation (TXDOT) on improvements to the state highway system. As appropriate, consider land use, economic benefit and community implications to planning initiatives.

Objective F7. Continue to coordinate with Tarleton State University on transportation system implications of proposed school facility expansion and needs. Establish proactive planning dialogue and coordination to optimizing traffic operations and school safety to specific site issues.

Goal #3: Preserve Local Character Preference

Investments should enhance transportation choices and accessibility, and create lasting value that complements the character and vision of Stephenville's neighborhoods, employment centers and activity centers.

Goal Vision: Provide a transportation system planned and designed with people, places, and history, and culture in mind, including amenities and aesthetic design treatments that reflect a positive visual experience for all modes of transportation.

Objective P1. Promote roadway design details, landscaping, and visual elements that reflect the rural heritage of Stephenville, such as natural materials, native grasses, and local character accents. Provide natural, grassed drainage where space permits, and where provided, promote open agriculture inspired fence styles along corridors.

Objective P2. Encourage public/private participation in beautification efforts. Explore utilizing assistance that may be available from private and volunteer groups to landscape design related projects and help maintain enhanced public areas (e.g., street medians, small landscaped areas, intersection corners, etc.).

Objective P3. Create visual gateways at principal entry points to establish a design theme or other coordinated visual for the city.

Objective P4. Develop pedestrian-friendly access to key community resources and areas. Link key community assets with comfortable, safe pedestrian links. Employ traffic calming techniques as necessary, to moderate speeds and traffic volumes, particularly on residential streets.

Objective P5. Expand the Shared-use path network centered on the Bosque River trail to connect key community assets with a non- auto options. Develop an equestrian-appropriate transportation link linking the major equestrian destinations in the community using existing easements where possible to promote the local activity, and provide a safe and active transportation link buffered from vehicular traffic.

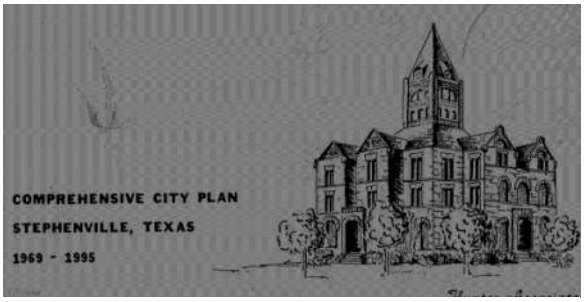
Objective P6. Develop a plan for use of brick pavement treatment, and reuse of existing brick materials where appropriate and in a way that highlights the historic use and local visual preference.

Transportation Planning

This Thoroughfare Plan serves as the long-range plan for major transportation facilities for the City of Stephenville. The Thoroughfare Plan, like the Stephenville Comprehensive Plan, is a living document and intended to accommodate development of the City's thoroughfare network, but is also meant to be updated periodically as goals are accomplished and conditions change. The plan is also a policy document for corridor and right-of-way preservation, allowing for orderly development of a transportation network to support the City's growth plans over time, and as properties in the area of the City develop. Making needed connections happen is a combination being able to focus City, and contributing agency participation such as TxDOT and Erath County, for improvements that are publicly supported. This policy document guides that, but individual connections not provided through development over time are still left to partnerships between City, County, and TxDOT to prioritize and implement.

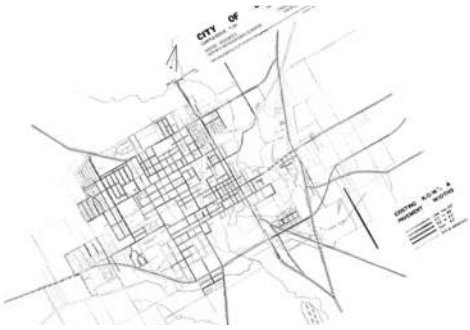
Future thoroughfare alignments are long-term and general in nature, and have been identified with high level planning consideration based on current, available conditions. As such, their alignments may be modified over time during the development process, but linkages should be maintained so that the overall system functions as a whole. This section describes the public process used in the creation of the plan, the referenced planning documents that formed the basis for its development, coordination process, and formal adoption process.

Thoroughfare Plans



Cover, 1969 Comprehensive Plan

Thoroughfare plans are important to help guide development, and preserve transportation options for the future, as a community changes. The corridors help frame where development can occur, but just as importantly where it should not occur, as preserved through the City's subdivision authority – so that when key connections are needed they can be made with less disruption, displacement and cost. In this way, a plan is a cost-effective way to lay out a vision for a city in the way a farmer will lay out his plan for a field to plant. This thoroughfare plan is a continuation of prior plans in Stephenville, dating back to 1969 with a summary plan which included a chapter on thoroughfare planning. In each iteration, the City Council has worked to provide a similar framework for growth, understanding the community values, discussing alternatives, and providing the opportunity to lay the framework for the next generation.



Stephenville, 1969

Stephenville, 2016

Public Involvement

Several interim presentations were made to review and discuss the existing conditions and needs, modal plans, policies and programs and implementation strategies for the thoroughfare plan, culminating with a public meeting and open house. The draft plan was then submitted to the City Council to initiate the public adoption process.

- City Council Planning and Public Works subcommittees briefing on Goals & Objectives, Existing Conditions and Needs (1/26/16)
- Public Open House: Goals & Objectives, Existing Conditions and Needs, Modal Plans, Working Draft Thoroughfare Plan Alignments, and draft CIP (2/9/16)
- City Council Planning and Public Works subcommittees briefing on Draft Thoroughfare Plan, Modal Plans, and Implementation (2/16/16)
- County Briefing on Existing Conditions and Needs and working draft alignments coordination (2/19/16)
- City Council Planning and Zoning Committee Briefing on Recommended Thoroughfare Plan and Implementation (12/13/2016)
- Planning and Zoning Commission Hearing on Recommended Thoroughfare Plan, Modal Plans, and Implementation (3/15/2017)
- City Council Adoption: Transportation Plans, Policies and Programs, Implementation (4/4/2017)

Public Open House

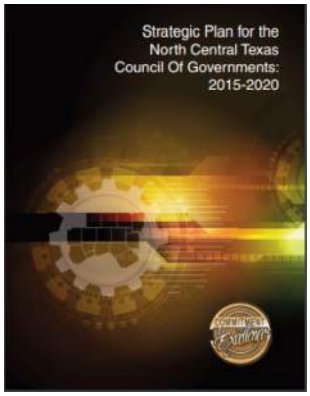
An open house was held on February 9th, 2016, to brief the public on progress material that had been developed. Topics included existing conditions, draft goals and objectives, concepts for trail extensions, and working ideas to adjust the alignments of the thoroughfare plan from the adopted Stephenville 2030 Comprehensive Plan. The meeting was well-attended, with nearly 300 participants in two presentation sessions followed by questions and answers. Comments and questions were taken, an exit survey was handed out, and contact information on how to include comments on the material was made available. Comments taken at the session and

written comments submitted were incorporated into the plan recommendations as applicable and alignments adjusted further based on specific input details. Written comments were also submitted and accepted. Of the feedback given, it was apparent there was general lack of knowledge of the pre-existing thoroughfare plan outside of the City. The considerable majority of comments appeared to focus on the concept for a loop roadway, which was vocally discouraged. In general, the public comment period following the open house allowed residents to seek more information and understand the details of the proposal.

As a result of the feedback, given the significant number of comments regarding the 'loop' concept, direction was given to the team to remove the loop alternative, and instead focus on a grid network which was carried forward as part of the planning process. The resulting grid network layout is sufficient for growth of the community, but will place the emphasis on the community to implement the segments of roadway to link to other arterials continuously, particularly for the growing west and southwest edges. Without continuous arterial network link improvements, pressure will build at the key points in the network.

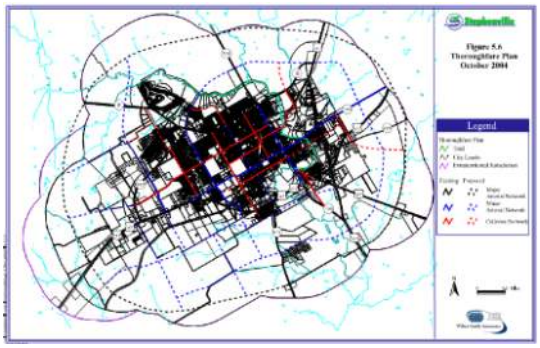
Regional and Agency Coordination

North Central Texas Council of Governments



Stephenville is situated in the southwest edge of the greater Dallas/Fort Worth Metropolitan Area which is hosts the North Central Texas Council of Governments (NCTCOG). The transportation elements of the current NCTCOG Strategic Plan related to Stephenville call for support for adequate transportation funding that results in reduced congestion and opportunities for economic development, making improvements to air quality, and improving goods movement. These broad policy statements are supported by the elements of this thoroughfare plan.

Stephenville 2030 Comprehensive Plan



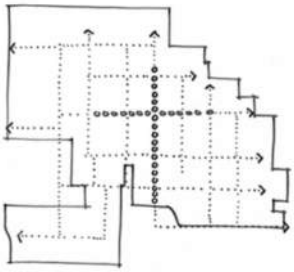
The City adopted a comprehensive plan in 2008 through a public process that included land use and transportation recommendations for the growing community. The comprehensive plan forms the basis of the goals and objectives, initial alignments and functional classifications are the predecessor for this Thoroughfare Plan. The thoroughfare network of the plan included conceptual alignments for new roadways and a loop road concept to frame growth at the periphery of the community. The alignments have proven difficult to implement, and in some cases had conflicts with existing development or water district ponds that would preclude their implementation.

The conceptual alignments of the prior plan have been revised to reflect - and to the extent possible avoid - known conflicts of homes, water features, steep slopes, and floodplain. They were also re-aligned to better match updated roadway infrastructure, existing rights-of-way and known property lines. The loop road concept was also generally seen as problematic from residents outside of the city limits, and so the plan was modified to reflect the input. The land use map of the 2030 comprehensive plan also formed an important piece of the development of this plan, and is referenced in a later section.

Tarleton State University

With an enrollment over 11,000 and plans in motion for growth, Tarleton State University's main campus is also at the heart of the City of Stephenville. The University Campus Master Plan calls for the conversion of Lillian and Vanderbilt Streets to pedestrian malls. While traffic is already blocked by bollards to all but emergency vehicles, over time the roads will be converted with permanent improvements. Coordination with TSU during the thoroughfare plan development yielded specific concerns including: classifications of streets near the campus, preserving the area of pedestrian-emphasis, and adding concern for cyclists to the plan. An increasing number of students choose to access the campus, as well as move around it, by bike. Congestion was also noted, with the balancing concern for safety and pedestrian access.

Continued redevelopment of the university main campus will provide good opportunities to co-locate additional student housing on the campus, which reduces the need to access the campus by vehicle. The campus is also served by a shuttle service, which extends to dense nodes of off campus housing, and should be expanded to new concentrations of students to reduce the need for driving. Together with redevelopment opportunities, the campus can best accomplish reduced vehicle trips by reducing and even restricting parking on campus, and requiring payment for the convenience. As the university continues to grow, the City should consider partnering with the university on an operational traffic study, with detailed analysis of travel patterns to and from the main campus, to ensure safe access without negatively impacting the surrounding community disproportionately. Outcomes of such a as study could include intersection improvements, wayfinding signage, marked pedestrian crosswalks with lighted signage, new sidewalks, and shelters for shuttle stops.



Erath County

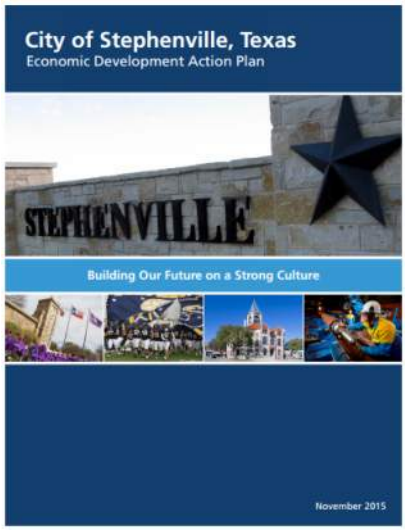
Erath County Commissioner's Court was briefed on the project in February, and invited to collaborate on the thoroughfare plan alignments and plan elements. Collaboration with the County is important to the City as a good neighbor practice, and for generating cooperation on coordination of transportation infrastructure. Initial feedback concerned the maintenance of roadways, and interim conditions where a portion of roadway in the City ETJ would be built to City standards rather than county standards. Concerns were also raised and over limited infrastructure resources for maintenance and new roadways. Commissioners were also invited to comment on draft roadway alignments, with comments incorporated in the plan recommendations as applicable.

TxDOT

Some of the roadway alignments identified in the plan may be developed in part through TxDOT participation. For rural areas in Texas, projects focused on connectivity are typically a combination of State and local efforts, when the needs arise. Advanced planning helps align the purpose and need with potential rights-of-way preservation that allows for better communication and collaboration, and results in less disruptive and less costly project implementation.

The Erath District staff were also invited to comment on the plan throughout its development, and was kept informed of the status of alignments and concepts under development. TxDOT contributed to existing thoroughfare plan needs, vehicle trip projections, and some specific project concepts from their perspective that are supported by the city thoroughfare plan, such as the need for a specific access management study along the US Business 377 (Washington Street) corridor, and status updates on discussion of long-term improvements to the Washington Street and South Lillian intersection.

Stephenville Economic Development Action Plan



Consideration to accommodate for growth and orderly economic development is one of the goals of the plan, and consideration of the City's economic development goals, including locations and types of development, were incorporated in the plan. Key inputs were areas designated more industrial – and therefore needing additional access to regional roadways. Areas designated as residential were included in the plan with recommendations for collector streets to preserve connectivity during subdivision.

Gateway locations are also a function of the economic development plan, which identifies several districts, and the need for signage. This plan compiles those locations, and also has recommendations for delineation of additional community gateway features to distinctly announce arrival in Stephenville.

Lastly, the character of the City and region includes the rodeo prominently, and the plan reflects this character in three key ways. First the grid network of roadways is a direct result of input received from residents in the open house. Second, the plan includes development of a rural arterial roadway functional classification, which has natural drainage and fewer travel lanes. Third, the plan calls for an equestrian-appropriate trail extension to connect and serve prominent rodeo and equestrian destinations. This important transportation link serves the unique travel mode in Stephenville in locations most likely for it to be utilized.

Transportation System Needs

Regional Mobility and Connectivity

Stephenville and Erath County are currently in the greater Dallas/Fort Worth Metropolitan Area administered by the North Central Texas Council of Governments (NCTCOG), but considered a rural county and therefore not a participating member of the NCTCOG metropolitan planning organization (MPO). With current growth trends, within 5-10 years Erath County population can be expected to exceed 50,000, enabling the community to join the MPO if they choose. Joining the MPO has several benefits, including allowing participation in the greater regional planning discussion, and consideration nomination and allocation of MPO-directed federal and state transportation funding for projects.

Stephenville is the center of a regional transportation hub, at the intersection of four highways bisecting Erath County and providing connections across an area approximately 50 miles across. Stephenville is also the County seat, and the center of commercial truck shipping routes for US 281, US 377, and US 67. The Erath County region is shown in the illustration below.

Local Mobility and Safety

Traffic Volumes & Congestion

The performance of the local roadways and resulting congestion can be linked to many components – including the number of vehicles using them and at what times, number of lanes, speed limit, daily traffic volumes, adjacent land uses, traffic signal parameters, driver types, signage, pavement conditions, road design elements, and access control. In this section, traffic volumes are reported to track average conditions at the time of the plan.

According to US Census data, approximately 97% of all work trips in the City of Stephenville are automobile-based, with an average commute time of 15 minutes. Currently, 14% of work-bound trips are carpool based, with 3% of respondents walking, biking, or working from home. Notably, this does not include data for students. The percentage of people driving to work alone has been increasing slightly, from 77% in 2000 to 86% for most of the incorporated area in 2013. For those not working at home, the commute time varies based on the length of trip, destination, and chosen route.

The most heavily traveled route in Stephenville is US 67/US 377, which carries 25,900 vehicles on an average day just east of the Northwest Loop. The Northwest Loop, by comparison, carries nearly 10,500 vehicles daily. FM 8 is the second most travelled roadway, with 15,700 average daily trips. Other arterial routes with high average daily trips range between 8,000 and 10,000

Figure 1. Peak Hour Level of Service, Current.

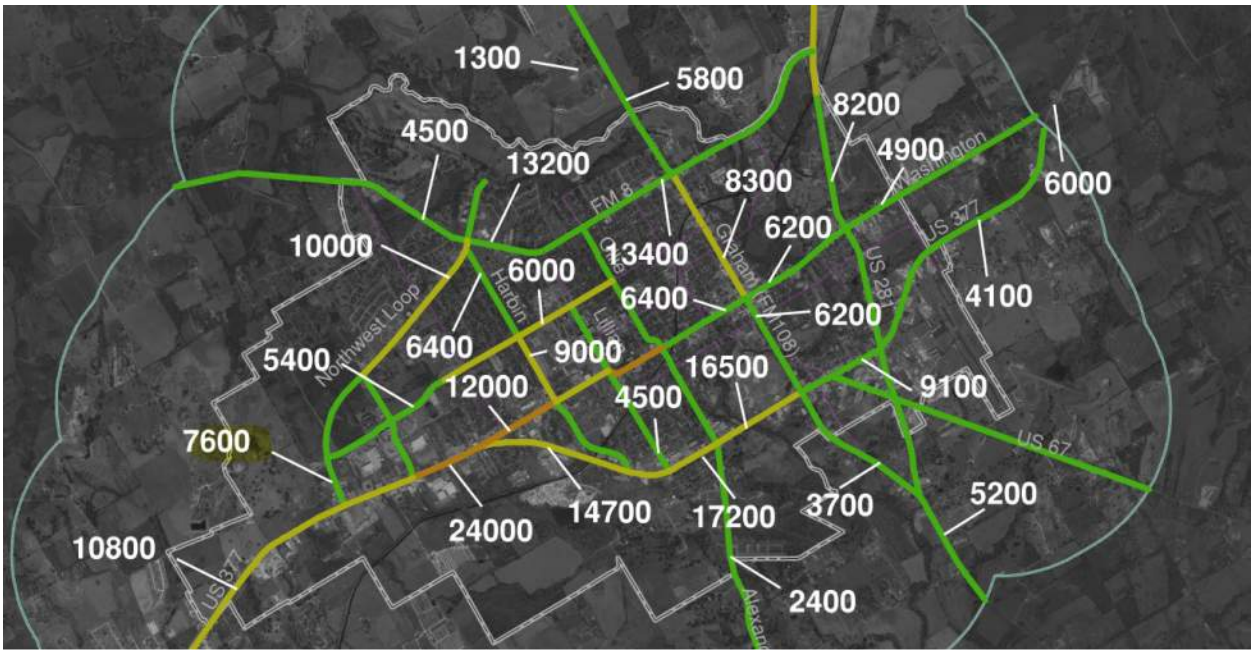
Data: 2011 TxDOT saturation count, 2013 AADT, and 2015 GRAM, Inc. traffic counts.

daily vehicles. A comparison of traffic volume data from 2007 revealed annual increases ranging from under 2% to 3%, generally. However, the data did reveal heavier increases in key traffic corridors, and more volumes on the west side of the city, where retail and some major employers are located. This is indicative of both the commute patterns to major employers in the west, the clustering of schools in the education triangle, and connection to the concentration of retail which typically sees highest volumes in the PM peak traffic period. The concentration of trips in this period leads to residents experiencing traffic delays, with stop controlled intersections of minor arterials and collectors requiring frequent management by an uniformed officer (Image below).

Intersection of Harbin and Frey during peak traffic periods

Average annual daily traffic (AADT) volumes were gathered from TxDOT, with 2013 data available in the figure below, and also supplemented by the Stephenville Thoroughfare Plan counts taken in 2015. Additional detail is included in the Projected Growth and Needs section, and the study appendix.

Figure 2. Existing Average Annual Daily Traffic

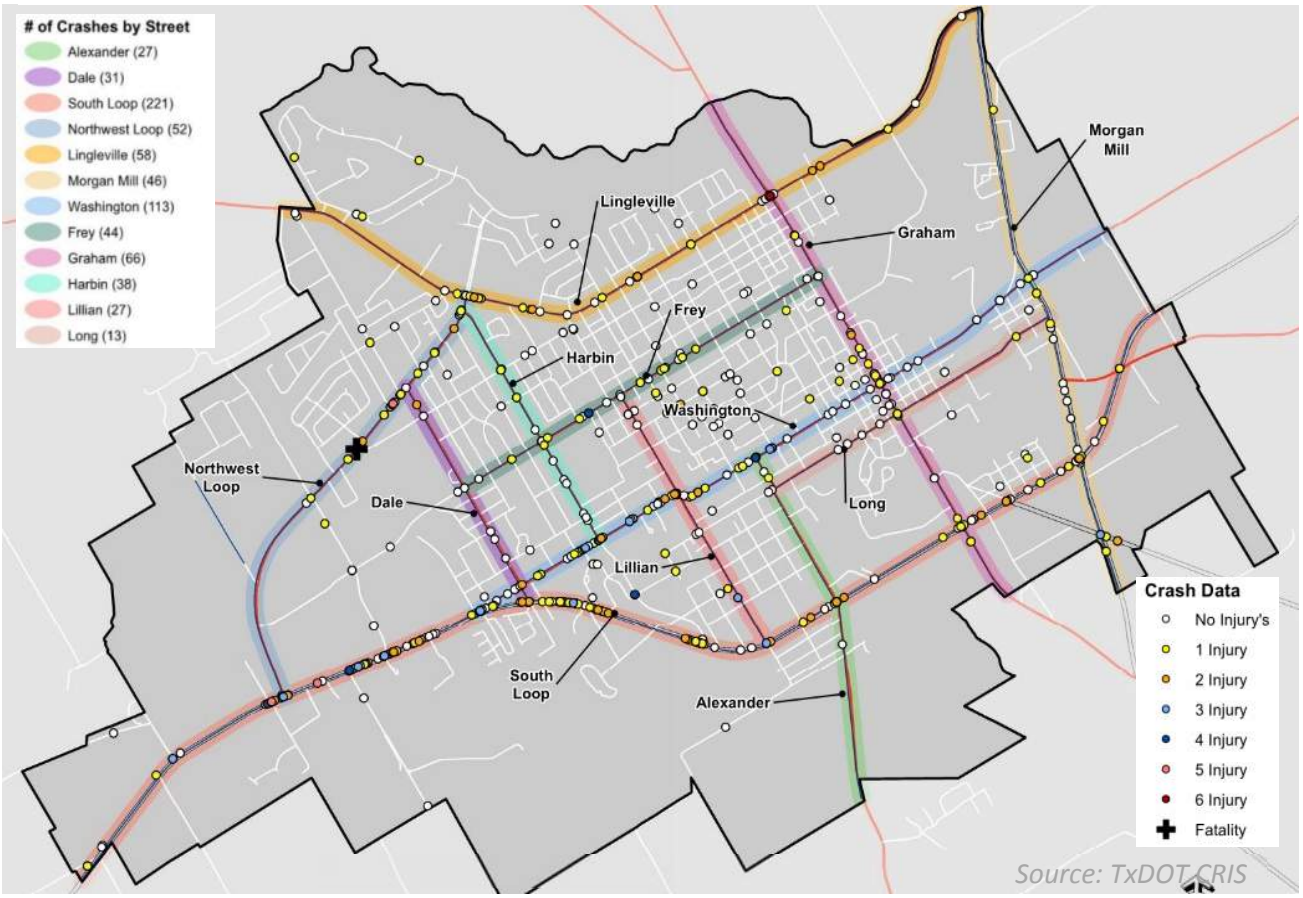


Crash History and Trends

Vehicle crashes are a source of considerable personal anguish, disruption and loss of personal property and time and can result in personal injury and in the worse cases, death. Analysis of crashes recorded over the prior three-year period of available data was conducted to determine if patterns were prominent. Rates of crashes on roadways were also compared to cities of similar size. The analysis showed that, generally, arterials in Stephenville have a similar or lower number of crashes per year compared to communities of similar size in Texas, such as Denison, Seagoville, and Forney.

For the three-year period, an average of 270 crashes per year were reported on roadways in Stephenville, with one crash resulting in fatalities on the Northwest Loop in 2015. For the period analyzed, 20 out of 815 total crashes reported resulted in incapacitating injury.
Of the crashes resulting in incapacitating injury, 70% occurred on roads with a posted speed limit of 40 miles per hour or higher. 55% of the crashes resulting in significant injury occurred on the two roadways with the highest average daily travel – US 67 and US 377, which also overlap in designation. Weight differential can often also be a significant contributing factor. Although related data was not available for all years, commercial vehicles as a subset of vehicle types were involved with a limited number of crashes overall in the period analyzed, and none of the crashes resulting in incapacitating injuries. Commercial vehicles were not a factor in the

Figure 3. Crash Data (October 2012 through September 2015)



crash resulting in fatality. Neither time of day nor weather conditions appeared to be contributing factors for fatal crashes for the period of time studied. Overall, 35% of the crashes occurred at night. The policy implications for the City of Stephenville are that speed differentials between crash vehicles increase crash severity, and lower speeds are more appropriate for residential areas, with enforcement and education of speed risks an ongoing concern. Additionally, road design features such as narrower lanes and reduced turn radii at intersections can be visual cues to slow traffic on arterial roadways.

Future Land Uses and Population

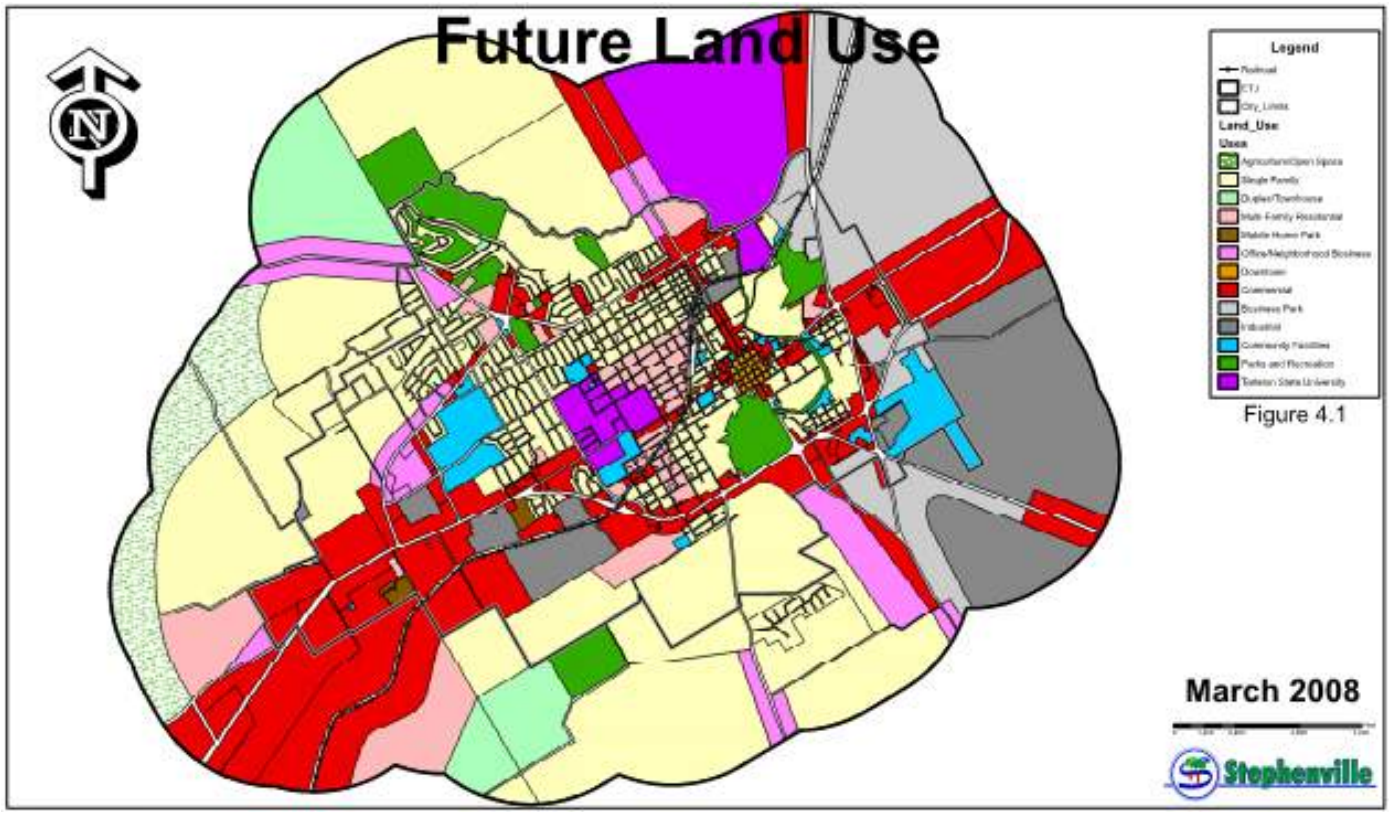
The Future Land Use map and the conceptual existing thoroughfare plan of the adopted Stephenville Comprehensive Plan 2030 were used as the land use basis for the transportation analysis and near term needs. The land uses were combined with the 2015 Stephenville Economic Development Action Plan, Strategic Plan for NCTCOG 2015-2020, and the Tarleton State University 2020 plan for locations of prevailing and planned land uses, residential, commercial and institutional locations and densities. These prevailing land uses were overlaid with the existing thoroughfare network to form an initial, functional basis for transportation network capacity evaluation.

The information gathered generally describes growth as follows:

- Residential growth anticipated to the north and west at both large-lot and traditional subdivision densities, (assumed to range from 1 acre lots to 5 homes/acre), with limited multifamily development, and an overall residential growth rate of between 1% and 3%.
- Ongoing commercial agricultural uses and small-scale personal use agriculture in the ETJ,
- Expansion of retail/commercial development along US 377, west and south, generally,
- Continued redevelopment of the central TSU campus, and gradual development of the TSU agricultural campus to the north, and
- Expansion of the airport runway, and potential for light industrial to the east.

Major employers in Stephenville as of 2012 included: Tarleton State University (1110+ employees), FMC Technologies (800+ employees), Saint-Gobain Abrasives (400+), Stephenville ISD (400+), Walmart (400+) and Schreiber Foods (400+), Western Dairy Transport, Texas Health Harris Methodist, and Tejas Tubular.

Figure 4. Adopted Future Land Use Map, 2008



Projected Growth and Travel Need

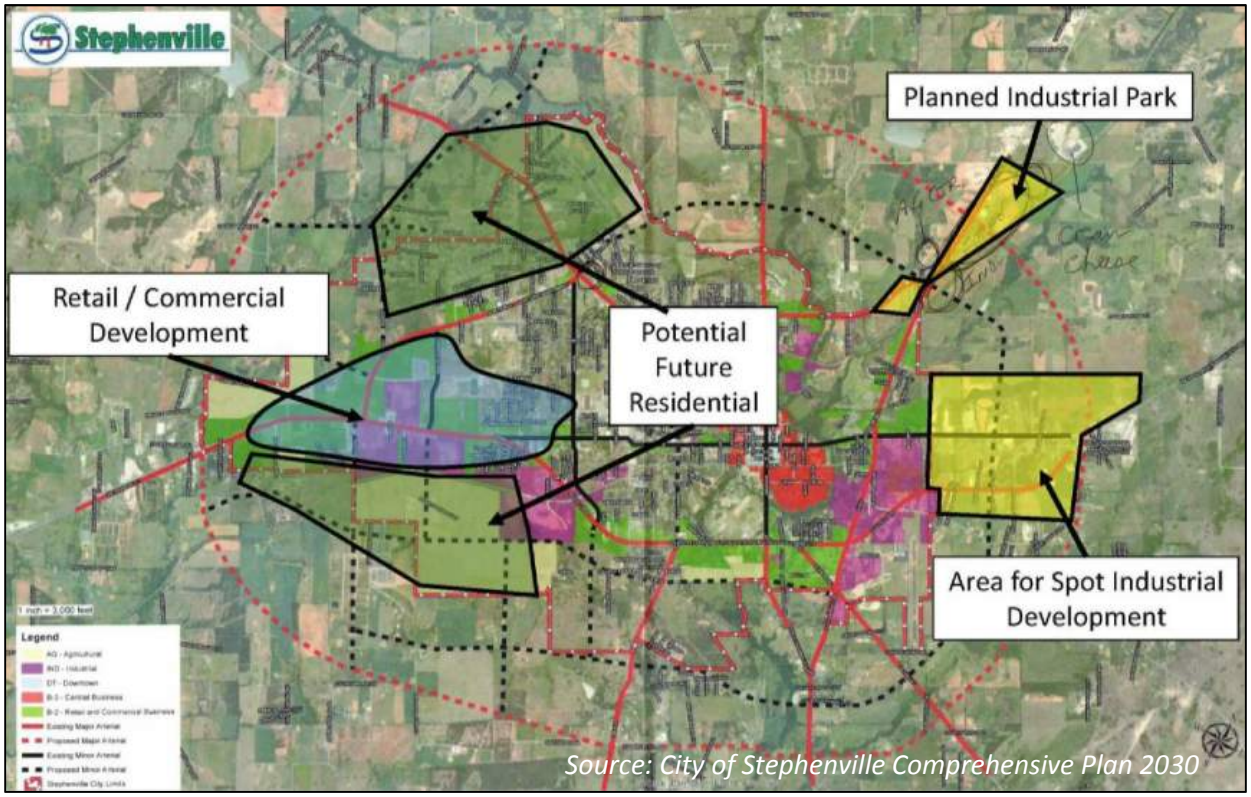


Figure 5. Current Economic Plan Development Areas

The population of Stephenville has grown at a rate of 13.3% between 2010 and 2014, with an estimated 2014 population of close to 20,000 (US Census). Periods of growth offer the opportunity to consider what is needed to support that growth, and the conversation on how a community wants to grow. The growth projections and results of the conversation form the core of the plan recommendation, supported by analysis of the network to support the plan recommendations.

In order to assess the capacity of the transportation network and evaluate the potential to accommodate growth, the existing network was analyzed. For the analysis, existing and future land use plans were combined with traffic projections by TxDOT for major arterials, and combined with update. The results inform recommendations on road classifications, number of lanes in a corridor, and needs for additional network connections. The table below shows a sample of historical average traffic growth, shown as Annual Average Daily traffic (AADT), recent AADT counts, and modeled projections.

A more focused analysis was conducted at six critical intersections for capacity and potential recommendations, for near term capacity consideration to include in the capital improvements plan discussions. Additional recommendations can be found in the next chapter in the section on Candidate Implementation Projects for Prioritization and more on the analysis is provided in the report appendix.

Table 1. Key Roadway Analysis

Key TxDOT Roadway	2007 Average Daily Traffic	2014 Average Average Daily Traffic	Annual Growth	2034 Potential Daily ADT
US 67/US 377 (South Loop, west)	19,700	24,000	2.9%	46,000
US 281 (Morgan Mill)	8,400	8,200	<2.0%	12,000
FM 8 (Lingleville Road)	14,000	13,400	<2.0%	20,000
US Business 377 (Washington Street, downtown)	7,300	6,400	<2.0%	9,500
FM 108 (Graham, downtown)	8,400	8,200	<2.0%	12,000
FM 988 (Northwest Loop, north end)	13,400	10,000	<2.0%	25,000

Based on these growth trends, several key roadways in Stephenville will need additional capacity in the time horizon of the plan – leading to recommendations for expansion of the network, the grid pattern of streets, as well as specific corridors as growth occurs. Specifics include:

- Near-term need for access management for US Business 377, (Washington Street) and US 377 to identify operational changes and detailed schematics in order to maintain acceptable levels of service and better define the pedestrian through-way.
- Near-term need for operational enhancements at intersections to maintain levels of service.
    - US 67/US 377 (South Loop) at FM 988 (Northwest Loop)
    - FM 8 (Lingleville Road) at FM 988 (Northwest Loop)
    - US Business 377 at Lillian
- Near-term need for upgraded intersection control on West Frey Street at Harbin Drive and Wolfe Nursery Road. Need for evaluation of intersection of FM 988 and Northwest loop, and intersection of FM 8 and Ollie and for upgraded intersection controls.
- Near-term need for better pedestrian accommodation on Washington Street between Tarleton State University Campus and Central Business District.
- Mid-term need for additional connections and “legs” to the thoroughfare network, to provide route alternatives. Segments south of the rail line and west of FM 988 appear to be needed in order to support priority development patterns.
- Mid-term need for revisions to operations for FM 988 and Harbin Drive intersection, to address difficulties regarding proximity to intersection with FM 8.
- Mid-term need to expand Harbin Drive and Northwest Loop to maintain levels of service.
- Potential future need for US 377 to be expanded to 6 lanes and addition of a raised median between FM 988 (Northwest Loop) and US Business 377, to maintain acceptable levels of vehicle service.
- Opportunity for active transportation mode alternatives beyond the traditional, walkable town center.
- Opportunity for better defined bike routes to and from Tarleton State University.

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Thoroughfare Plan

The recommended plan builds on the transportation principles established in the city comprehensive plan and the goals and objectives of the first chapter of this thoroughfare plan, coordination with Erath County, and input obtained throughout the planning process. Key features of this thoroughfare plan update of the comprehensive plan include:

- Building on the prior roadway functional classification system – addition of rural arterial and grid network given public preferences
- Modifying the conceptual alignments – to establish a functional basis for corridor preservation
- Adding network connections and continuity
- Expanding the trail system to connect to existing and planned community assets and provide for transportation choice

Thoroughfare Network

The thoroughfare plan provides for the long term increased mobility and connectivity needs, and a reduced dependency on the automobile. Thoroughfare plan recommendations are part of a continuity of plan efforts, and as needs change, the plan should be amended to reflect updated information for the preservation of long term community needs. Transportation planning initiatives should be coordinated with other infrastructure investments and priorities within the community and with other agencies to leverage financial resources, for example, coinciding improvements to replacement of utilities, or timing widening projects to occur at the natural end of a pavement's useful lifespan. **Figure 6** illustrates the recommended thoroughfare plan network.

Intersection of North Loop and North Wolfe Nursery Road

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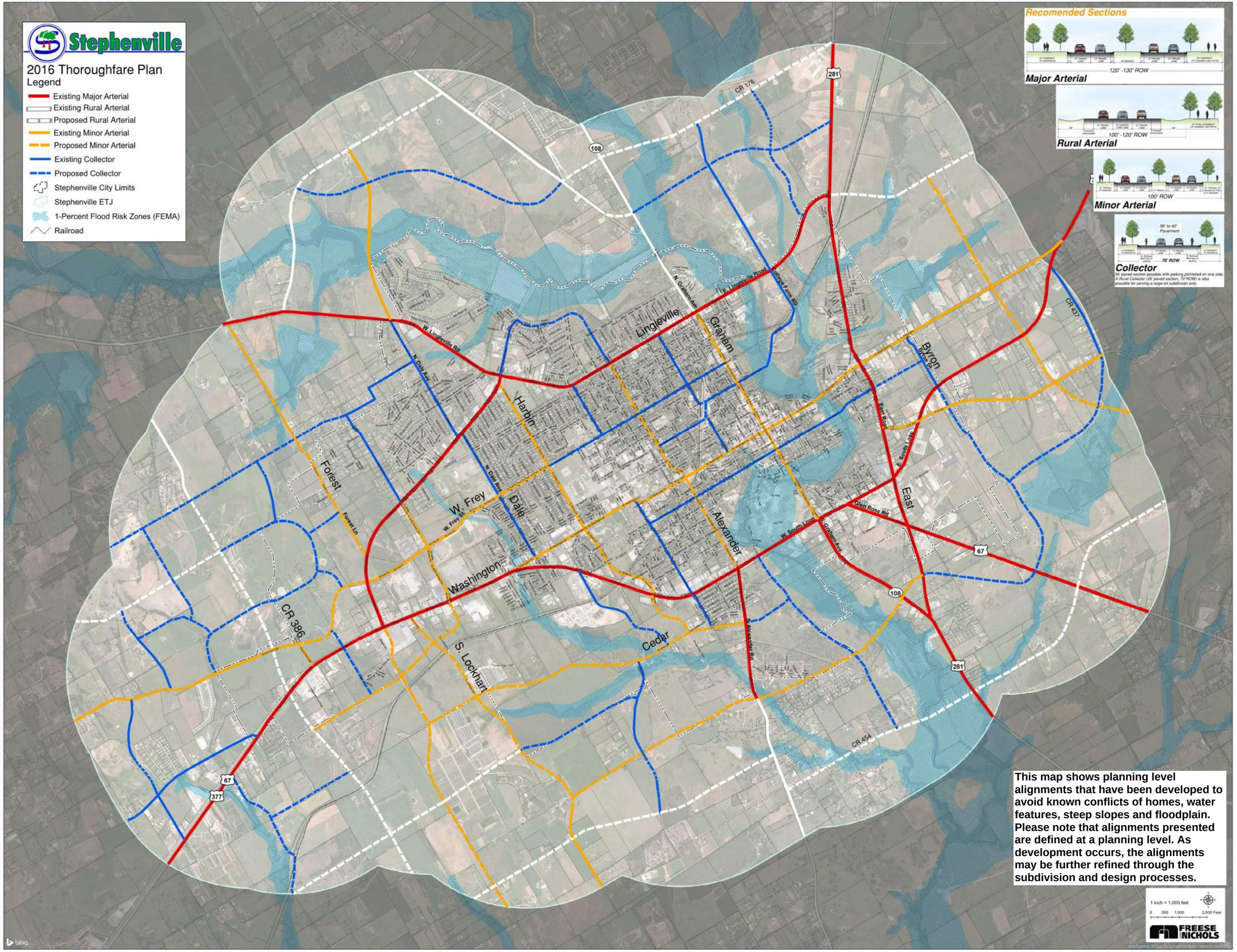

Figure 6. Thoroughfare Plan

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Street Functional Classifications

Functional street classifications are the hierarchy of streets organized into a network. Functional classifications not only create a framework of mobility and connection for regions and cities, but also provide for minimum design standards according to function. The combination of design elements of the roadway and associated spaces result in certain right-of-way widths needed to accommodate them adequately. The right-of-way widths are then targets for corridor preservation through county, city, and state actions. The following section outlines the targeted details and function of each of the classifications:

Major Arterials

The recommended right-of-way for major arterials ranges from 120' to 140'. The right-of-way is intended to accommodate higher volumes and levels of mobility, providing substantial regional access and statewide travel. Where 6 travel lanes are needed, a typical section of 140' is used for the travel lanes and appurtenances, buffer space, and drainage. A right-of-way of 120' allows for 4 travel lanes and associated spaces.

A divided median is key for this classification of roadway, and a median width minimum of 16' is included. A divided median of sufficient width allows area for dedicated left turn lanes at intersections and provides access management for fewer turning conflicts and preservation of traffic flow. In rural areas, the median can be depressed from the roadway which also provides natural drainage. In these cases, the median width should be between 48' and 76' and wider right-of way widths would be required to provide adequate spacing for turning commercial vehicles. Driveway access onto principal arterials should be limited by access management and spacing requirements, and parking along arterial roadways is generally prohibited. Purpose and characteristics include:

- High degree of regional mobility, higher traffic volumes and operational speeds
- Connected to regional arterial plans
- Access is carefully managed
- Curb and gutter section with underground Stormwater utilities and drainage

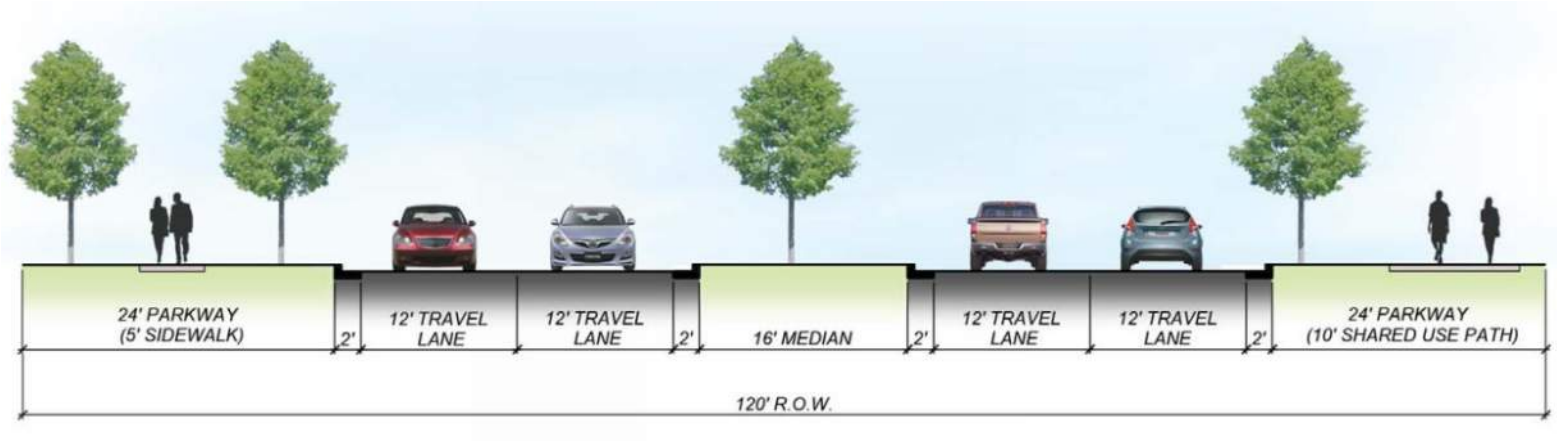


Figure 7. 4-Lane major Arterial Section

- Examples include South Loop (US 377/US 67), West Lingleville Road (FM 8), the Northwest Loop (FM 988), and the East Road (US 281).

Figures 7 and 8 illustrate typical principal arterial sections, for 4 and 6 travel lanes with surfaced medians.

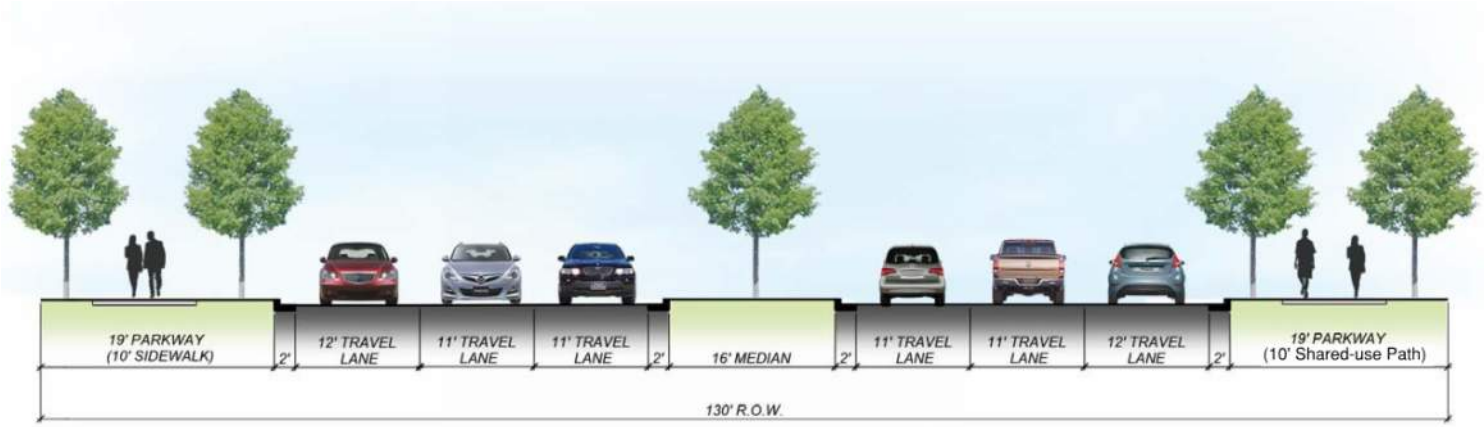


Figure 8. 6-Lane major Arterial Section

Rural Arterials

Minor Arterial roadways carry traffic across significant segments of the city, connect major arterials to collectors and accommodate moderate volumes. The recommended right-of-way for Minor Arterials is 100' to 120'. Minor Arterials are intended to include a three lane section, with two travel lanes and a median. Travel lanes should be 12' and shoulders between 8' wide to accommodate emergency parking, extended site lines, and bicycles. Wide areas at the edge of paved shoulders provide for drainage and buffer from the roadway. Where sidewalks are provided, they should be between the drainage channel and the edge of the right-of-way. Driveways may be more frequent than major arterials and higher-class facilities, but should still be guided by access management principles. A two-way left-turn lane in the center of the section provides buffer distance from oncoming traffic and left turn opportunities.

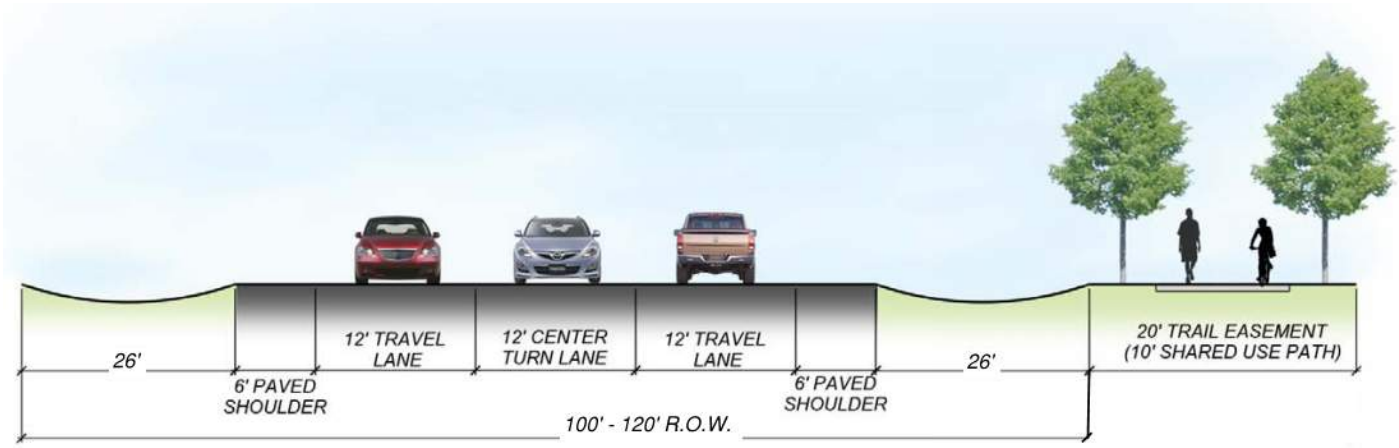


Figure 9. Rural Arterial Section, with adjacent trail easement

The purpose and characteristics of Rural Arterials include:

- Cross-town mobility
- Accommodate medium traffic volumes and operational speeds
- Managed access
- 2-lane, divided with a surfaced median
- Open section drainage

Examples include North Graham Avenue (FM 108) within the City Limits, and FM 2303 and County Road 386 in the City's ETJ.

Minor Arterials

The recommended right-of-way for a Minor Arterial in Stephenville is 100'. The arterial is intended to accommodate medium volumes, provide local mobility, and make connections to neighboring communities. Minor arterial roadways are intended for local trips, so design speeds should also be notably lower than major arterials. A right-of-way of 100' allows for four travel lanes and space to buffer different travel modes. A divided median is also important for this classification of roadway, providing access management for fewer turning conflicts, and allowing space for left turn bays at minor intersections. Additional ROW may be preferred at major intersections. Driveway access to minor arterials should be guided by access management and spacing requirements. Parking along the roadways is generally prohibited. Bicycle accommodation is preferred to be provided on a shared-use path buffered from the roadway, though bike lanes are useful where space and demand permit. The purpose and characteristics of Minor Arterials include:

- Cross-Town mobility
- Accommodates medium traffic volumes and operational speeds
- Access is managed
- 4-lane divided
- Curb and gutter drainage

Examples include Wolfe Nursery Road, Harbin Drive, and Washington Street (US Business 377).

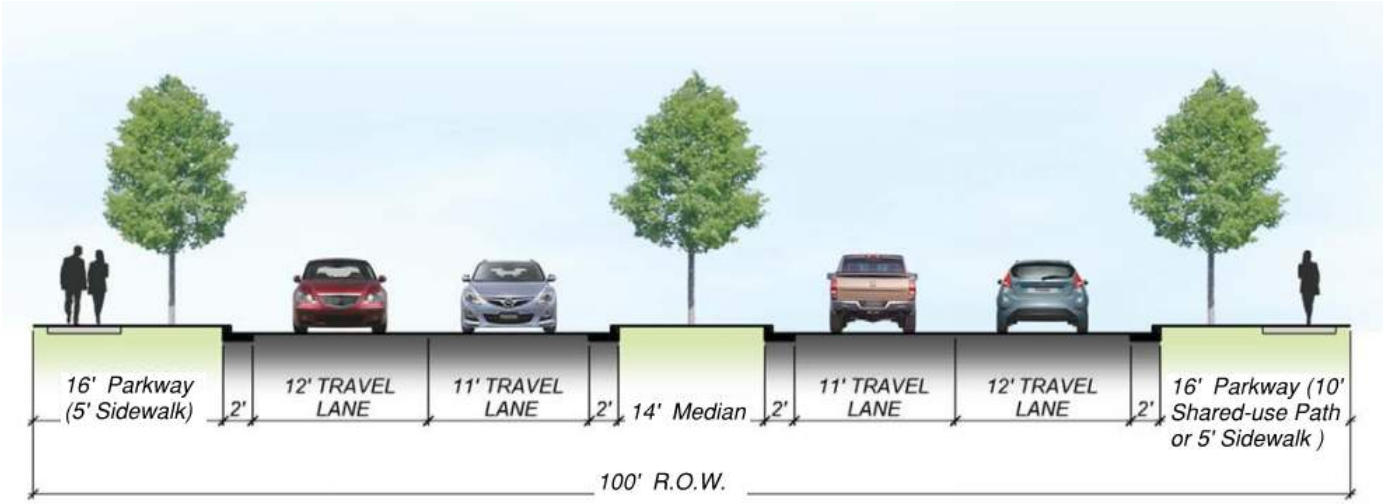


Figure 10. Minor Arterial Section – Example Wolfe Nursery Road

Collectors

Collector roadways serve to provide access between higher functional class facilities and access to residential areas. Collectors are designed for short trips, lower speeds, and connections between residential and commercial areas. They are differentiated from arterial streets by their length and degree of access to adjacent development and driveway access onto collector roadways is seldom limited.

The recommended right-of-way for Collector roadways is 70'. The pavement width of 40' is wide enough to provide various layouts of lane striping to accommodate adjacent uses – whether it is on-street parking, bike lanes, or a center turn lane, the width is intended to be flexible over time as needs change. A rural Collector alternative with a 28' paved, open section, clear shoulders on either side, and 70' ROW is also possible for serving a large-lot subdivision only. The purpose and characteristics include:

- Collection and distribution of traffic
- Speeds and volumes dependent on adjacent land uses and neighborhoods served
- Access to development and neighborhoods
- Connectivity to arterial and residential collector streets

Examples include Dale Avenue, Byron Street, College Farm Road, and Pecan Hill Drive

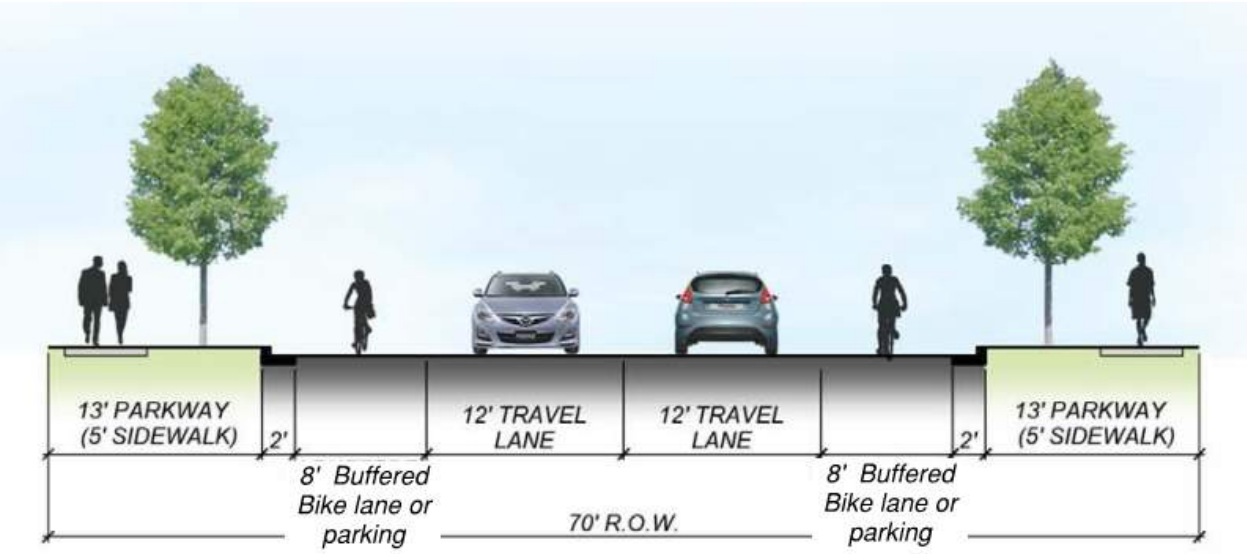


Figure 11. Collector – Example: Dale Avenue

The roadway classification shown in **Table 2** provides summary characteristics and functional classification guidelines across all road types for Stephenville.

Table 2. Roadway Classifications

Type of Roadway	Function	Spacing from other similar roads (Miles)	Direct Land Access	Roadway Intersection Spacing (3)	Volume Ranges (Veh./Day)	Speed Limit (MPH)	Parking	Comments
Highway	Traffic Movement; long distance travel.	1-5	Provided by on/off ramping schematics to continuous frontage roads.	1 mile	30,000 to 125,000	55-70	None	Supplements capacity of arterial street system and provides high speed mobility.
Major Arterial	Moderate distance inter-community, intra-metro area, traffic movement. Serves long trip lengths.	½ -1 ½ (2)	Restricted – some movements may be prohibited; number and spacing of driveways controlled.	1/4 mile	20,000 to 45,000	40-55		Provides higher mobility and speeds. "Backbone" of the street system.
Minor Arterial	Mobility function is primary; access function is secondary. Serves moderate trip lengths.		May be limited to major generators; number and spacing of driveways controlled.	1/8 mile	7,000 to 34,000	30-45		Provides route and spacing continuity with major arterials.
Collector	Collect / distribute traffic between local streets and arterial system. Serves short trip lengths. Provides land access and inter-neighborhood traffic movement.	¼ -½ (2)	Safety controls; limited regulation.	300 feet	2,000 to 18,000	30-40	Limited	Through traffic should be discouraged.
Local Street	Land access.	2 lot lengths	Safety control only.	125-200 feet	200 to 1,500	20-30	Permitted	

(1) Spacing determination should also include consideration of (travel within the area or corridor based upon) ultimate anticipated development.
(2) Denser spacing needed for commercial and high-density residential districts.
(3) Spacing and intersection design should be in accordance with state and local thoroughfare standards.

Candidate Priority Projects

The thoroughfare network is implemented in segments over time. It is envisioned that the majority of the network will be provided through the development process, by developers at the time of subdivision, using this document as a guide. This is accomplished through the subdivision and requiring dedication of right-of-way, and using the road standards to construct roadways. Some roadways may initially be built with fewer lanes to meet current needs, but the ultimate right-of-way is still preserved to expand the roadway to meet future issues.

This plan effort is also an opportunity to examine solutions that can be implemented to address short- and long-term needs. The next section addresses priority projects that arose through the planning process or were already under way in developing this plan.

Short Term

1. **US 377 and US Business 377: Graham Street (FM 108) to Northwest Loop – Access Management Study to identify operational and geometric improvements for traffic operations, and non-auto considerations. Should include multi-use path on north from business district to TSU campus.**

US 377 and US Business 377 between Graham Street (FM 108) and Northwest Loop were found to have the highest volumes per lane, and are also located at the heart of the retail/commercial cluster of Stephenville. This location is positioned between the geographic center of town and the major commercial/retail area. Retail uses also front these sections continuously. Existing development, civic uses, and the rail corridor limit opportunities to expand the grid of streets parallel to this section, which will see increased traffic as the town grows. Therefore, this segment is the highest priority for consideration for geometric and operational improvements. Improvements can include driveway coordination and sidewalk delineation that would enhance the mobility in the corridor, reduce turn conflicts that are opportunities for crashes, and offer the opportunity to make it visually more attractive. The corridor has both high volumes and higher number of crashes compared to other roads in Stephenville. The various segments of this established thoroughfare have very different purposes and needs, and therefore 'one size' solution will not fit all. A focused analysis, with stakeholder input and alternatives developed, would result in a roadway more appropriate for its context.

2. **Northwest Loop at Harbin Drive: evaluate the intersection for potential intersection improvements to reduce delays and associated problems from the close spacing to the FM 8 and North Loop Intersection.**

The intersection of Northwest Loop at Harbin Drive is located less than 350' from the Northwest Loop and FM 8 intersection. The close spacing limits the function of both intersections and can add to delays. Both intersections should be evaluated for engineering and operational improvements to improve safety and traffic flow. One potential solution to be explored with other alternatives further, could be to implement a roundabout at Northwest Loop at Harbin Drive. A roundabout would eliminate the need for traffic signals and associated

synchronization, as well as reduce annual operation cost. Studies also show that modern roundabouts can reduce intersection fatalities by up to 90%. More information on modern roundabouts is included in the study Appendix**.**

3. Northwest Loop at FM8: Northbound channelized right turn and acceleration lane, relocation of southwest corner light pole to allow for lane expansion.

The intersection of Northwest Loop at FM 8 is currently a key node in the northwest portion of the network. A critical lane movement analysis of the turning movements of the Northwest Loop at FM 8 reveal that the intersection could better accommodate the northbound right movement by extension and expansion of the channelized right turn lane and addition of an eastbound acceleration lane. Implementing these improvements will increase intersection capacity and reduce congestion from continued areas of growth.

Northwest loop at FM 8

4. Northwest Loop at US 377: Southbound channelized right turn acceleration lane.

The intersection of Northwest Loop at US 377 is currently a key node in the southwestern sector of the community. A lane movement analysis of this intersection indicate that it is nearing capacity. Implementation of a continuous right-turn bay would accommodate southbound right movements to meet growth need. This would be accomplished through extension and expansion of the channelized right turn lane, to include an extended westbound acceleration lane. These improvements would increase the capacity of the intersection, reduce congestion, and allow for enhanced green time at the signal for other movements.

5. Super 2 highway configuration on US 281 to improve safety and roadway capacity.

In August, 2016, TxDOT issued requests for bid to re-construct US 281 outside of the city limits as a super-two highway configuration. The configuration adds a passing lane that allows each direction to function as two lanes in that direction intermittently, giving drivers the option to pass slower moving vehicles, but also provides distance from oncoming traffic for a portion of traffic, providing a safer highway configuration than a single lane in each direction without a median.

6. **Washington Street (US Business 377) and Lillian: Potential near-term lane reconfiguration in anticipation of longer-term reconfiguration of intersection by TxDOT and TSU.**

Providing a near-term project to restripe the left turn lane and signal timing modification to direct west bound left-turns to South Lillian via Centennial Lane. Doing so would potentially give more pedestrian crossing time in an area with frequent student crossings accessing the university.

7. **Evaluate peak-period left turn restrictions along Northwest Loop south of Harbin.**

Left turn movements on segments of the northwest loop appear to cause some delay during congested peak morning and evening peak periods – roughly between 7 AM and 9 AM, and 4 PM to 6 PM. The City should work with TxDOT to examine the potential for prohibiting left turns during that period. A longer-term project to re-align the intersection of Northwest Loop and North Dale Avenue would also improve the intersection performance for vehicles at a location that will impede the overall capacity of the roadway in its current configuration.

8. **Traffic Signal Warrant Studies conducted by traffic engineer for potential traffic signal controls.** The following locations are experiencing increasing use, and may be exceeding the controls that a signed, four-way stop control provides. They should be evaluated for signalized controls, to be implemented through agreement with TxDOT, or solely by the City.
    a. FM 8 and Ollie
    b. Harbin and W Frey
    c. W Frey and Wolfe Nursery Road

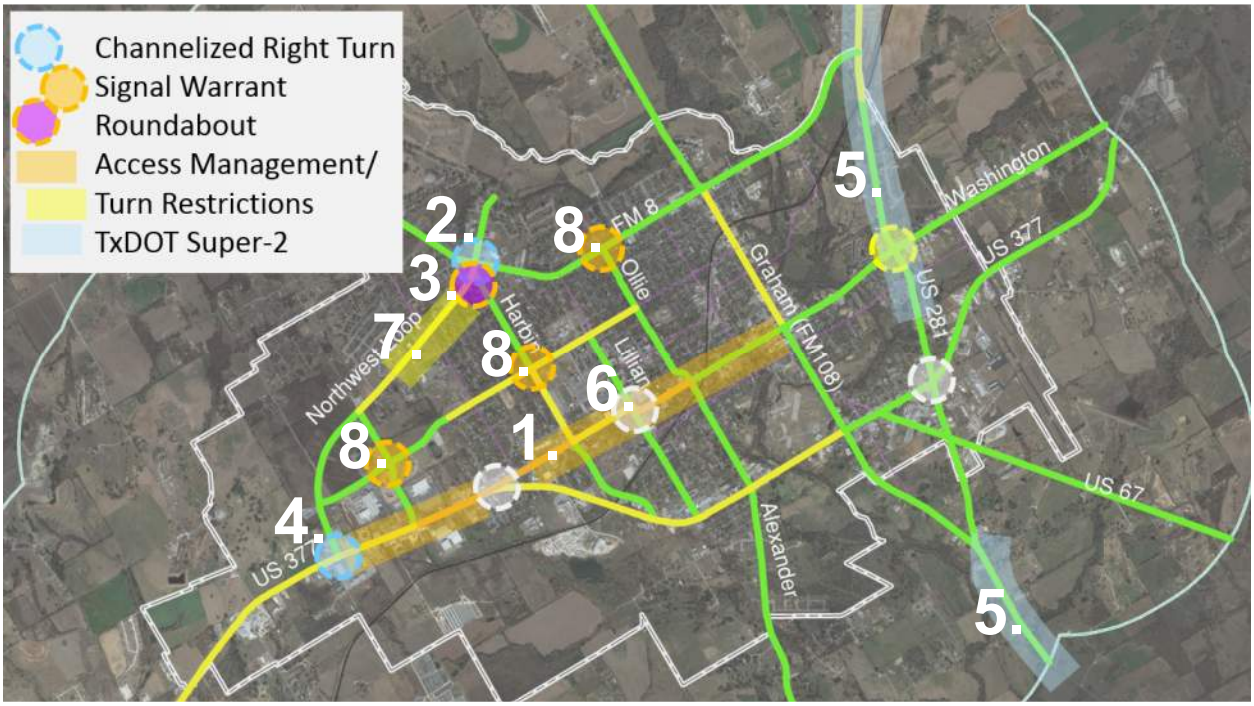


Figure 12. Near Term Needs.

Long Term

This section includes specific guidance and concepts to address system needs, including the plan recommendations for an expanded grid network of connections and route alternatives, functional classifications for roadways as they evolve, and non-auto considerations such as the planned trail network.

Network Spacing and Corridor Design

The City of Stephenville has existing roadways reflective of the era in which it was originally developed. Downtown, with its pedestrian centered orientation, has street block spacing every 200 feet, collectors or arterials spaced at less than 1400 feet, and predominantly 50-foot wide rights-of-way. The more auto-oriented commercial area west of Stephenville has street spacing approximately 2400 feet, and right-of-ways on arterials, between 100 feet to 120 feet wide. The Thoroughfare Plan seeks to maintain spacing of arterials and collectors at 1600 feet to 1700 feet spacing, unless the area is serving only large lot residential or less intensive land uses. One disadvantage to this strategy is that larger blocks lead to longer travel times and longer trips, and therefore may discourage network connectivity.

The plan standards include pavement widths that correspond to number of travel lanes and posted speeds of the roadway, and lane widths to allow for higher travel speeds. Standard lane widths are also regularly 11'-12' wide, with some collector streets being wider to allow for on-street parking. Increasingly, recent standards of practice by TxDOT, AASHTO, ITE, NACTO and others allow and encourage narrower lane widths for street applications with lower design speeds. Lanes widths of 11' to as narrow as 10' on roads with designs speeds of 30 MPH, preserve mobility and traffic volumes, but also help to promote lower speeds. Lower speeds, in turn, translate to reduced severity of crashes, reduced crossing times for pedestrians, shorter cross-traffic signal timing, less stormwater runoff, and less pavement to construct and maintain.

Thoroughfare Design Considerations

Planning, design and construction of thoroughfares must comply with the development standards that are contained in the City's Subdivision Ordinance. Requirements for thoroughfare development should include standards and criteria governing the following characteristics of thoroughfares:

Location and Alignment of Thoroughfares – The general location and alignment of thoroughfares must be in conformance with the Thoroughfare Plan. Subdivision plats should provide for dedication of needed right-of-way for thoroughfares within or bordering the subdivision.

Any major changes in thoroughfare alignment that are not consistent with the plan require the approval of the Planning and Zoning Commission and City Council through a public hearing

process. A major change would include any proposal that involves the addition or deletion of established thoroughfare designations, or changes in the planned general alignment of thoroughfares that would affect parcels of land beyond the specific tract in question.

Rights-of-Way and Pavement Width – The pavement width and rights-of-way width for thoroughfares and other public streets should conform to the standards, as specified earlier, unless a waiver is granted. Based on adopted criteria, plats that include or are bordered by an existing thoroughfare with insufficient rights-of-way width shall be required to dedicate land to compensate for any rights-of-way deficiency of that thoroughfare. When a new thoroughfare extension is proposed to connect with an existing thoroughfare that has narrower rights-of-way, a transitional area should be provided.

Continuation and Projection of Streets – Existing streets in adjacent areas should be continued and when an adjacent area is undeveloped, the street layout should provide for future projection and continuation of streets into the undeveloped area. Where adjacent land is undeveloped, stubbed streets should include temporary turnarounds to accommodate fire apparatus.

Location of Street Intersections – New intersections of subdivision streets with existing thoroughfares within or bordering the subdivision should be planned to align with existing intersections, where feasible, to avoid the creation of offset or "jogged" intersections and to provide for continuity of existing streets, especially collectors and higher classes of thoroughfares. Additional guidance can be found in the Access Management section, below.

Off-Set Intersections – Offset or "jogged" street intersections should have a minimum separation of 125 feet between the centerlines of the intersecting streets.

Angle of Intersections – The angle of intersection for street intersections should be as nearly at a right angle as possible. Corner cutbacks or curb radii should be required at the acute corner of the right-of-way line, to provide adequate sight distance at intersections.

Cul-De-Sac – Cul-de-sac streets should have a maximum length of no more than 600 feet measured from the connecting street centerline to centerline of radius point, with a paved turnaround pad of at least 80 feet in diameter and a right-of-way diameter of at least 100 feet in residential areas, and at least 180 feet of pavement within a diameter of 200 feet of right-of-way diameter in commercial and industrial areas. They should generally be discouraged off of major highways as a sole point of access.

Residential Lots Fronting on Major Arterials – Wherever feasible, subdivision layout should avoid the creation of residential lots fronting on major arterials, with direct driveway access to the arterial street. Lots should be accessed from collector or local/residential streets within or bordering the subdivision or an auxiliary street designed to accommodate driveway traffic.

Geometric Design Standards and Guidelines – Other requirements and guidelines for the geometric design of thoroughfares and public streets are provided in Subdivision Ordinance. Further guidance can be found in the NCTCOG Public Works Construction Standards Manual, often referred to as the "blue book," the Institute of Transportation Engineer's Design for Walkable Urban Thoroughfare guidelines, and the AASHTO Geometric Design of Highways and Streets. Though Erath County is not currently a participating member in the NCTCOG Metropolitan Planning Organization, the resources on roadways can be useful to evolving communities in need of supporting engineering and planning resources.

Private Streets – The Planning and Zoning Commission should not approve a plat containing private streets unless the proposal to utilize private streets has been previously approved by the City Council and adequate assurances are provided for maintenance. Private streets should be designed and constructed in conformance with City Standards. The same shall apply for gated communities, if approved. Gates for such communities shall allow for emergency access, without restriction, to authorized emergency vehicles and apparatus.

Sidewalks – Within the boundaries of a subdivision, sidewalks should be installed on both sides of arterial, collector and local/residential streets. If the subdivision is large lot zoning, then sidewalks may be considered optional on the local and residential streets.

Non-Auto Considerations

Though primarily focused on arterials, this plan also includes consideration for bicycles and pedestrians. The bicycle and pedestrian system for Stephenville includes the pedestrian access routes along roadways and shared use paths, lanes shared with bikes on roadways, as well as dedicated bike lanes and bicycle paths. A shared equestrian trail extension of the Bosque River Trail is also included to serve between two key community assets – the Lonestar Arena, and the TSU agriculture campus and arena. The paths for these non-auto modes are not only amenities for recreation, they are functional transportation routes that are intended to offer transportation alternatives.

Connectivity

A city's walkability is determined by the availability of pedestrian connections and proximity of residential and retail land uses. For example, the traditional center of Stephenville has an exceptionally high level of walkability due to its short blocks and grid pattern of local streets. More recently constructed neighborhoods are typically separated from other uses promoting vehicular use. By creating better connectivity between neighborhoods and other uses with both vehicular and pedestrian facilities, citizens have healthier options for completing daily tasks. With neighborhood support services incorporated within neighborhoods, citizens can walk or bike to a grocery store, restaurant, or convenience store. Alternative options to vehicular use allows for cost savings on gas and improved air quality. Sidewalks should be included throughout neighborhoods and provide connections to parks, schools, amenities and other neighborhoods.

Bike and Recreation Trail Connections

Figure 13 highlights the bicycle and recreation facilities recommended by this plan.

- The Bosque River Trail forms a north-south, all weather multi-use trail for recreation and transportation purposes. The trail takes advantage of several existing grade-separated bridges to provide a more continuous and comfortable flow for people on foot and on bike. The transportation plan expands on the City's prior investment of the Bosque River Trail. By connecting this trail with future on-street facilities, the ability to travel to key city assets becomes more comfortable and accessible.

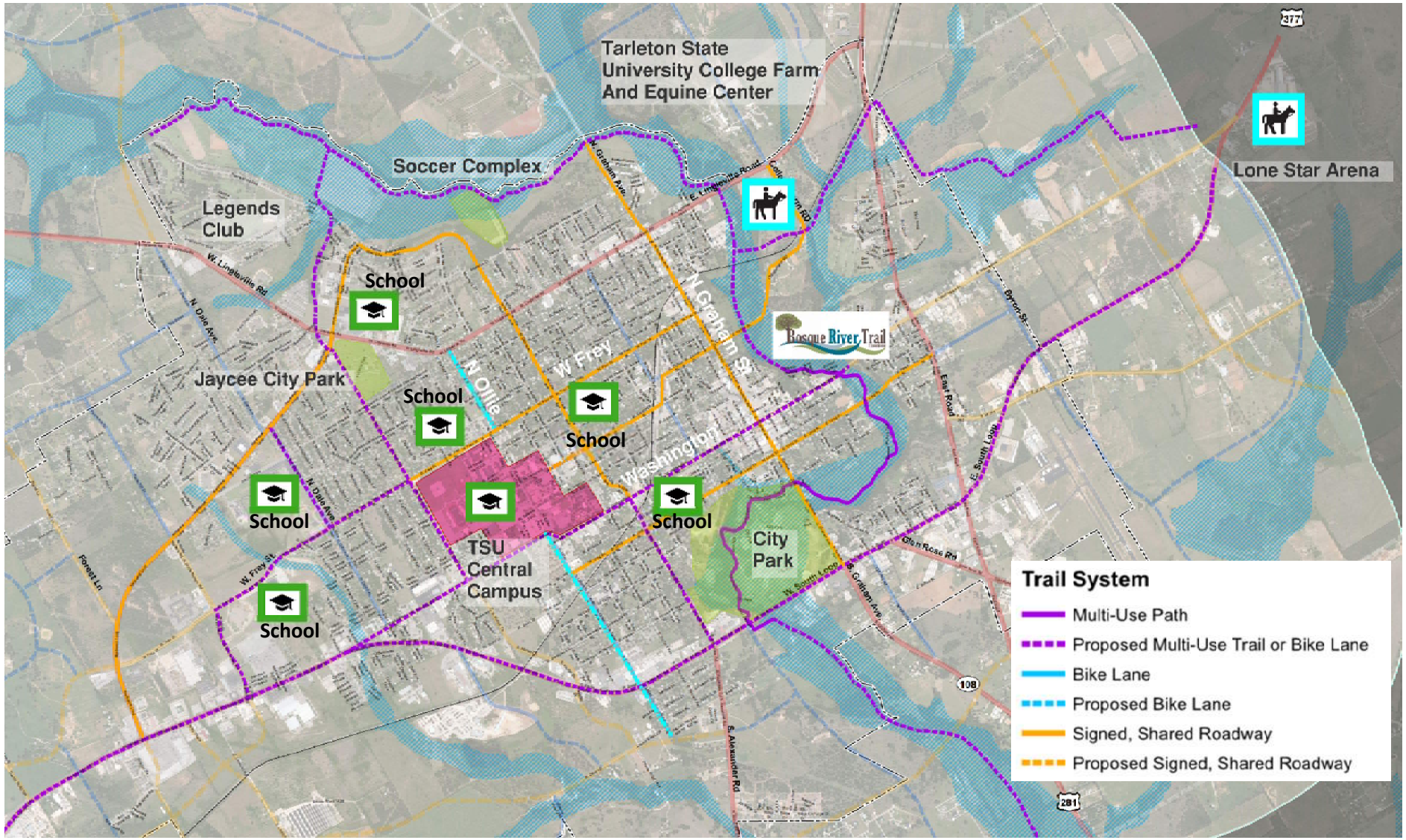


Figure 13. Bike and Recreation Recommendations

- This plan includes a combined-use trail concept to link the TSU arena and Lonestar arena primarily via existing easements northeast of the City. The trail is intended to accommodate equestrians and hikers on a natural surface, and cyclists and hikers on an adjacent, all-weather surface where possible, connecting destination recreational uses. Trails may also be adjacent to roads for some segments. Crossings of major roadways may include taking advantage of existing grade separated crossings and/or Pedestrian Hybrid Beacons or **H**igh-Intensity **A**ctivated cross**W**al**K** beacon (HAWKs).

- The TSU campus has long term plans to become a pedestrian-priority area, and certain corridors already blocked to thru-vehicle traffic would be reconstructed as pedestrian and bike-only corridors.

Illustration looking west along the future Vanderbilt Street pedestrian mall terminated by a landmark element of the student housing development near Memorial Stadium

- The core of the future non-auto network for Stephenville is structured around multi-use paths next to roadways. Separating bicycles and pedestrians from higher speed and higher volume traffic can provide an efficient, comfortable alternative for less confident facility users than on-street facilities.

- The existing grid network of neighborhood streets in the center of town can be considered shared roadways, due to their low speeds and low traffic volumes, and are

ideal for short distance and local trips.

- In addition to the multi-use paths beside higher speed and higher traffic volume roads, signed, and shared roadways should include paved road shoulders or bike lanes where space permits. Bicycling on a paved, striped shoulder of sufficient width is an acceptable multi-modal accommodation. Current TxDOT design guidelines designate recommended shoulder widths to accommodate bicycles, for example, along the Northwest Loop (FM 988) and North Graham road (FM 108).

Complete Streets

One of the planning concepts Stephenville may consider to incorporate in roadway design on key corridors is a Complete Streets initiative. The focus of a complete streets initiative is to consider all modes during the planning, design, construction, operation and maintenance of the city's street network, which strengthens economic development and reinforces it. Effective complete streets policies help communities routinely create safe and inviting road networks for everyone, including bicyclists, drivers, transit users, and pedestrians of all ages and abilities. Instituting a complete streets policy ensures that transportation planners and engineers consistently design and operate the entire roadway with all users in mind. For the Complete Streets policy to be effective, a program of supporting policies and procedures need to be put in place in the City which could include a program of land use planning guidelines, project development checklists, established responsibilities for addressing modal issues, and more specific design and operating standards for implementation and maintenance.

For Stephenville, this practice could be best implemented in steps, with perhaps a few initial candidate corridors. For as example of how this policy would apply to–East Washington Street could be to add a shared-use path along the north side of the roadway, separated from traffic by a landscaped buffer. This would allow the roadway to continue to be used by automobiles, but provide a comfortable and attractive alternative for pedestrian and cyclists separate from the narrow existing roadway with a constrained right-of-way. This addition could be provided in an easement shared with adjacent property owners, who could stand to benefit from the improved access, landscaping, and shared treatment to their frontage. Some segments of Washington Street do not currently have sidewalk, nor a defined pedestrian area.

Washington Street between the Central Business District and TSU campus.

South Graham Avenue is another corridor for potential complete streets application. In order to better accommodate the functional use of the road in its critical location in the network, a context sensitive approach to improvements should to be taken. This could include an alternative to the typical arterial design section – for example, by adding curb and gutter, broad sidewalks or a shared-use path, and considering pedestrian bulb-outs similar to the central business district - to shorten pedestrian crossing distances of streets. Creating specific parking areas as an extension of the central business district would then allow a functional and visual extension of the central business district and connect to the city park. Providing a separated, comfortable space for cyclists to connect to the city park also provides a linkage for activities, and would form a stronger connection to the trail network. Adding sidewalks would complete the street for all modes.

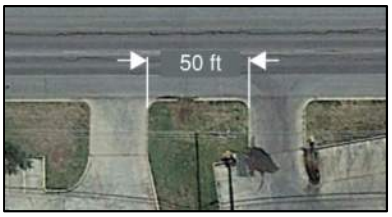
The City should explore design alternatives for the implementation of a complete streets concept when redesigning key individual corridors in order to meet the multiple needs of those corridors by considering their constraints. Solutions should be developed that balance the needs with the changing character of their use, including adding pedestrian and bike accommodations, stormwater drainage, landscaping, and access management where appropriate.

Access Management

Access management refers to the practice of coordinating access points to a roadway by considering specific design criteria for the location, spacing, design and operation of driveways, median openings, and intersections. The goal of access management is to safely balance access to land development while maintaining efficiency of the transportation system. This is accomplished through influencing, and in some cases controlling, the location, spacing, design, and operation of driveways, median openings, and street connections to a roadway. Over time, land development along some arterials has created duplicative and wider driveways that decrease system efficiency. Washington Street between Harbin Drive and the South Loop (US 377) is one example.

In general, as the mobility of a roadway is increased, access to facilities along the roadway is decreased in order to maintain efficiency of the road and improve traffic safety. The following guidelines include specific details the City can influence to do so.

Driveway Spacing



Driveway spacing guidelines limit the number of driveways along a roadway by establishing a minimum distance between driveways and non-signalized intersections. Spacing requirements help reduce the probability of crashes as vehicles enter and exit the roadway. The distance between two access points is measured between the nearest edge of pavement of two access points. For example, in the example shown in the figure to the right from Washington Street, two driveways are 50 ft. apart. A balance is found between allowing enough access to serve the adjacent land use, but not too much access so that it degrades the road performance. Distances can be modified depending on the intent of the roadway use, for example higher speed roads and anticipated truck traffic, to provide more time for shifting. The City should consider adopting these guidelines and access management strategies.

Collector roadways at appropriate spacing should be encouraged to gather the vehicle traffic at access points at appropriate distances. The local City Engineer or TxDOT Area Engineer should be consulted for guidance. Access should be reviewed when new driveway permits are requested, a land use enlargement or change of use is planned, or when significant number of vehicle trips is noted. TxDOT provides the following spaving guidelines for new facilities: for Major Arterials, preferred spacing guidelines appropriate to posted speed limits on a roadway as shown below:

Table 3. TxDOT Driveway Spacing Guidelines for New Facilities

Posted Speed (MPH)	Distance Preferred Between Driveways on New State Highways
< 30	200
35	250
40	305
45	360
> 50	425

Shared and Cross-Access Easements

Coordination between developments can better utilize existing access points. Illustrative examples are shown in **Figures 15 and 16.** These methods are achieved through discussions with property owners, developers, and reflected in platting. They can also be required by the subdivision code.

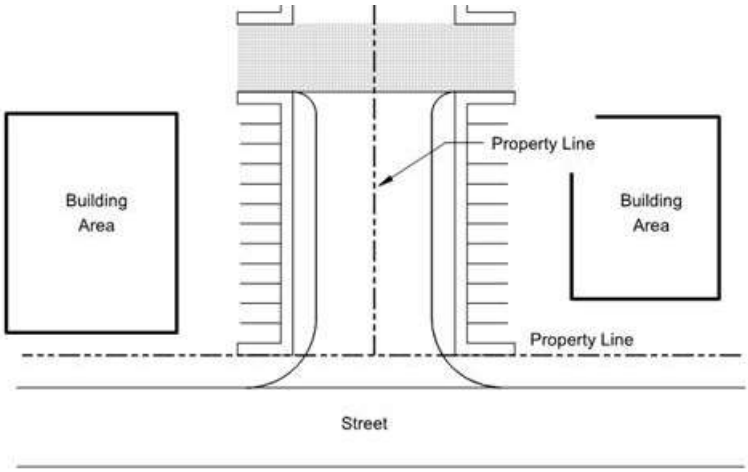


Figure 14. Example, Shared Access Easement

Non-Traversable Medians
The median is the space between opposing sides of traffic on a road. Including one that is non-traversable, either through curb or landscaping is one of the simple and most effective access management design tools. Medians improve traffic operation and safety due to the reduction in potential conflict points. Where access is needed, directional median openings can be used to restrict some turn movements while still providing some access.

Signalized Intersection Spacing
The distance between traffic signals also influences mobility, with spacing of 1,200 feet between signalized intersections considered good for signal timing progression. In general, for roadways with higher mobility classification, signalized intersections with spacing less than 800 feet should be discouraged.

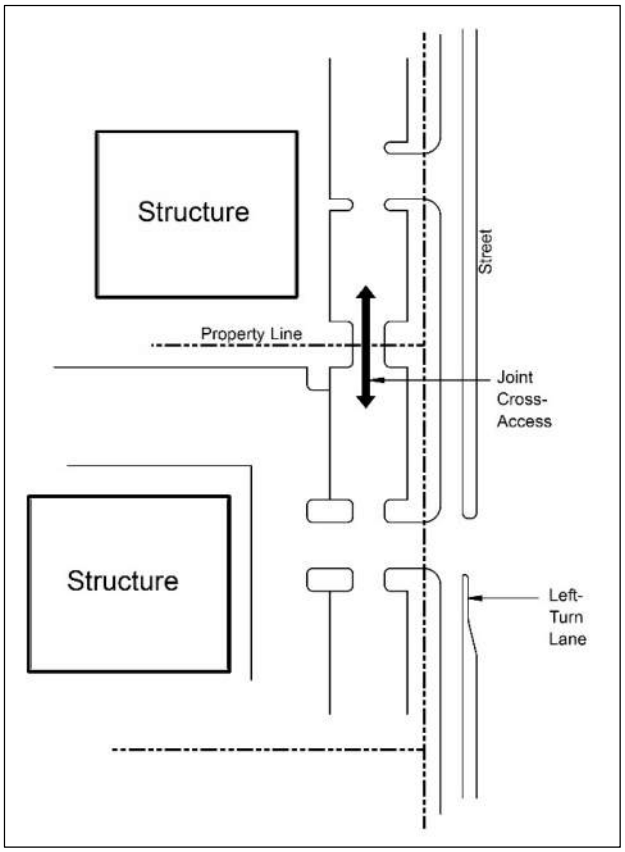
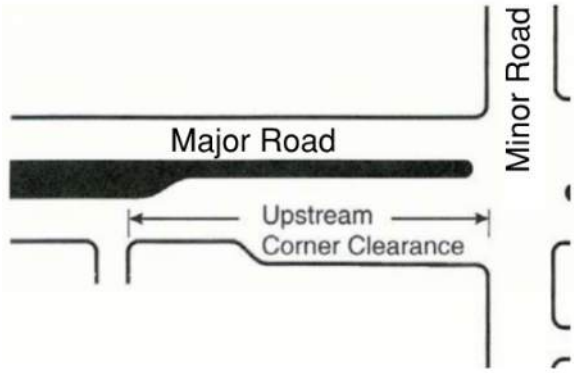


Figure 15. Example, Cross Access Easement

Corner Clearance
Corner clearance is the distance between an intersection and the nearest access point. Corner clearance standards avoid or reduce conflicts between driveway traffic and vehicle queues and turning movements at intersections. Where possible, driveways should not be permitted in the functional area of an intersection which includes turn lanes. Where corner clearance spacing cannot be obtained, access may be permitted at the point farthest from the intersection. Further considerations could be made to restrict the driveway be designed as right-in, right out, or shared access with the adjacent property.



Key Mobility Intersections

The ability for the roadway network to operate effectively relies on the ability of intersections to efficiently process traffic. Operational conditions typically break down when insufficient turn lane capacity is available to remove turn movements from the traffic stream. To ensure the ability to provide channelized turn movements, such as a second left-turn or right-turn lane, an additional 22 feet should be provided at key major and minor arterial intersections. To determine the exact dimensional requirements of specific intersections, a traffic analysis should be conducted at the time of facility implementation or coordination/approval with the City Engineer.

As currently defined, divided roadways have the ability to accommodate a separate left-turn lane. By adding 22 feet of width, a second left-turn and separate right-turn bay can be added as needed to an intersection. Travel lanes of 11 feet provide sufficient roadway width for turn movements.

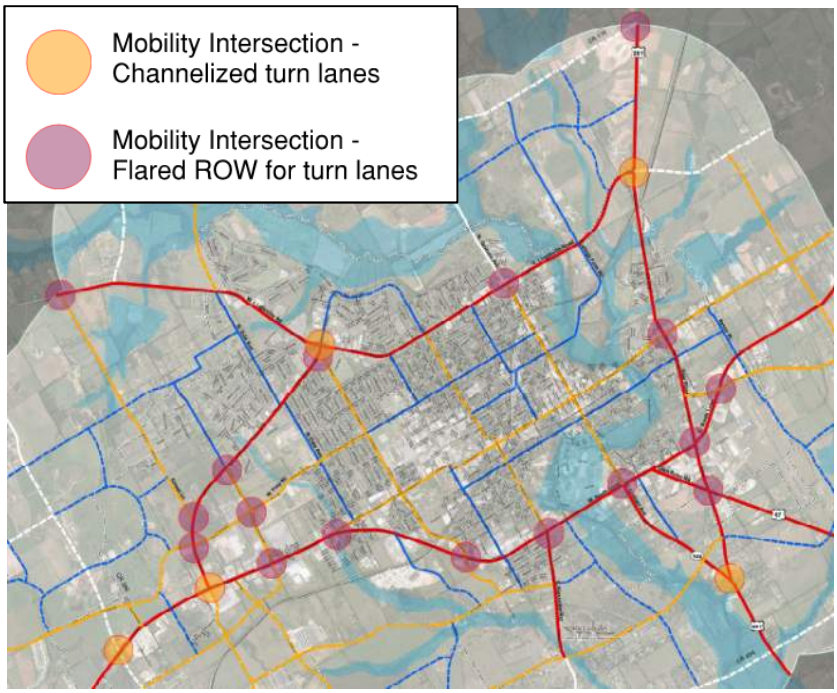


Figure 16. Key Mobility Intersections

22 intersections have been identified as "critical intersections" and fall primarily on major and minor arterial facilities. At these intersections, the City should require additional right-of-way via the platting process (where possible) to allow for additional turn lanes that may be needed in the future.

Critical Intersection Right-of -Way Requirements				
Roadway	**Major Arterial**	**Minor Arterial**	**Major Collector**	**Minor Collector**
Major Arterial	350'	350'	300'	260'
Minor Arterial	300'	300'	260'	260'

Table 4. Mobility Intersection ROW Guidelines

Table 4 identifies necessary distances by roadway class for storage and transition requirements. The distances identified allow for minimum turn-lane storage and lane transitions. In high intensity development areas, a traffic analysis should be conducted to determine appropriate intersection requirements. **Figures 18 and 19** illustrate intersection right-of-way requirements

at critical locations, if not planned for other improvements that have more specific right-of-way needs detailed.

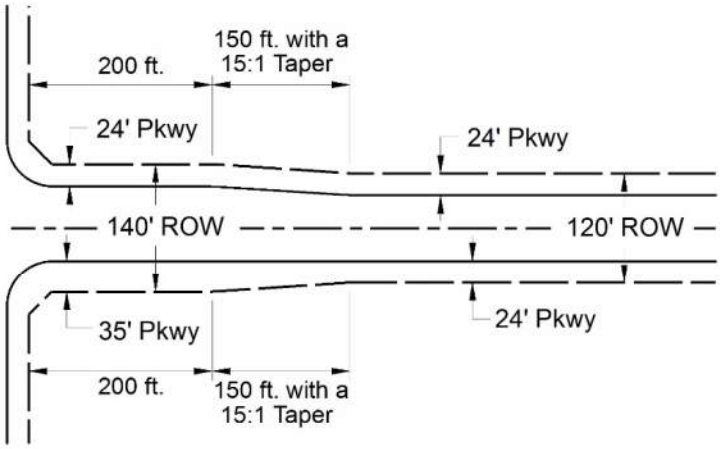


Figure 18. Major Arterial Flared Intersection ROW Dedication guidelines

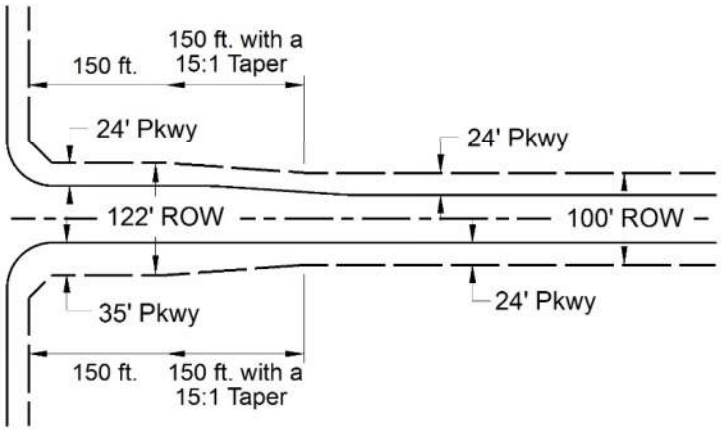


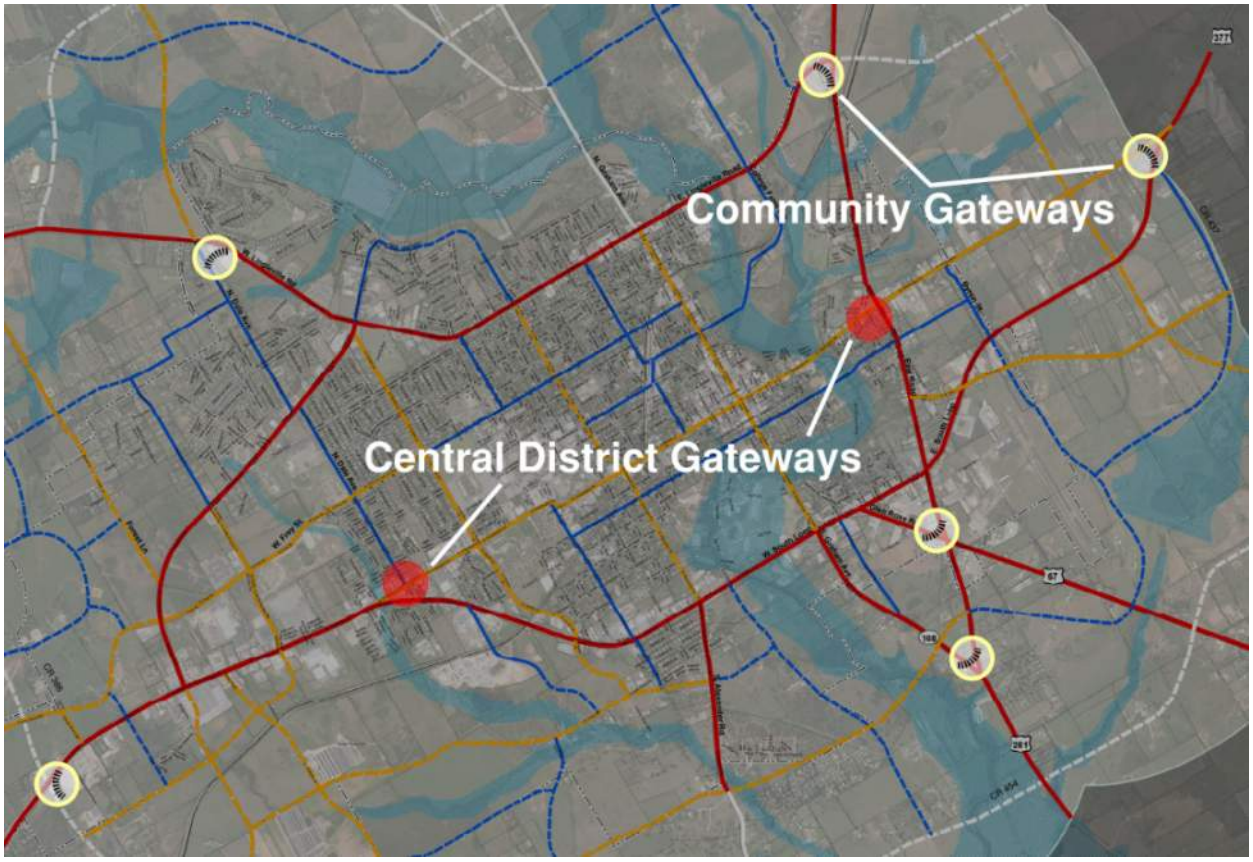
Figure 17. Minor Arterial Flared Intersection ROW Dedication guidelines

Entryways and Community Gateways

Much like a home, cities have main entrances and intersections that provide visitors with their first impressions and begins to describe the community and its residents. These gateways provide a statement about Stephenville —one that encompasses its history, values and interests.

Gateway signage and landmarks can be designed at a variety of scales to accommodate specific locations, traffic volumes and traffic speeds along a corridor, as well as communicate important information about the area. Major gateways are typically located along highways at major intersections; ideally these would be along edges of changing urban form. Gateways are not necessarily limited to a single sign or element, but can also encompass an entire node or intersection. Gateways provide visitors with a sense of place and give the impression they are entering a special place. Community gateways are a form of branding that can be used to distinguish places, note a threshold, or make lasting impressions on visitors.

Figure 18. Proposed Gateway Locations



Implementation

Most of the new segments of the Thoroughfare Plan will be implemented through the subdivision process administered by the City of Stephenville at the time development occurs. Some segments of the plan may require public action by the City independently or with coordination with other public agencies. In those cases, there are many specific action items that will require planning for the design of facilities to enhance the quality of the transportation infrastructure in Stephenville.

Some of these projects in the Plan are already process, for example the Super-2 configuration for US 281 is nearing construction. Some generalized cost ranges are included for scale comparison. Steps for implementation and potential actions are as follows:

	Action to Be Taken	Responsible Entity
1.	Adopt Stephenville Thoroughfare Plan	Stephenville
2.	Make amendments to Subdivision Ordinance to allow for thoroughfare plan alignment and corridor preservation through development process	Stephenville
3.	Develop CIP: Direct the Planning and Building Services Department to develop a Capital Improvements Plan short and long range list of projects and potential funding sources, including a Capital Improvements Program.	Stephenville
4.	Continue to meet with Erath County to coordinate on transportation projects	Stephenville, Erath County
5.	Continue to meet with TxDOT to coordinate on project prioritization and determine funding and participation for operations and project implementation	Stephenville, TxDOT
6.	Revise Thoroughfare Plan every 5 to 10 years to address evolving need	Stephenville

Table 5. Recommended Short Range Projects and Programs

	Project	Timeframe	Lead Agency	Funding Opportunity	Est'd Project Cost Range, (2016 Dollars)
1.	Access Management Study of Washington Street	1-3 Years	TxDOT	State, CIP	> $100K
2.	Super-2 Highway Configuration on US-281	1-3 Years	TxDOT	State	> $10M
3.	Washington Street (US Business 377) and Lillian: Restriping and extend pedestrian time	1-3 Years	Stephenville, TxDOT	City budget, State, CIP	< $10K
4.	Evaluate peak-period left turn restrictions along Northwest Loop	1-3 Years	Stephenville, TxDOT	City budget, State	< $10K
5.	Conduct traffic signal warrant studies: FM 8 and Ollie, Harbin and W. Frey, and W. Frey and Wolfe Nursery Rd.	1-3 Years	Stephenville, TxDOT	City budget, State	< $10K
6.	Northwest Loop at Harbin Drive: evaluation of the intersection for potential intersection control improvements	1-3 Years	Stephenville, TxDOT	City budget, State, CIP	> $100K
7.	Consider traffic calming measures for North Dale Drive	1-3 Years	Stephenville	City budget, CIP	> $10K

8.	Design and Build Shared Use Path along Washington Street between Downtown and the TSU Campus	3-5 Years	Stephenville, TxDOT	CIP	> $500K
9.	Consider traffic signal control program by City or partnership with TxDOT for non-TxDOT intersections	3-5 Years	Stephenville	City budget, CIP	> $500K
10.	Northbound channelized right turn at the Northwest Loop and FM 8 intersection	3-5 Years	Stephenville, TxDOT	State, CIP	> $100K
11.	Northwest Loop at US 377: Southbound channelized right turn lane	3-5 Years	Stephenville, TxDOT	State, CIP	> $100K
12.	Consider restriping North Harbin Street as a 3 lane as part of mill and overlay maintenance work in conjunction with potential roundabout at Northwest loop	3-5 Years	Stephenville, TxDOT	State, CIP	< $1M

Administration

In the administration and enforcement of the Plan, special cases and unique situations will occasionally arise where existing physical conditions and development constraints in certain areas conflict with the need for widening of designated thoroughfares to the planned rights-of-way width and roadway cross section. Such special circumstances require a degree of flexibility and adaptability in the administration and implementation of the plan. Acceptable minimum design criteria and special roadway cross-sections may have to be applied in constrained areas where existing conditions limit the ability to meet desirable guidelines. Where new development occurs, cross sections should be according to the Thoroughfare Plan and Subdivision code. For redevelopment in areas with existing, constrained right-of-way, a unique roadway design determination may be necessary, and is subject to the approval of the City Engineer/Staff, and/or the Planning and Zoning Commission. The standard roadway cross-sections should be used in newly developing areas and whenever possible, in existing developed areas subject to the prevailing right-of-way for the existing thoroughfare.

The following roadways are listed on the City's Pavement Management Report as needing advanced rehabilitation, but are not yet constructed to planned thoroughfare standards. The coordination of full-reconstruction of the roadway should consider the ultimate planned configuration of the roadway. Full-depth reconstruction should be viewed as an opportunity to implement the ultimate roadway cross section. Rehabilitation involving resurfacing the roadway is also a cost-effective time to consider adding striped bike lanes, signage and sidewalks where called for.

Minor Arterials

a. North Ollie Avenue – Existing right-of-way is constrained by neighborhood residential and not expected to redevelop. Alternate designs for this established roadway could enhance the character of the neighborhood, but still allow safe conveyance of cars, pedestrians and bikes through improvements. Consideration should include adding parallel parking bays to situate parked cars out of travel lanes.
b. CR 256 – segments of this roadway are classified as collector streets and restricted from expansion by ROW constraints. As the area grows, a connection to Alexander Road is planned. The coordination of reconstructing the roadway should consider the ultimate

configuration of the roadway, including its role as an east-west minor arterial south of the railroad corridor.

Collectors

a. N Dale Avenue North of Northwest Loop (Right-of-way constrained)
b. N Dale Avenue south of Northwest Loop
c. Frey Street (Right-of-way constrained)
d. S Lillian, South of Washington (Right-of-way constrained)
e. Lillian South of 377. (Right-of-way constrained)
f. East Long Street, just west of US281 (East Road) (Right-of-way constrained)
g. East Collins Street, College Farm Road (Right-of-way constrained)

Plan Amendment Process

It will be necessary to periodically consider and adopt amendments to the Thoroughfare Plan to reflect changing conditions and new needs for thoroughfare system improvements and development. A systematic procedure should be followed for making plan amendments, including a schedule for considering changes.

Typically, plan amendment requests may originate from landowners, civic groups, neighborhood associations, developers, other governmental agencies, city staff and other interested parties. Proposed revisions should be analyzed by the City Planning Director, Public Works Director or City/Traffic Engineer, and other City Staff, and the proposed changes and staff recommendations should then be considered by the Planning and Zoning Commission. A public hearing on proposed plan amendments, including advanced notice of such hearing, to obtain input to proposed amendments is undertaken. The burden for proving compelling reasons for and public benefit of any proposed changes should rest with the requesting parties. Decisions and determinations should represent the best interests of the public.

Subject to Planning and Zoning Commission recommendation, the revised Thoroughfare Plan, including any approved recommended plan amendments, should be submitted and considered by the City Council for adoption. The amended plan becomes effective upon adoption by the City Council.

Conclusion

This Thoroughfare Plan provides a framework for a transportation system to offer choices in how residents travel, and includes recommendations for corridor alignments to preserve mobility and connectivity as the community grows. This plan also serves as a blueprint for transportation investment decisions and includes opportunities to address current and anticipated needs for roadway capacity, right-of-way preservation, and critical network connectivity.

The thoroughfare network cannot be implemented at one time and must be implemented in segments over time. It is envisioned that the majority of the network laid out in this document will be provided through the development process at the time of subdivision, using this document as a guide. But the network will still need to be managed, guided and operated through shared responsibilities and partnerships between the City, county, and regional agencies such as TxDOT.

Using public resources in an efficient and effective manner includes anticipating growth and making reasonable allowances for its coordination. The City will need to improve its network of roads and corridors as the city grows, and balance expansion with maintenance and operation of the existing system in order to preserve the ability to reach desired goods, services and activities. Select expansions to the network will increasingly provide connection opportunities to drive, but also to walk and bike, thus reducing the future fiscal burden on residents to provide city services in areas with certain levels of activity and infrastructure. But care needs to be taken in the implementation, to preserving the community character and seek balance between the need to accommodate growth, yet retain what is distinctive and best suits the Stephenville community.

The planned network, and specifically the near-term projects identified in the study, have been identified based on existing and anticipated needs for the transportation network, and reflect the input received from stakeholders through the plan process. These improvements and additions to the transportation network are recommended as effective solutions for key locations with the highest existing travel volumes and areas with significant concentration of anticipated public activity for the Stephenville community. It is the intent of all who participated in the plan process that it be a positive guide for transportation services to support the community in continued success.

Appendix

A - Capacity Trends

A carrying capacity analysis of the transportation network in Stephenville shows that roadways can accommodate further growth in local and through-traffic. Traffic volumes from available TxDOT AADTs were supplemented with off-system saturation counts and turning movement counts taken in late 2015. Since no demographic forecasts were readily available, generally prevailing land use densities and growth patterns based on a concentric model approach were considered to frame growth amount totals contributing to corridors and book-end potential growth rates along the corridor. The link volumes were then extrapolated out 20 years using a growth rates of 2% and 3% and compared to Highway Capacity Manual (HCM2010) volumes thresholds for 2, 4, and 6 lane roadways. A conservative growth rate of 2% was evaluated for most roadways, and is similar to the rates used by TxDOT in statewide analysis. It should be noted that several roadways have shown historic growth rates at less than 2%, or even zero growth rates for the prior years of listed AADT reported, reflecting fluctuations or stable traffic patterns.

Results over all anticipate that the roadways can accommodate growth in traffic volume, assuming continued implementation of the thoroughfare plan network of alternate connectivity and general land use growth and population growth rates assumed in the current land use and economic development plans. Some degradation in mobility may be experienced, and should continue to be monitored and responded to with operational studies and improvements, such as auxiliary turn lanes at intersections, major turn movements, signal installation as warrants allow, and construction of key links to facilitate non-auto travel.

The analysis used a combination of Level of Service (LOS) measure of planned capacity for roadways and corridors and a more precise Critical Lane Movement for key intersections. The LOS methodology is a standard transportation engineering measure maintained by the national Transportation Research Board, and correlates to average capacities of streets with certain characteristics like numbers of lanes and speeds with resultant grades of service levels not unlike those for a school report card.

Segments of Washington Avenue (US Business 377), are currently operating in the LOS D range. The roadways have some limited capacity for additional volumes from development, but are also constricted by limited right-of-way for expansion, and established adjacent land uses.

While some improvements can be made to the segments at intersections to increase efficiency, in order to retain the local character of these streets needing improvements and be sensitive to their contexts, consideration should be made to not widen them, but instead make improvements such as pulling parking spaces outside of the travel-way, implement access management techniques, and encourage alternate modes through the corridor such as biking, walking and local transit – particularly as they serve the TSU campus, and in support of the TSU campus master plan.

As part of the alternatives considered, the prior thoroughfare plan's concept of a loop roadway was considered, with modifications to avoid existing homes and critical environmental features. The project team subsequently removed the contiguous loop concept from the recommended plan. As a result – the network needed to be reevaluated to consider the possibility that connections south of US 377, and other connections envisioned may not be contiguous. In order to be conservative for establishing number of travel lanes, an average rate of 3% was then evaluated for certain key major thoroughfares with significant commercial land use. Resulting volumes were still anticipated to be in the LOS D range, but some anticipated to be at LOS E or worse. Based on this revised analysis, the segment of US 377 between US Business 377 and FM 988 should retain the option to be expanded to 6 through lanes with a minimum 130-foot wide right-of-way.

The conclusion of this analysis is that, barring unprecedented growth in local or through traffic movements, Stephenville arterial roadways, with planned improvements, should be able to

Figure 19. Future Traffic, 2034

accommodate anticipated growth through approximately 2035. However, localized improvements at key intersections will need to be made in order to maintain design rate flows as growth does occur, including channelized turn movements and periodic reevaluation of signal timing as part of normal operation and maintenance consideration. A key challenge for the City will be implementation of continuous links between the existing major arterials, and sponsorship for construction of the linkages not made through development. Without clear linkages of higher classification to sponsor, partner agencies like TxDOT may need to develop additional plans for projects to implement, which can take long periods of time to plan before implementation. The downside of not having continuous and connected linked corridors and road at the periphery of the city over time is that without alternate routes, increased congestion and delays will likely result on existing linkages.

As a subset of the capacity analysis, a more detailed look at 6 intersections was conducted. For these intersection, traffic turning-movement counts were taken and a planning level, critical lane-movement analysis was done to inform network movement trends and identify potential near-term improvements to maintain capacity. Each of the intersections was first counted with a turning-movement count, noting all turning movements during the peak period.
For the analysis, the highest number of conflicting turn movements, or critical lane movements, were compiled and compared to acceptable ranges for a signalized intersection. Where intersections were found to be approaching thresholds for capacity, a recommendation is included for specific capacity improvements or modification suggested. This analysis did not consider operational changes like signal timing, which are generally not considered at the Thoroughfare Plan level. Therefore, additional engineering would be needed for intersections considering increased traffic controls, such as conversion of 4-way stops to signalized intersections. Such recommendations are within the operational controls of the City, County, and TxDOT and not the subject of this plan, though some recommendations for Signal Warrant analysis are recommended as acknowledgement of the issues raised during the plan development.

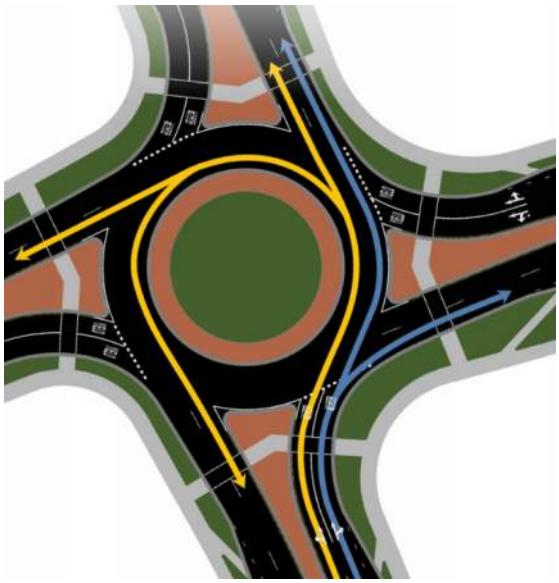
A roundabout concept may be a potential alternative to a signalized intersection at Northwest Loop and Harbin Drive and should be explored further with a traffic engineering study as it relates to traffic operations at this intersection, as well as the intersection operations of FM 8 and Northwest Loop, which is 250' to the north. One concern voiced through the plan process is that the signalized intersections close proximity is reportedly causing difficulty with traffic progression, and the short distance can also be a challenge for traffic weaving to make certain turn movements.

Dale Avenue and Northwest Loop

The intersection of Dale Avenue and Northwest Loop is offset by approximately 150'. However, both intersections are signalized, which, over time, will limit the amount of mobility through this intersection. Consideration should be given to a long-term operational solution to address the offset, should operational or safety concerns rise to the point of a public demand for addressing it. Potential solutions not looked at in detail as part of the Thoroughfare Plan, could include a single intersection design. Detailed engineering analysis and further public outreach process would need to be done at the point the project warrants further analysis. Some property impacts may result, depending on the level of solution detailed, but no structure or parking impacts are foreseen at this planning stage.

Modern Roundabouts

In this report, a modern roundabout is one potential solution recommended for the intersection of Harbin Drive and the Northwest Loop (FM 988) due to its proximity to another signalized intersection. A modern roundabout is a one-way circular intersection engineered to maximize safety and reduce traffic congestion. Because modern roundabouts are a new concept for Stephenville, this section introduces the concept and their characteristics.



Illustrative roundabout showing traffic flow lines

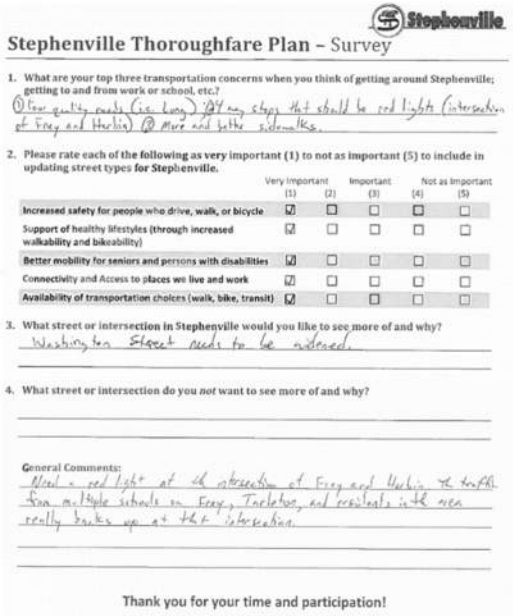
Roundabouts feature a "yield at entry" rule, which reduces delay by eliminating unnecessary stopping. Drivers yield to traffic in the roundabout and enter when there is a gap in traffic. Design, pavement markings and signs direct traffic into a one-way, counterclockwise flow. Pedestrians use raised islands and marked

crosswalks, providing safer and shorter crossing distances. Bicyclists can either use the sidewalk or enter the roundabout as a vehicle. Roundabouts are becoming more common in Texas due to their many benefits. They are safer, more efficient, and more economical than traffic signals. They reduce delay by allowing drivers to yield rather than stop at a light. They can also handle higher traffic volumes, which help vehicles get through more quickly.

Roundabouts have been proven to reduce overall crash rates by approximately 30-40%. Personal injury and fatal injuries have been reduced by over 75-90%. Properly designed roundabouts have also resulted in 65% reduction in delays and a 50% reduction in vehicle stops compared to intersections. The delay savings results in a 30% reduction in fuel consumption for drivers over time, because vehicles are not idling at a red light. The roundabout center island can also provide an opportunity to beautify the location with landscaping, and communities choose to personalize the treatments, making the intersection aesthetically pleasing. Roundabouts also cost less to construct, operate and maintain over the long term, including benefits to users. A typical modern roundabout costs approximately two-thirds that of a signalized intersection over a 30-year period. A modern roundabout design could be an appropriate solution to the delays experienced at certain intersections, and provide a safer, cost effective traffic control design solution.

Public involvement and alternatives considered

An open house was held on February 9th, 2016, to brief the public on progress material that had been developed. Topics included existing conditions, draft goals and objectives, concepts for trail extensions, and working ideas to adjust the alignments of the thoroughfare plan from the adopted Stephenville 2030 Comprehensive Plan. The meeting was well-attended, with nearly 300 participants in two presentation sessions followed by questions and answers. Comments and questions were taken, an exit survey was handed out, and contact information on how to include comments on the material was



Stephenville

Stephenville Thoroughfare Plan – Survey

1. **What are your top three transportation concerns when you think of getting around Stephenville; getting to and from work or school, etc.?**
   (1) Poor quality roads (i.e. Long) (2) any stops that should be red lights (intersection of Frey and Harbin) (3) More and better sidewalks.

2. **Please rate each of the following as very important (1) to not as important (5) to include in updating street types for Stephenville.**

	Very Important (1)	(2)	Important (3)	(4)	Not as Important (5)
Increased safety for people who drive, walk, or bicycle	☑	☐	☐	☐	☐
Support of healthy lifestyles (through increased walkability and bikeability)	☑	☐	☐	☐	☐
Better mobility for seniors and persons with disabilities	☑	☐	☐	☐	☐
Connectivity and Access to places we live and work	☑	☐	☐	☐	☐
Availability of transportation choices (walk, bike, transit)	☑	☐	☐	☐	☐

3. **What street or intersection in Stephenville would you like to see more of and why?**
   Washington Street needs to be widened.

4. **What street or intersection do you *not* want to see more of and why?**

General Comments:
Need a red light at the intersection of Frey and Harbin. The traffic from multiple schools on Frey, Tarleton, and residents in the area really backs up at that intersection.

Thank you for your time and participation!

Figure 20. Sample completed open house survey.

made available. Comments taken at the session and written feedback were incorporated into the plan recommendations, with alignments adjusted based on specific input details, where applicable. Five written comments were submitted. From feedback, it was apparent there was general lack of knowledge of the pre-existing thoroughfare plan outside of the City. The considerable majority of comments appeared to focus on the concept for a loop roadway, which was vocally discouraged. In general, it was the opinion of the project team that the public comment period following the open house allowed residents to seek more information and understand the details of the proposal, and that a significant number of residents received information and understanding of the overall plan.

The revised alignment of the loop concept from the prior adopted comprehensive plan presented at the public meeting received a generally skeptical reception from stakeholders in the ETJ. Little written feedback was received, with only five comment cards received from the public meeting. Three comments concerned the loop concept. Despite the positive attendance of the meeting (300+ attendees, according to sign in sheets collected by the city), relatively few written surveys were returned. Five comment cards were submitted. However, several questions were asked by residents related to the loop and general concern with the concept was stated.

It was unclear if the concern was due to specific development, or due to concern over individual property rights. There was also some confusion from mistaken comparisons to a neighboring community Dublin's partial controlled access loop. Dublin's Loop is a 200' ROW with controlled access, compared to the rural arterial road with 100' ROW originally proposed as part of the Stephenville Plan. Subsequent to the open house, the team removed the loop road concept from the draft.

Summarizing written comments received – Three were alignment-related where an alternative could be accommodated. One comment was generally critical of the need for the alignment crossing a particular property, which was significantly sized enough that an alternative was not possible. One comment was generally appreciative of the process and information provided.

The prior Thoroughfare Plan in the 2008 Comprehensive Plan has been publicly posted the City's website, with alignments and roadway classifications. However, it was discovered through feedback given at the open house that this was generally an unknown to those who attended.

B - Demographics

The following section includes existing demographics, population and employment characteristics that were considered during the development of this plan include the following figures, which map Census survey data.

Figure D1. Population Density, Census 2013

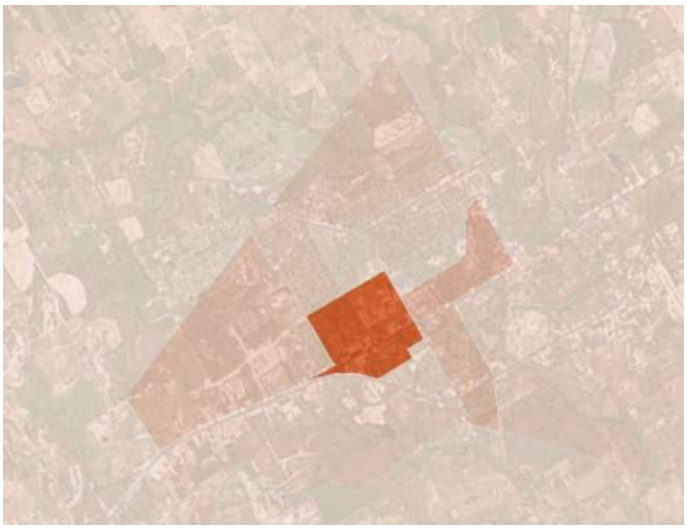


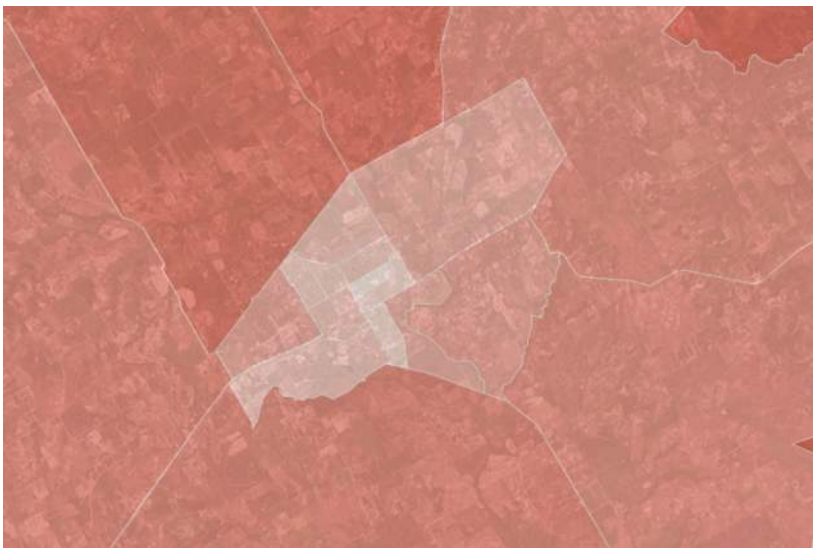
Figure D2. Employment Density, Census 2013

Population densities in Stephenville range from 10 people per acre in the center of town (darkest), to 1.3 people per acre west of Dale Drive. Average density for Stephenville is 2.4 persons per acre. There were approximately 11,600 jobs in Stephenville in 2013, ranging from 11.6 jobs per acre in the center of town to averages of 1 job to the acre at the periphery. The average number in Erath County is 0.03 jobs per acre.

Housing unit densities in Stephenville ranged from 4.4 units to the acre in the center of town (darkest), to 1.6 units to the acre or fewer for most of the City.

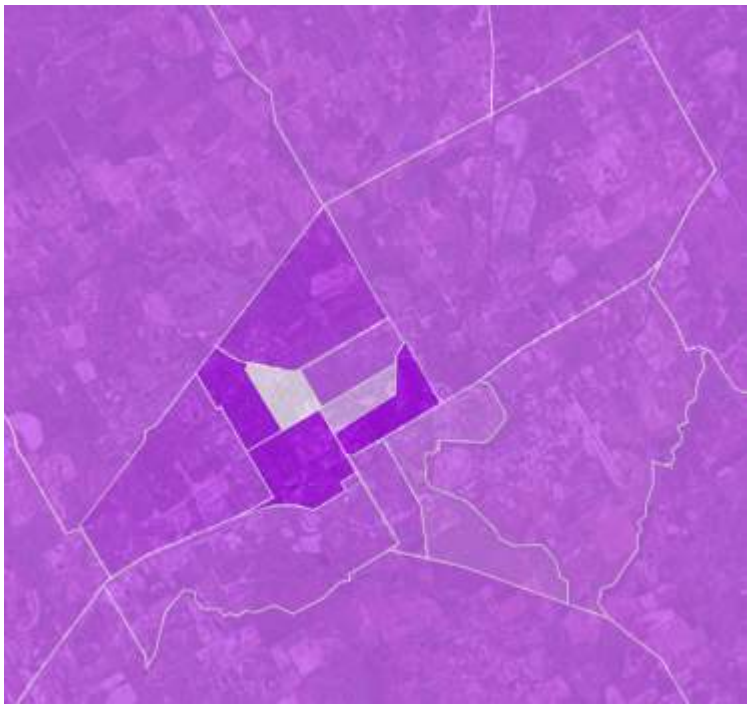
Access to economic activity:
The Employment Access Index is a weighted measure developed to estimate both the quantity of and residents' access to the jobs in a region. It is calculated using an inverse-square law to model total access to jobs in the metropolitan area by using the sum of the number of jobs divided by the square of the distance to those jobs.

Figure D3. Access to Economic Activity, Census 2013



The percent of a family's income spent on transportation ranges from 25% in the center of Stephenville, to 35% at the periphery, representing the cost of longer travel times and few alternative – modes or destinations - for shorter trips. The State average is 25% and the average for Erath County is 32%.

Figure D4. Percent of Income Spent on Transportation, Census 2013



The change in population from 2000 to 2010 shows approximately where development is happening – with an average of 2-3 people per acre being added in Stephenville (areas shaded darker), and 0 to 0.3 being added on average at the periphery. Some areas experienced negative growth in the same time period.

Figure D5. Change in population 2000-2010, by Density, Census 2013

Figure D6. Population (Blue shaded), and employment (Yellow shaded), Census 2013

Figure D6 shows overlapping areas of population density as well as employment density. Darker shaded areas are better for infrastructure investments infrastructure to meet the existing density of possible trips for population and jobs overlap. This area of overlap has potential to serve existing concentrations of residences, jobs and employees. But it may not reflect economic development priorities, which may want to introduce a larger service area or under-represented areas.

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Welcome to
STEPHENVILLE
City Of Champions

W. South Loop
Graham Ave