Appendix A: Existing Conditions

Existing Document and Policy Review Memo

SAN MARCOS TRANSPORTATION PLAN UPDATE

COMPREHENSIVE REVIEW OF EXISTING DOCUMENTS & POLICIES WITH RECOMMENDATIONS INCLUDING PLANS & POLICIES RELATED TO OFF-STREET TRAILS

Prepared by McCann Adams Studio
for HDR Engineering, Inc.

July 21, 2016

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SAN MARCOS TRANSPORTATION PLAN UPDATE: COMPREHENSIVE REVIEW OF EXISTING DOCUMENTS & POLICIES WITH RECOMMENDATIONS - UPDATE INCLUDING PLANS & POLICIES RELATED TO OFF-STREET TRAILS

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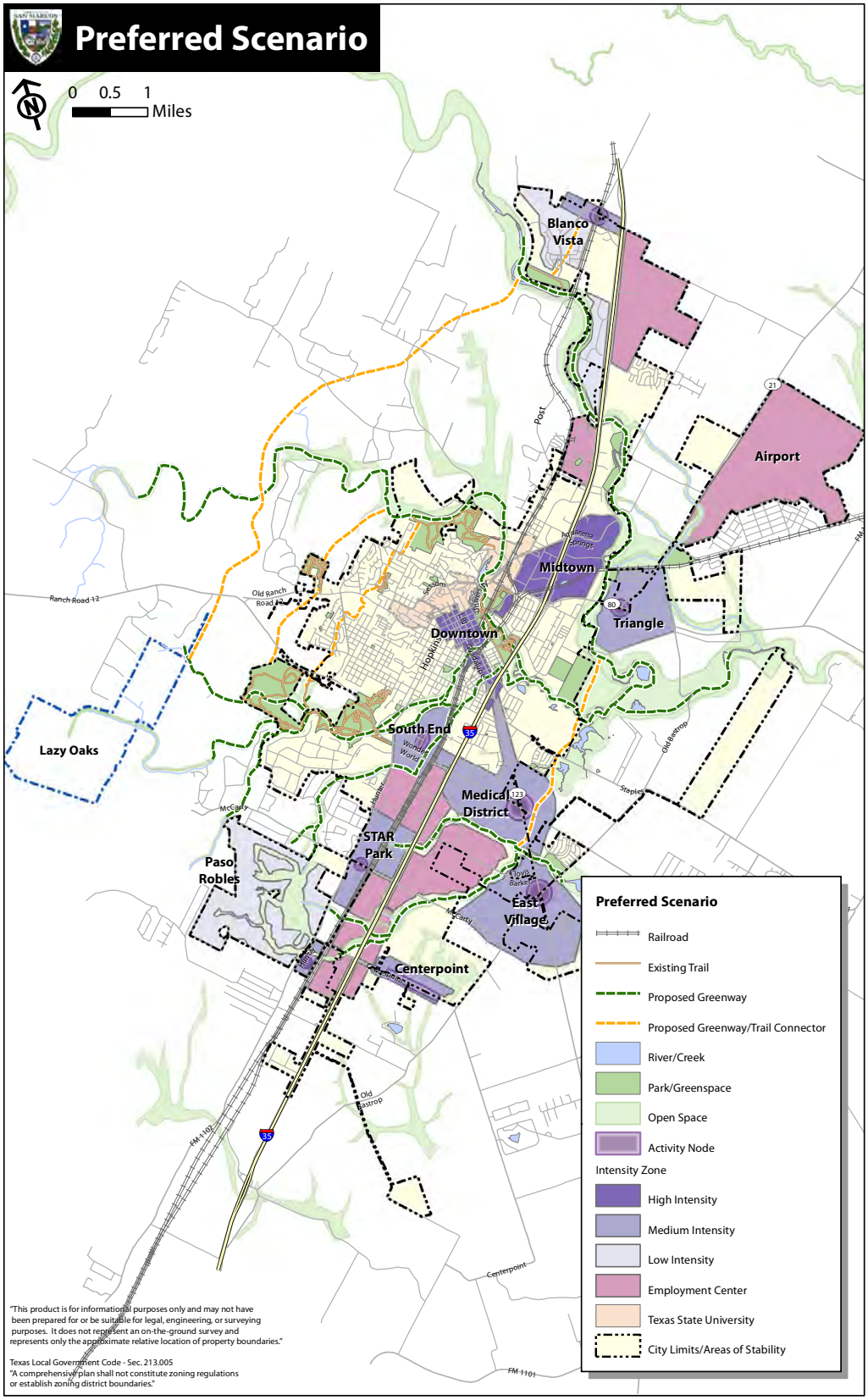

Figure 1:
San Marcos Comprehensive Plan "Preferred Scenario"

INTRODUCTION

This report provides a comprehensive review and evaluation of existing documents and policies that guide the planning and implementation of transportation facilities in the City of San Marcos. The intent of the report is to summarize the transportation policies set forth in these documents, to identify any conflicts and inconsistencies with the City's recently adopted Comprehensive Plan, known as Vision San Marcos: A River Runs Through Us (2013), and to make recommendations aimed at bringing all of the City's transportation policies into alignment within an updated Transportation Master Plan. This latest draft incorporates policies and plans related to off-street trails to inform the City's preparation of a Trails Master Plan as part of the overall Transportation Master Plan.

The Comprehensive Plan
Vision San Marcos: A River Runs Through Us (2013)

The San Marcos City Council adopted the Comprehensive Plan in April, 2013 after an extensive public engagement process and work by both City staff and outside consultants. The adopted plan addresses the need for a more comprehensive and integrated transportation network that caters to all types of users and modes in San Marcos. The Comprehensive Plan lists the following transportation action items:

- Focus on non-vehicular transportation improvements in the updated Transportation Master Plan;
- Develop connections between the community and the airport;
- Develop a transit plan that matches the preferred scenario map to encourage connectivity between the identified activity centers;
- Create a connected network for non-automobile travel;
- Develop a unified parking plan;
- Obtain "Bicycle-Friendly Community" designation;
- Create a Sidewalk Master Plan;
- Create an Urban Transit District;
- Pilot a Green Streets program, and
- Develop a complete streets policy.

The Comprehensive Plan indicates that the Travel Demand Model used in San Marcos demonstrates that about 30% of area roadways experience high levels of congestion, particularly during the morning travel time. The

Comprehensive Plan prioritizes coordinated land use and development strategies with the goal of lower vehicle miles and hours travelled and it indicates that the "preferred land use scenario" could achieve these goals.

Community priorities identified in the Comprehensive Plan included providing more trails and natural areas, a task which was determined to be the number one priority of the Parks, Public Space and Facilities section of the plan. This section of the document also mentions that (at the time of printing, in 2010) the City had only reached five miles of a 10 mile trail goal.

The Comprehensive Plan is rooted in a vision of environmental protection and support for non-automobile transportation as part of a larger sustainable development strategy. Throughout the plan, economic development, land use, and transportation planning successes are connected to ecological sustainability and compact development.

SUMMARY OF TRANSPORTATION POLICIES

In addition to the Comprehensive Plan itself, the following documents provide specific policy guidance for transportation decision-making in the City of San Marcos:

1. San Marcos Transportation Master Plan (2004) *prepared by Wilbur Smith Associates*
2. San Marcos Transportation Design Manual (2004) *prepared by Wilbur Smith Associates*
3. City of San Marcos Parks, Recreation & Open Space Master Plan (2010) *prepared by San Marcos Parks and Recreation Department*
4. San Marcos Downtown Master Plan (2008) *prepared by Broaddus & Associates*
5. The San Marcos Five Year Transit Plan (2014)
6. Downtown Parking Initiative (2012) *prepared by Gateway Planning and Kimley Horn & Associates;*
7. Hays County Parks, Open Space & Natural Areas Master Plan (2012) *prepared by Design Workshop Inc. and Greenplay, LLC*
8. Texas State University Campus Master Plan (2006-2015) *prepared by Broaddus & Associates.*
9. ITE Context Sensitive Design Manual (2010) entitled *Designing Walkable Urban Thoroughfares: A Context Sensitive Approach*, *prepared by the Institute of Transportation Engineers in collaboration with the Congress for New Urbanism.*
10. Agreements with TxDOT.
11. San Marcos Land Development Code (including zoning regulations).

Today, these important plans and policies are not always consistent with the vision set forth in the Comprehensive Plan. Page 83 of Vision San Marcos: A River Runs Through Us outlines the need to revise policies to ensure that the current vision of the plan is implemented. To that end, this section of the report identifies inconsistencies between the vision of the adopted Comprehensive Plan and the regulatory framework that guides transportation policy decisions in the City and makes initial recommendations aimed at bringing those policies into alignment.

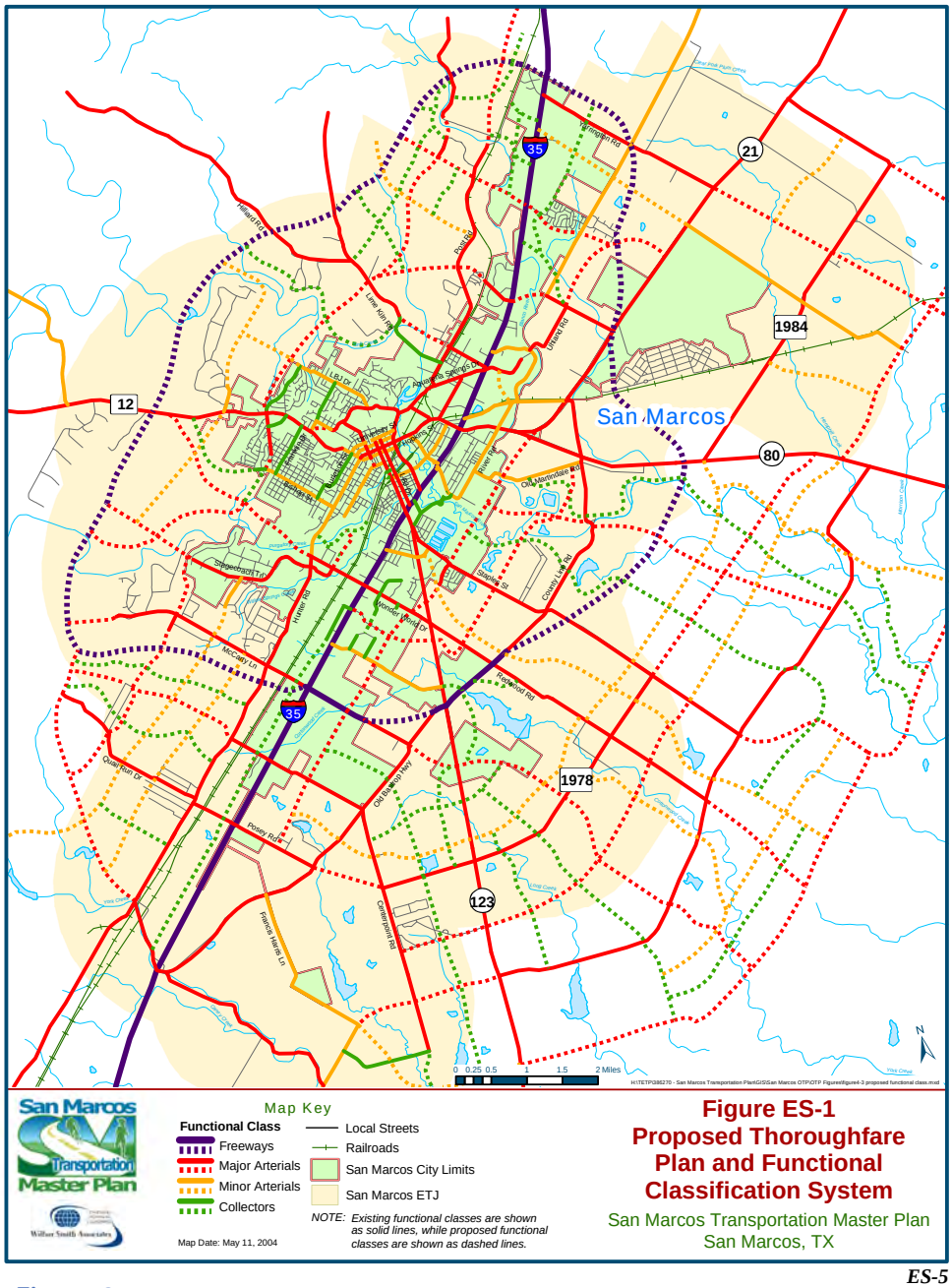

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Figure 2:
San Marcos Thoroughfare Plan (2004)

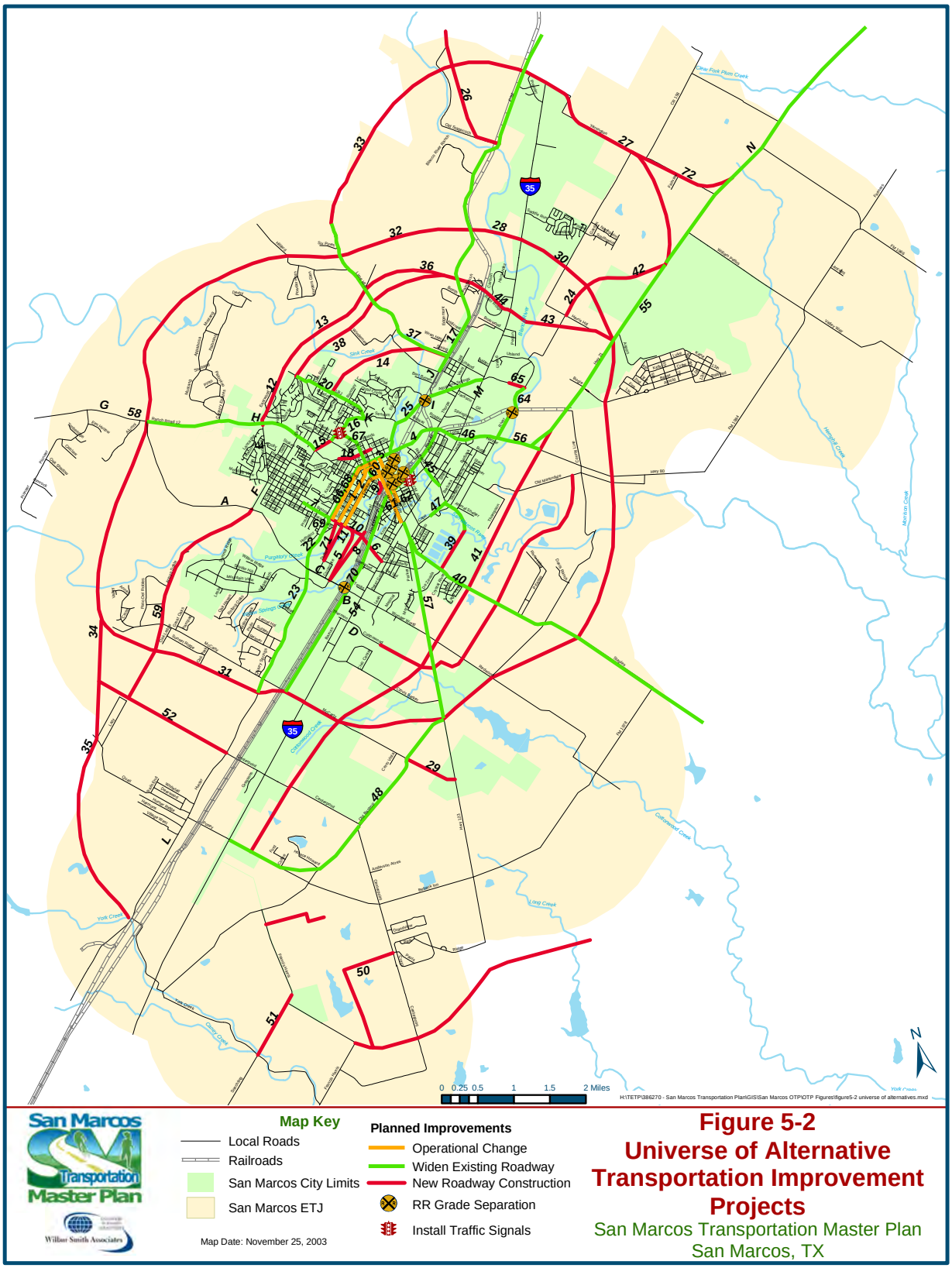


Figure 3:
Universe of Alternative Transportation Improvement Projects (2004)

1. San Marcos Transportation Master Plan (2004)

The last complete iteration of the San Marcos Transportation Master Plan was completed over ten years ago. Since that time, the rapid pace of growth in the region has changed and the vision of a future San Marcos has evolved with it. The 2004 plan focuses more on private automobile traffic than on transit or non-motorized transportation. Chapter Six of the 2004 Plan addresses bicycle and pedestrian facilities for San Marcos. While the plan calls for "the enhancement of bicycling and [the] consideration of needs for pedestrian movement" (pg. 6-1), the Plan ultimately focuses on the improvement of single occupant vehicle facilities first.

The Transportation Master Plan outlines corridors where there is opportunity for development of bicycle and pedestrian linkages including rivers and creeks (such as the San Marcos River, Blanco River, Cottonwood Creek and Purgatory Creek), which represent a key opportunity for increasing mobility. The Plan recommends a network of multipurpose trails within the city, rated by priority. The Plan also urges the city to be opportunistic in securing right-of-way in areas where trails could be developed, taking into consideration the securing of key areas where connections to existing trails could be made.

Location	Length	Priority
Along Aquarena Springs from IH 35 to University Drive	2.1	S
Along San Marcos River from Aquarena Springs to River Road, including an under crossing of IH 35	4.8	S
Along RM 12 from Franklin to Holland	0.1	S
Along the Blanco River from SH 80 to IH 35		S
Along Purgatory Creek, from CM Allen to the regional park west of the Wonder World Drive extension, with neighborhood connectors	5.2	M
Connector from the high school along Broadway to DeZavala to Crystal River and south to Cape Road	0.6	M
Connector from Mockingbird to Leah near the Medical Center	0.2	M
Along Blanco River from IH 35 to Dudley Johnson Park		M
Along Blanco River from Dudley Johnson Park to new park at US 80	7.9	L
Along San Marcos River east of Cape Road to the extension of SH 21 and then along the edge of the fish hatchery to Staples Road	4.2	L
Along Craddock Road from RM 12 to the regional park west of the Wonder World Drive extension	1.1	L
Convert Cape Road to one-way with two-way trail, River Road to SH 123	0.7	L

Note: Priority – S=Short Term, M=Intermediate Term, L=Long Term

Figure 4:
Transportation Plan Multipurpose Trail Development Priorities

However, the recommended solutions to transportation concerns in the Transportation Master Plan generally focus on road expansions and the creation of a freeway loop system to help distribute through traffic. The Plan recommends that one of the top priorities for future transportation planning should be the acquisition of wider rights-of-way to allow for the future expansion of roadway facilities for vehicular traffic.

The 2004 Plan does not include street cross sections to guide the design of street improvements, but rather the number of lanes for each functional classification and the projected volume of vehicles each type of roadway could handle.

Conflicts and Inconsistencies with the Comprehensive Plan

With its primary focus on vehicular mobility, the 2004 Transportation Plan is in direct conflict with the Comprehensive Plan's emphasis on sustainable multi-modal transportation solutions. Vision San Marcos is clear in its goal of equality between pedestrians and motorists: "Sidewalks are equally important to the transportation system as roadways" (pg. 102). To make the Transportation Plan consistent, the updated document needs to develop a more comprehensive policy for all modes of transportation including bicycle, pedestrian and vehicular circulation.

The types of streets discussed in the 2004 Plan represent generally standard, car-centric designs. The concept of "complete streets" and the balanced use of rights-of-way for all modes of transportation is a clear direction provided by the Comprehensive Plan. Further development of acceptable street sections is recommended, particularly with regard to the Comprehensive Plan's desired inclusion and accommodation of pedestrian and bicycle facilities within each functional classification and the recognition that streets represent the most significant portion of the City's public space. The updated Transportation Plan will need to develop a suite of street crosssections that accomplish this goal, and that apply best practices including the criteria set forth in the Institute of Transportation Engineer's Context Sensitive Design Manual (discussed below).

The currently adopted Thoroughfare Map that was included and amended along with the Transportation Master Plan no longer complements other planning efforts throughout San Marcos. An updated Thoroughfare Map that supports the Comprehensive Plan's Preferred Scenario with its defined Activity Centers will be an important product of the updated Transportation Plan. Based on the prioritization of environmental protection in the Comprehensive Plan and the observation that a number of the roadway

construction and expansion projects recommended in the 2004 Plan posed "serious threats" to the environment, some of the future roadway alignments (particularly those west of IH-35) will need to be reevaluated for current and future applicability.

Design Elements	Alley	Residential Street	Residential Collector	Neighborhood Collector	Commercial/ Multifamily Collector	Industrial Collector	Minor Arterial	Major Arterial	Parkway	Freeway
Expected ADT (vpd)	-	500	500-3,000	500-3,000	2,000-10,000	> 3,500	3,500-12,000	9,000-20,000	18,000-30,000	18,000-30,000
Minimum Right-of-Way (feet)	16	53	62	54	80	70	82	100	140	150
Minimum Paved Width (feet)	15	30	38	30	48	44	58	70	2 @ 41	2 @ 46
Number of Lanes	1-2	2	2	2	2-4	4	4	2-4	6	6
Lane Width (feet)	15-20	10-11[a]	10-11[a]	10-11[a]	11-12	11 to 12	12	12	12	12
Design Speed	-	20-30	30-35	30-35	30-40	30-40	40-45	40-50	50-70	50-70
Curb Basis (feet)	-	10	10.5	10.5	14.5	11.5	10.5	13.5	14.5	14.5
Tangent Length between reverse curves (feet)	-	50	100-150	100-150	100-150	100-150	150-200	150-200	200	200
Spacing of Cross-Street (feet)	-	<300	300-500	300-500	500	500	1000	1000	1300	1300
Driveways permitted	-	Yes	Yes	Yes	Restricted	Restricted	Restricted	Restricted	No	No
Driveway Spacing (feet) [b]	-	1 Driveway/ Property	50-75	50-75	75-100	75-100	150-200	150-200	-	-
Parking	-	Yes	Yes	Yes	Restricted	Restricted	Restricted	No	No	No
Landscaping	-	Both sides	Both sides	Both sides	Both sides	Both sides	Both sides	Both sides	Both sides	Both sides
Sidewalks	-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Grades % (max) [c]	2	8	8	8	8	8	8	8	6	6
Min. Median Widths (feet)	-	-	4	4	4	4	6	6	23	23
Expected percent of Heavy Vehicles (%)	-	1.7	1.4-8.3	1.4-8.3	2.0-9.8	2.0-9.8	12.1-34.0	34.0-50.0	Full access	Full access

a. With additional parking lanes of 7 - 8 feet on both sides.
b. Varies with the design speed of the roadway and is different for City and TxDOT roadways. Refer to Chapter 5: Driveway Design and Access Management.
c. For construction of steeper grades, detailed traffic and environmental studies are required.

Figure 5:
Roadway Design Standards (2004)

2. The San Marcos Transportation Design Manual (2004)

The San Marcos Transportation Design Manual was adopted alongside the 2004 Transportation Master Plan as an accompanying technical document to guide the design and construction of streets. Much like the plan that it accompanies, it is focused on the maximization of space for cars in terms of lanes and lane widths.

The 2004 Design Manual methodically lists the types of streets approved for design and construction in San Marcos, their functional classification, more detailed geometrics associated with each type and with special circumstances, such as intersections, railroad crossings, and traffic calming areas.

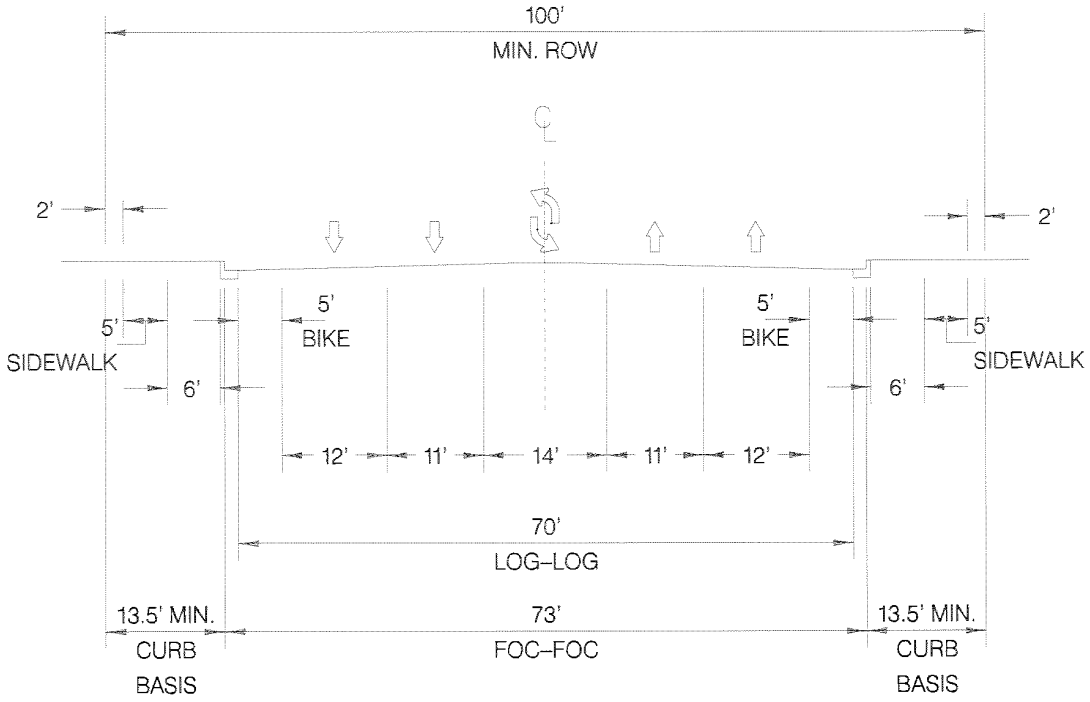


Figure 6a:
Design Criteria for Four-Lane Divided Major Arterial Street

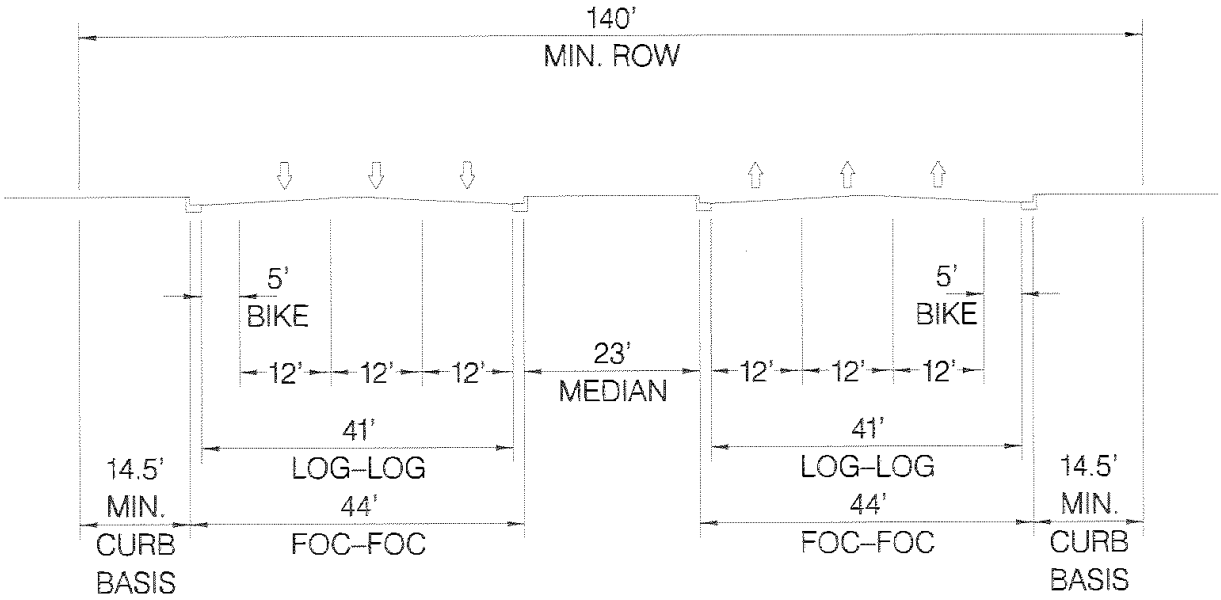


Figure 6b:
Design Criteria for Six-Lane Parkway

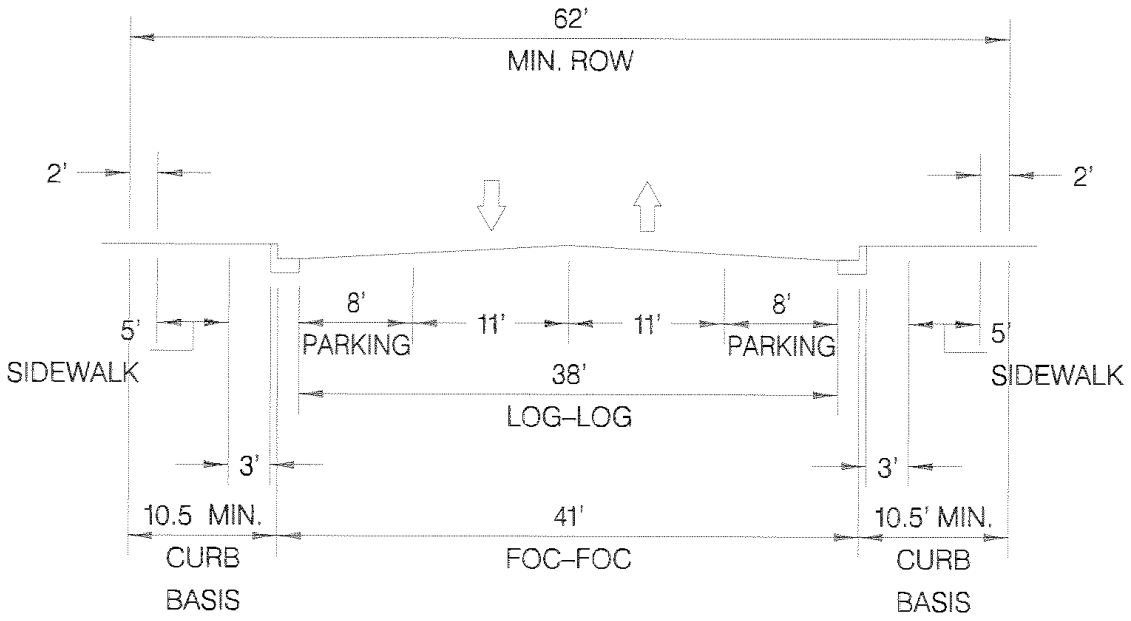


Figure 6c:
Design Criteria for Residential Collector Street

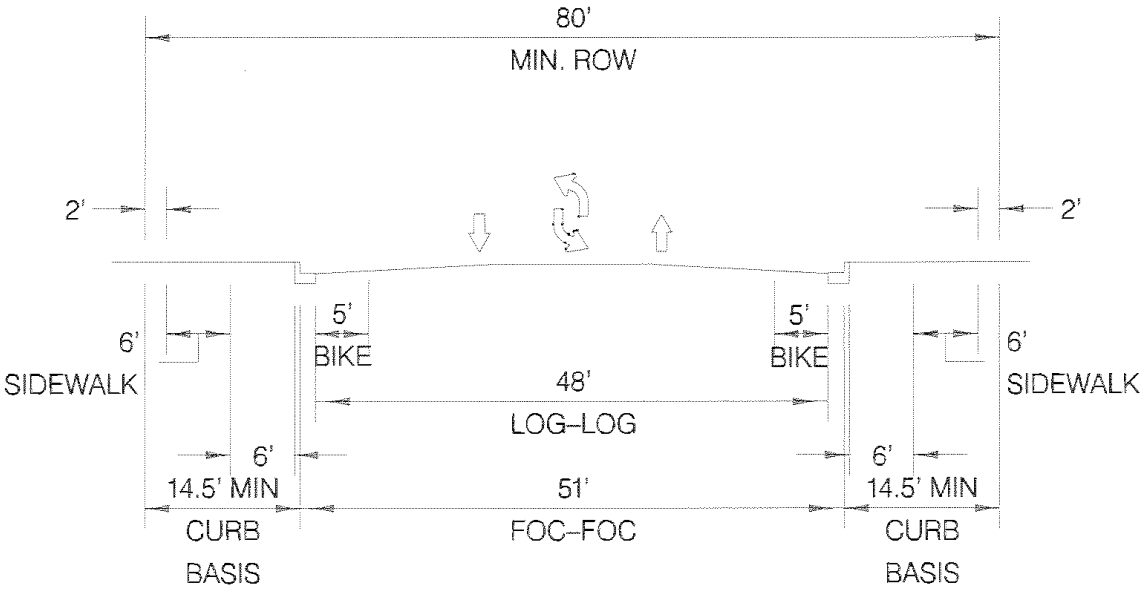


Figure 6d:
Design Criteria for Commercial/Multi-Family Collector Street

The following roadway types are included with specific design standards, with each defined by expected traffic volumes and levels of access, among other criteria:

- Alley
- Residential Street
- Residential Collector
- Neighborhood Collector
- Commercial/Multifamily Collector
- Industrial Collector
- Minor Arterial
- Major Arterial
- Parkway
- Freeway

The accepted designs of each street type reflect a generally conservative approach with respect to right-of-way acquisition and lane widths and appear to be based on use-based volume forecasts. The functional classifications and a mobility analysis of each type were adapted from the 1984 AASHTO Geometric Design of Highways and Streets manual.

The Design Manual outlines specifications for multi-use trail construction, which are generally consistent with current best practices:

- Paths should preferably be 10 to 12 feet wide, with a minimum eight foot width only in situations of spatial limitation and in areas of low use. Multi-use paths must have two feet of smoothly graded area on either side, three-foot horizontal clearance and 10-foot standard (eight-foot minimum) overhead clearance.
- Paths in areas that will experience high levels of use should be 12 feet wide and separated between bikes and pedestrians. In the vicinity of an intersection crossing, this type of path should combine uses into a ten-foot path.
- Multi-use paths should be constructed of a hard surface such as concrete or asphalt. Jogging paths and other specific paths can use granular surfaces.

<u>Conflicts and Inconsistencies with the Comprehensive Plan</u>

Like the Transportation Plan, the Design Manual is not consistent with the Comprehensive Plan, which prioritizes the development of better facilities

for both pedestrians and bicyclists, and the concept of "complete streets". In order to bring the Transportation Design Manual into alignment with the Comprehensive Plan (and with the principles of Context Sensitive Solutions discussed below), the following policies should be reviewed:

Roadway Design Standards

(Table 1-1):

- Functional Classification should be revised and terminology should move away from strictly use-based determinations, i.e. "Residential Street" (Figure 5c) or "Commercial/Multifamily Collector" (Figure 5d). Roadway typologies and the specific context should be considered in the design, not simply projected trip counts based on typical uses.
- In general, minimum lane widths should be reviewed and potentially revised downward. The recommended 12 ft. lane widths on arterials could be reduced, depending on the specific context. As an example, the 38 ft. allocated for three lanes on a "Commercial/ Multi-Family Collector" could be reduced by as much as 5 ft. Less space devoted to car travel could open up valuable right-ofway for pedestrian and bicycle facilities recommended by the Comprehensive Plan.
- The spacing of cross streets for arterials should be reviewed and potentially revised downward. The current 1,000 ft. spacing recommendation could be detrimental to neighborhood connectivity goals.

Street Cross Sections

It is recommended that the updated Transportation Manual redesign the hierarchy of roadway types and the corresponding standards, consistent with the goals of Vision San Marcos to create a more comfortable pedestrian and bicycle environment. The roadway design standards should be refined to make them more pedestrian and bicycle friendly, and to incorporate current best practices and context sensitive design practices. The roadway widths are greater than they need to be to accommodate traffic in a calm manner, and to create an attractive pedestrian environment. For example:

- Lane widths could be reduced in width, and the gutter pan could be included as part of the functioning roadway (e.g., as part of the 8-foot parking lane), as recommended by the Context Sensitive Solutions (see discussion below).
- On local residential streets where traffic volumes are minimal, the standards could allow for "queuing" streets with roadway widths of 28

feet and parking on both sides.

- The standards do not address the location of street trees; ideally most streets should be planted with trees in a zone of 6 to 7 feet along the curb edge, providing a green edge to the street and a clear separation between the sidewalk and a safer and more comfortable pedestrian environment. Root barriers should be utilized to prevent damage to curbs and sidewalks.
- The "alternative" standards without curbs and gutters should provide for a separated sidewalk, perhaps with rain gardens that provide the drainage and water quality functions.
- Protected bike lanes should be considered along streets with greater traffic volumes (e.g., along Multi-Family Collector streets).
- Uninterrupted pavement widths greater than 40 feet (i.e., without a median or a bulb-out) should be avoided as much as possible, as they create difficult and unsafe pedestrian crossing conditions.

3. City of San Marcos Parks, Recreation & Open Space Master Plan (2010)

One of the 10 goals listed in this master plan is "connectivity", which the document describes as an interconnected system of parks, trails, and greenbelts throughout the city and its ETJ. The Master Plan identified trail extensions and those connecting to existing rivers and creeks as the highest priority for park improvements.

The focus for these efforts is a) trails that connect parks and b) trails along drainage corridors. In combination, these two types of greenways are intended to form a network of mobility for bicycles and pedestrians. The Parks, Recreation and Open Space Master Plan, used in combination with the Transportation Master Plan, is intended as a guideline for park and open space development, but more detailed research is seen as necessary to determine the timing and feasibility of individual projects.

The Master Plan's goal is for all residents to be located within a quarter mile of city park land. Areas where greatest need for parks and trails include the far west areas of the city, the area east of I-35, and the south-southwest and southeast portions of the ETJ, which represents a significant opportunity because of its surplus of greenspace.

Priority projects for the next ten years are listed in the plan, along with estimated prices for their completion.

0-5 Years ($12,770,000)
- Provide multi-modal path from I-35 to River Center
- Provide access to east side of I-35
- Connect Purgatory Creek to Downtown (CM Allen Parkway)
- None of these projects appear to have been completed at this point.

5-10 Years ($11,025,000)
- Along Blanco River: Five Mile Dam Park to Blanco Shoals
- Along Blanco River: Blanco Shoals to US 80
- Connect downtown to conference center and hotel

Hike and bike trails - $200K per mile
Natural trails - $2K per mile

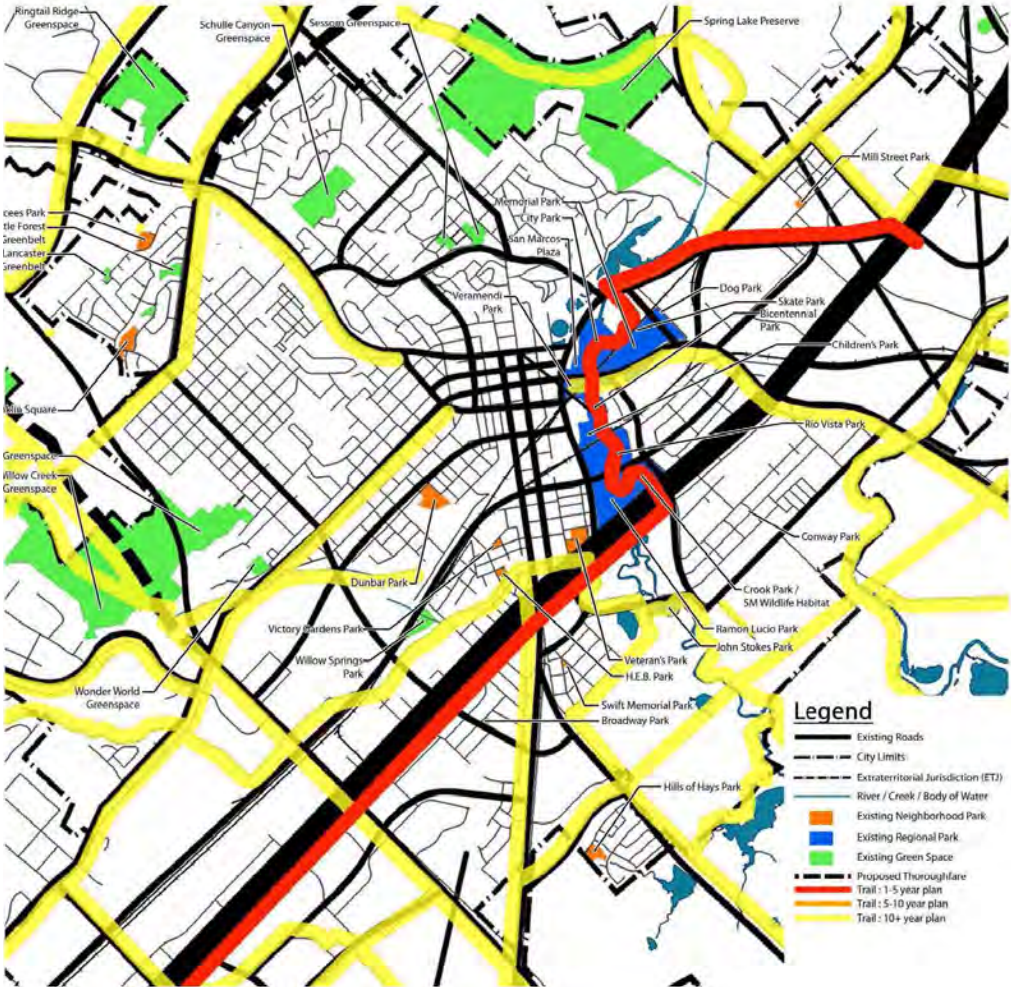


Figure 7:
Future Trail Layout Map - San Marcos Trails Master Plan

4. The San Marcos Downtown Master Plan (2008)

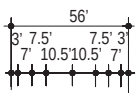
The San Marcos Downtown Master Plan guides the redevelopment and restoration of the historic Downtown. The Plan provides a coherent vision for Downtown as a walkable urban destination centered on the historic courthouse square and organized into a series of "villages" with distinct identities and thoughtful connections between them.

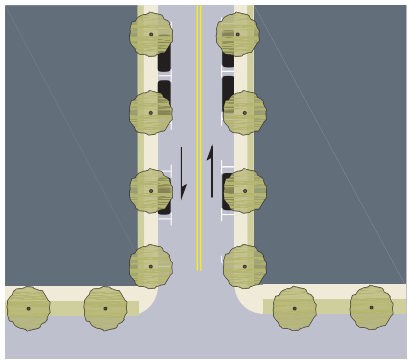
The Downtown Master Plan addresses the Downtown street and roadway network with specific recommendations, including:

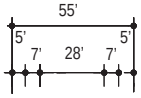
- Reinforce the character of primary and secondary streets by implementing Form Based Codes,

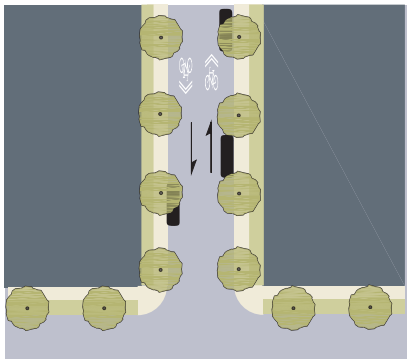
KEY	ST-57-20-BL
Thoroughfare Type	
Right of Way Width	
Pavement Width	
Transportation	

THOROUGHFARE TYPES	
Highway:	HW
Boulevard:	BV
Avenue:	AV
Commercial Street:	CS
Drive:	DR
Downtown FBC Street:	DT
Street:	ST
Road:	RD
Rear Alley:	RA
Rear Lane:	RL
Bicycle Trail:	BT
Bicycle Lane:	BL
Bicycle Route:	BR
Path:	PT
Transit Route:	TR
Sharrow	SH









	Lee St DT9-56-36	Love St DT10-55-28
Thoroughfare Type	Downtown FBC Street	Downtown FBC Street
Transect Zone Assignment	T4, T5	T4, T5
Required Right-of-Way Width	56 feet	55 feet
Pavement Width	36 feet	28 feet
Curb Relocation (Y/N)	No	No
Movement	Slow Movement	Slow Movement
Design Speed	25 MPH	30 MPH
Pedestrian Crossing Time	5.7 seconds	8 seconds
Traffic Lanes	2 lanes	2 lanes
Parking Lanes	Both Sides at 7.5 foot marked	Both Sides unmarked
Curb Radius	10 feet	10 feet
Walkway Type	7 foot Sidewalk	7 foot Sidewalk
Planter Type	4 x 4 foot Tree Wells	4 x 4 foot Tree Wells
Curb Type	Curb	Curb
Landscape Type	Trees at 30' o.c. Avg.	Trees at 30' o.c. Avg.
Transportation Provision	None	SH, TR

Figure 8a:
Downtown Master Plan Draft Street Cross Sections

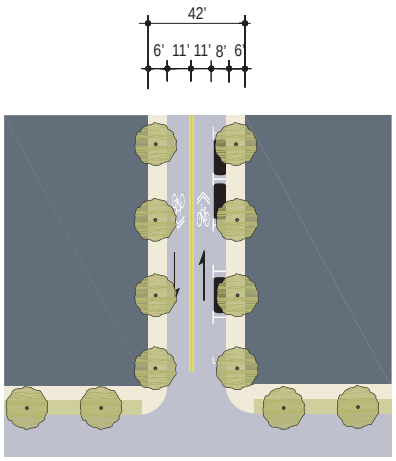
- Convert Downtown streets from one-way to two-way operation,
- Time traffic signals to improve traffic flow,
- Create a parking management plan and corresponding parking district,
- Use revenues as a way to finance future parking options, such as lot acquisition for surface lots and later construction of parking garages,
- Make streetscapes pedestrian and bicycle-friendly, and
- Incorporate consistent streetscaping elements, i.e. street trees, paving, benches, and lighting.

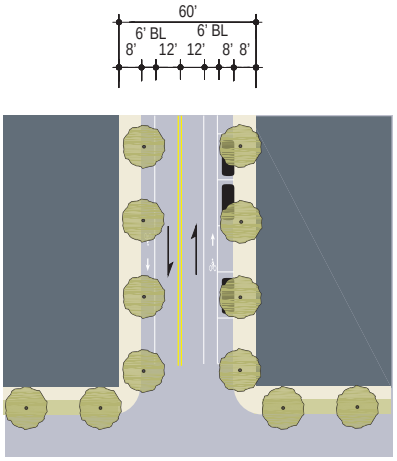
KEY ST-57-20-BL

Thoroughfare Type
Right of Way Width
Pavement Width
Transportation

THOROUGHFARE TYPES

Highway:	HW
Boulevard:	BV
Avenue:	AV
Commercial Street:	CS
Drive:	DR
Downtown FBC Street:	DT
Street:	ST
Road:	RD
Rear Alley:	RA
Rear Lane:	RL
Bicycle Trail:	BT
Bicycle Lane:	BL
Bicycle Route:	BR
Path:	PT
Transit Route:	TR
Sharrow	SH





	Cheatham St (Guadalupe to LBJ) DT5-42'-30'	Cheatham St (LBJ East) DT6-60-44
Thoroughfare Type	Downtown FBC Street	Downtown FBC Street
Transect Zone Assignment	T4, T5	T4, T5
Required Right-of-Way Width	42 feet	60 feet
Pavement Width	30 feet	44 feet
Curb Relocation (Y/N)	No	Yes
Movement	Slow Movement	Slow Movement
Design Speed	20 MPH	30 MPH
Pedestrian Crossing Time	6.3 seconds	8.6 seconds
Traffic Lanes	2 lanes	2 lanes
Parking Lanes	One Side at 8 foot marked	North Side at 8 foot marked
Curb Radius	10 feet	10 feet
Walkway Type	6 foot Sidewalk	10 foot Sidewalk
Planter Type	4 x 4 foot Tree Wells	4 x 4 foot Tree Wells
Curb Type	Curb	Curb
Landscape Type	Trees at 30' o.c. Avg.	Trees at 30' o.c. Avg.
Transportation Provision	SH, TR	BL, TR

Figure 8b:
Downtown Master Plan Draft Street Cross Sections

The Plan also addresses transit, but it was written before San Marcos was designated an "Urbanized Area", which will phase out the city's dependence on Capital Area Rural Transit Service (CARTS) for the transit service. Additionally, the 2008 Plan cites forthcoming commuter rail service (i.e., LoneStar rail) that has not yet come to fruition. Nevertheless, the plan's call for a robust, multi-modal transit hub is consistent with the vision set forth in the Comprehensive Plan.

As planning principles, the Downtown Master Plan emphasizes the importance of street design for both quality of life and economic development:

> "Prescribe sustainable infrastructure projects that minimize and shade paved surfaces, resolve stormwater problems, balance vehicular and pedestrian needs, and prioritize parking strategies." (p. 49)

Draft street cross sections for Downtown streets have also been released as part of the Downtown Master Planning process. These still appear to be in draft stages as of May 2014, but do generally reflect more urban interpretations of downtown streets.

The Downtown Design Guidelines, which were revised and adopted in 2012 as an addition to the Downtown Master Plan and accompany the Downtown SmartCode, refine the scale of recommendations throughout Downtown by breaking it into distinct districts for specific design vision and regulation. The guidelines act as implementation tools for the 2008 Downtown Master Plan. The City's SmartCode, which applies to much of the Downtown area, does include typical street sections that support the vision of the Downtown Master Plan, particularly in conjunction with the Downtown Streetscape Project.

<u>Conflicts and Inconsistencies with the Comprehensive Plan</u>

The Downtown Plan, with its emphasis on enhancing the pedestrian environment, is largely consistent with the planning goals and principles set forth in the Comprehensive Plan, and as such would not require significant amendments. One potential flaw in the design strategy described through the draft Downtown Street Cross Sections is the allocation of pedestrian space. Many of the street sections allocate 6-8 ft. of sidewalk space for a pedestrian walkway, street trees, and possibly ingress and egress for buildings lining the street. This is not enough space for an urban street. Best practices for sidewalk design include at least 12 ft. of space between the

curb and street-facing buildings for adequate walking and planting areas. The Context Sensitive Design Manual (described below) recommends a streetside width of 19 to 21 feet, depending on the context (See Figure 10).

Notably absent in this collection are cross sections for LBJ St. and Guadalupe St., both of which are currently wide, one-way thoroughfares through Downtown. These are key automobile thoroughfares and important Downtown connections for pedestrians and bicyclists. Both the Guadalupe and LBJ corridors have already received special consideration and City Council has approved their conversion to two-way traffic.

5. San Marcos Five-Year Transit Plan (2014)

In March 2012, the results of the U.S. Census designated San Marcos as an urbanized area, making it eligible for federal and state funds for public transportation. Since the 1980s the Capital Area Rural Transportation System (CARTS) has been providing general public paratransit service, and since 1996 fixed-route bus service along several routes. In 2013, CARTS contracted with consultants Nelson Nygaard to develop a Five-Year Strategic Plan for Transit Development. Guided by technical staff and a Steering Committee, six goals were established for the study:

- Conduct a comprehensive evaluation of the entire transit system
- Understand the needs of existing and potential customers
- Develop recommendations to optimize bus service
- Provide a framework for sustainable system growth
- Ensure alignment with the recently adopted local and regional
- plans; and
- Increase ridership by improving the attractiveness and practicality of transit service.

During the evaluation process, a number of important findings were identified:

- Residential densities have increased in several areas.
- A significant number of bus stops do not have signage and are not accessible.
- Several route segments exhibit low productivity.
- One-way streets near San Marcos Station increase travel time.
- Several routes operate along narrow, residential streets.
- A high percentage of customers must transfer to reach their destination.
- Most trips arrive and depart on-time.

The Strategic Plan organized its recommendations into two categories: system route restructuring, and system service expansion recommendations. System restructuring recommendations include a series of route changes that reallocate service from unproductive corridors to areas with greater transit need and higher ridership potential. The route restructuring recommendations take into consideration planned growth defined by the Comprehensive Plan,

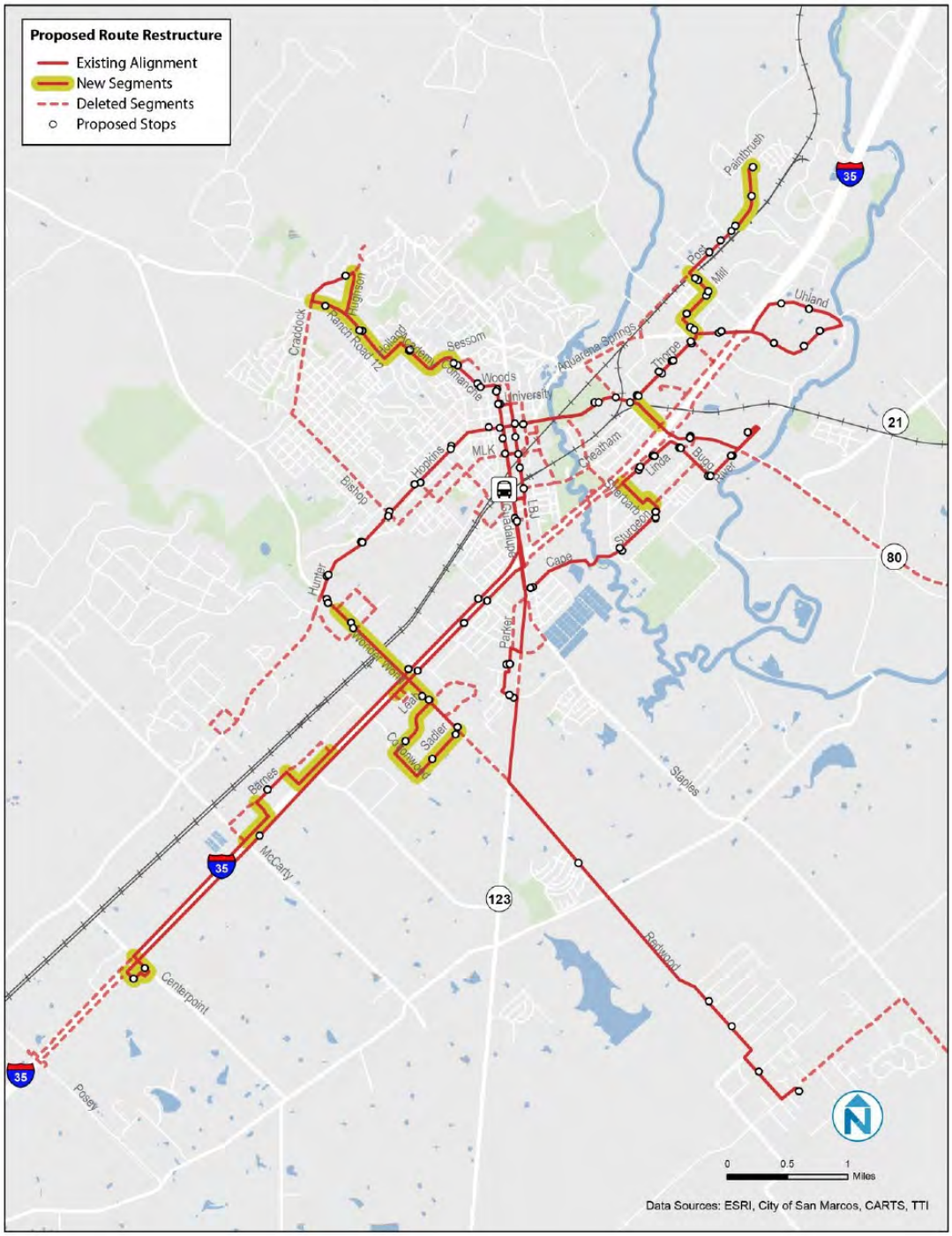


Figure 9a:
Transit Plan Summary of Recommended Routes

and also seek to reduce inefficiencies that have developed over time due to changes in development, traffic, and infrastructure. System expansion recommendations require additional funding to increase the number of service hours and number of vehicles. Expansion recommendations are intended to build upon restructuring recommendations.

Recommended Route	Route Serves San Marcos Station	Frequency	Total Annual Hours	Description
1 – Hopkins/Wonder World	No	30	5,500	Connects Medical Center to Walmart via Hopkins
2 – Post Road	Yes	60	1,375	Serves Post Road neighborhood and H-E-B
3 – Uhland Road	Yes	60	1,375	Serves Uhland Road loop and H-E-B
4 – Linda/Conway	Yes	30	2,750	Serves Walmart via Conway Drive and Linda Drive
5 – Outlets/University	Yes	60	2,750	Serves outlet malls, Texas State campus and Craddock Avenue
6 – Guadalupe/Redwood	Yes	6 trips / day	750	Service to Redwood via Guadalupe Street and Parker Drive
Total Annual Hours			14,500	

Figure 9b:
Transit Plan Summary of Recommended Routes

Category	Phase	Service Changes	Total Annual Hours
System Restructure	Phase 1	Cost neutral route restructure	15,000
Service Expansion	Phase 2	Extend service from 7am-6pm to 7am-8pm	17,500
	Phase 3	Add Saturday service to arterial routes	19,750
	Phase 4	Upgrade Outlets/University route frequency to 30 minutes	23,000
	Phase 5	Increase service on rural and senior routes Extend service from 7am-8pm to 6am-9pm Consider new routes	25,000

Figure 9c:
Transit Plan Summary of Recommended Routes

Route Restructuring Recommendations

The Plan makes the following recommendations, which present a costneutral route restructuring to lay the foundation for growth as additional funds become available. Key features of the recommended system are:

- 30 minute service on major corridors and to major destinations
- New crosstown route to reduce travel time and transfers
- New transfer opportunities away from San Marcos Station
- Simplified downtown routing
- Improve route directness
- Improved efficiency and cost-effectiveness
- High probability of increased ridership

Figure 9d:
Transit Plan Recommended Immediate Improvements

The Plan evaluated the performance of the existing eleven bus routes, and recommended their consolidation into six new routes. Each of the six recommended routes is described on the attached map and chart.

Service Expansion Recommendations

The Plan's recommendations for service expansion are based on community feedback for increased service and market analysis findings. Expansion recommendations are divided into four phases as follows:

Bus Stop Improvements

CARTS and the City of San Marcos are also cooperatively embarking on a multi-year effort to improve bus stops throughout the system. Currently, 75% of bus stops lack basic signage. Operators are instructed to pick up customers waiting along the route, thereby creating safety hazards and unnecessarily impeding traffic at times. Beginning in the summer of 2014, CARTS and the City of San Marcos will begin installing new signage at all bus stops in the system. Furthermore, CARTS and the City of San Marcos are committed to improving accessibility at stops and increasing the number of benches and shelters, based on bus stop guidelines described in the Plan. Immediate and high priority bus stop improvements are described on the attached map.

6. Downtown Parking Initiative (2012)

The Downtown Parking Initiative was developed to better address the management of limited on-street parking and the lack of convenient longer-term parking options for Downtown customers and employees. The document established four basic principles:

1. On-street parking should be dedicated to downtown visitors and customers,
2. Employees and Downtown residents should not park in on-street spaces during normal business hours,
3. On-street spaces should be managed with time limits and meters, and enforced; and
4. The goal in managing on-street parking is to provide convenient parking for the greatest number of potential parkers, while applying time limits that reasonably accommodate the needs of customers and visitors.

The Plan makes several recommendations:

- On-street meters or pay stations should be deployed on downtown streets to promote short-term convenient parking and to discourage abuse of the two-hour limit.
- Zoning revisions should be considered to allow "fee-in-lieu" parking instead of (or in addition to) on-site parking.
- Shared parking standards should be expanded, and all non-residential parking ratios should be the same to allow for easy changes of use, without triggering non-conforming status, and
- Joint arrangements with private sector businesses, institutions and the university should be pursued to expand the supply of off-street parking for Downtown customers and employees.

Seven action items are set forth in the plan:

1. Create a Parking Benefit District with its own board;
2. Recruit a Parking Program Coordinator to manage the district;
3. Develop an initial business and funding plan for the district;
4. Invest in on-street parking infrastructure including meters and parking stations;
5. Develop mid-to long-term surface parking resources that can ultimately be converted to parking garages;
6. Support New Downtown Development that can increase the supply of public parking; and
7. Develop an overall parking program branding marketing and communications strategy

<u>Conflicts and Inconsistencies with the Comprehensive Plan</u>

The recommendations of the Downtown Parking Initiative are consistent with the policies of the Comprehensive Plan, in that both are supporting the creation of a pedestrian-friendly Downtown that promotes a "park-once" district, optimizing the efficiency of scarce parking resources.

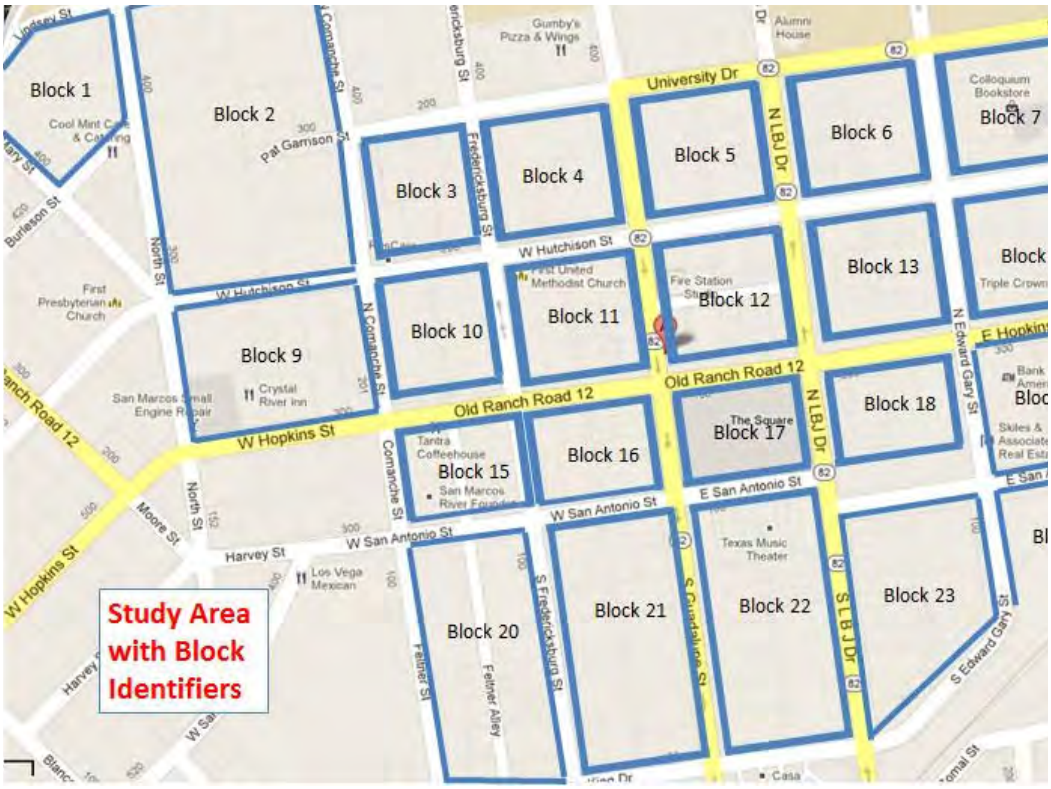


Figure 10:
Downtown Parking Initiative Study Area

7. Hays County Parks, Open Space and Natural Areas Master Plan (2012)

The Parks, Open Space and Natural Areas Master Plan was written in 2012 with the intention of consciously preserving the natural areas of Hays County as development advances and population grows. Overarching goals of the Plan are gleaned from citizen feedback and priorities.

According to the conclusions in the Master Plan, the top five priority improvement areas for the San MarcosPlanning Area are 1) Camping, 2) Multi-Use Trails, 3) River and Creek Access, 4) Community Gardens, and 5) Festivals and Special Events Spaces. Citizen feedback also indicates the need for increased trail access. This idea is corroborated by feedback from public meetings, surveys and discussions in 2011. Public input indicates a desire for multi-use trails and connections between parks, and multi-use trails are also listed as a Project Priority in the master plan. New trails are intended offer hiking and biking opportunities, designed as part of both city-developed systems for local connectivity and part of the larger system for regional connectivity.

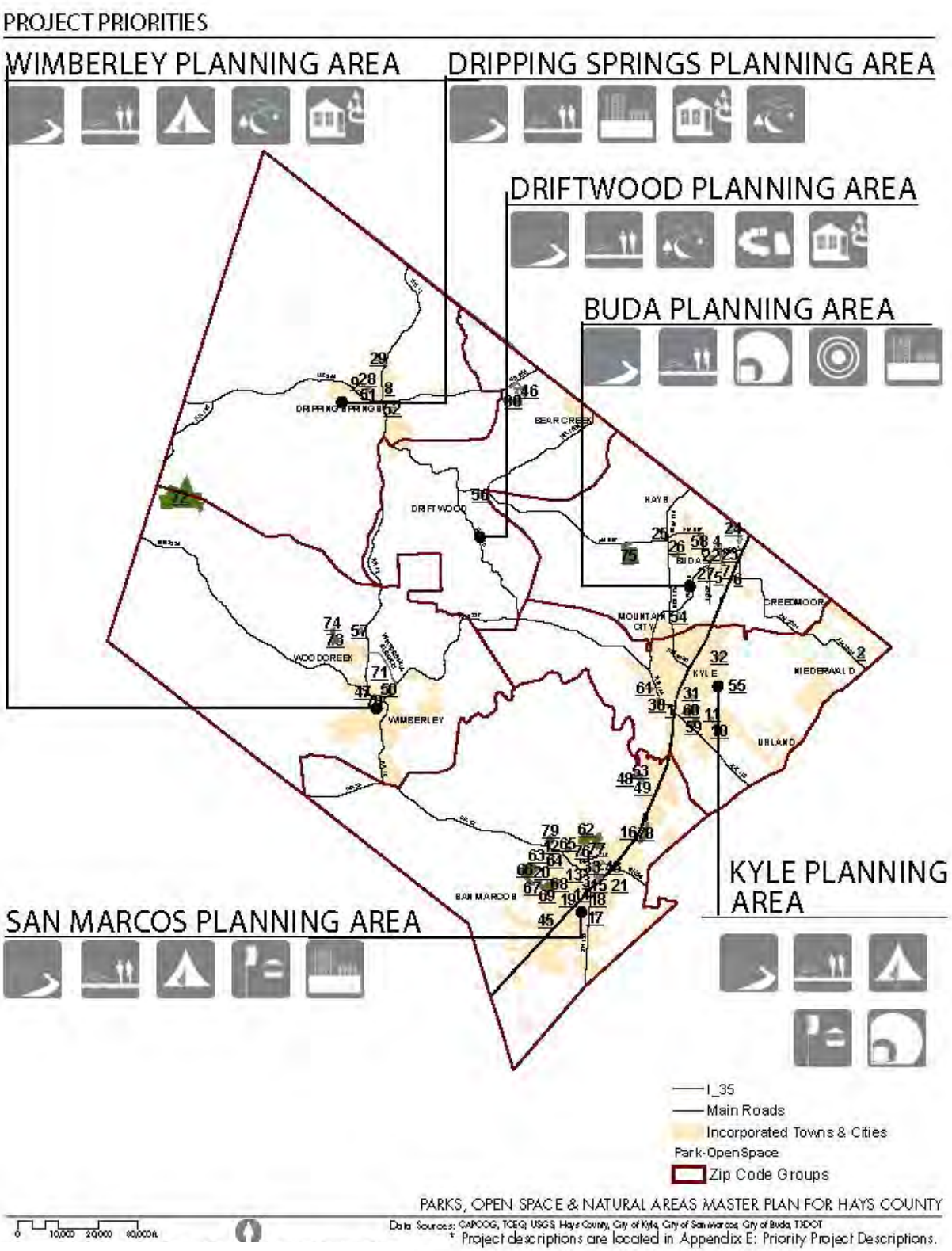


Figure 11:
Hays County Parks and Open Space Priorities

8. Texas State University Campus Master Plan 2006-2015 (Update 2012-2017)

The Master Plan for the Texas State University campus was developed in 2005 and then updated in 2011. The goal of the Plan was to create "a logical framework for growth." A series of mobility principles of the Master Plan were established:

- Manage University transportation and movement of people to further the mission of the campus and contribute to the educational, intellectual and physical development of the students, faculty and staff;
- Recognize that the University is a member of the regional community, and consider its impact on its neighbors and their access to the campus;
- Provide a campus that is conveniently and safety accessible by foot, bicycle, automobile and bus;
- Provide a safe and reasonable flow of traffic with preferred vehicular routes clearly identified;
- Provide parking, conveniently located or served by bus;

Figure 12:
Texas State University Campus New Construction Plan 2012-2017

- Continue to create an environment that is accommodating for persons with disabilities; and
- Eliminate the difficulties guests and first-time visitors experience when entering the campus, finding parking and navigating the campus.

The Plan calls for a more rational separation of motorized and pedestrian traffic to encourage a campus where walking and biking is the preference over driving. It proposes the systematic removal of surface parking lots to create a comprehensive network of green open spaces and new building footprints. Surface lots are replaced with strategically sited parking garages to free up space for new buildings and open spaces. Students and faculty are encouraged to park once and walk or bike during their time on campus. It calls for Downtown streets and sidewalks to penetrate the campus in a "seamless pedestrian experience". Minimizing conflicts between different modes of transportation and creating a more comfortable and welcoming path are high priorities of the plan. Covered walkways are proposed throughout the campus to provide continuous protection to the pedestrian.

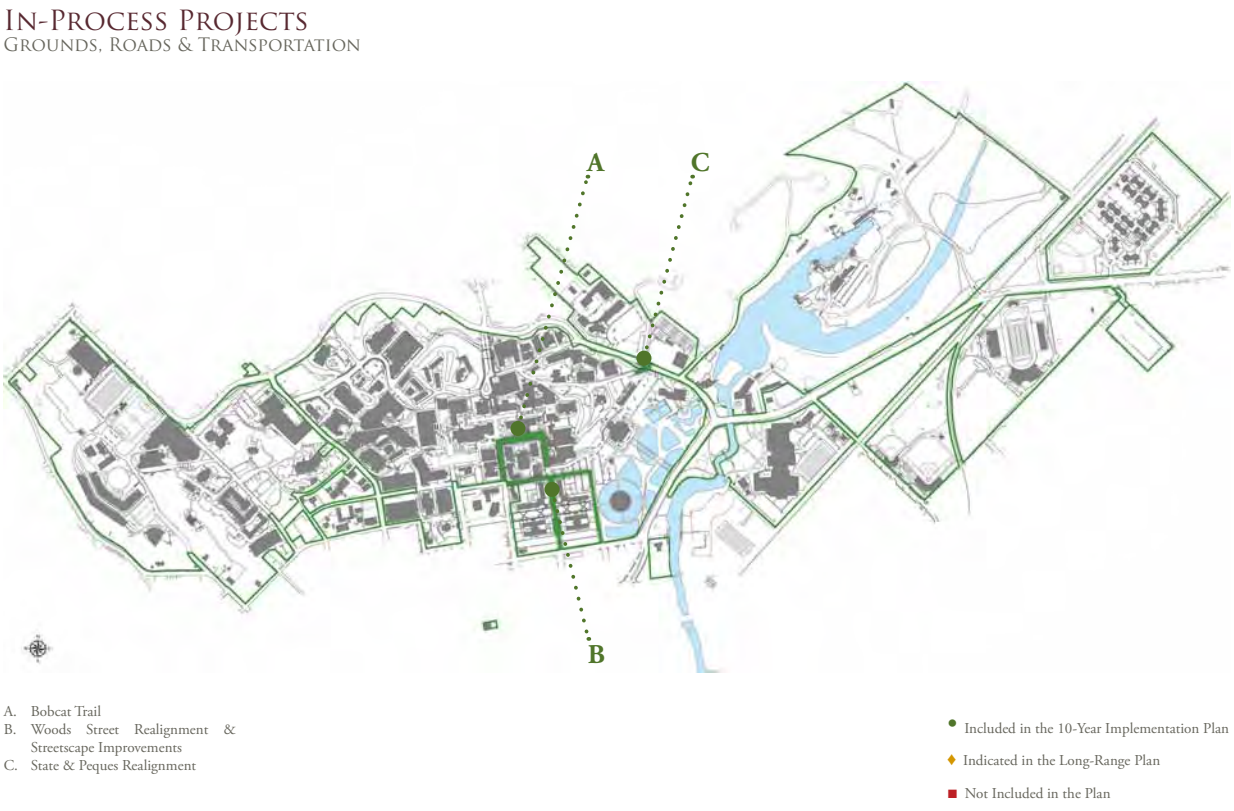


Figure 13:
In-Process Projects - Grounds, Roads, & Transportation

The Five-Year Plan outlines a series of transportation improvements (some of which have now been implemented):

- 1,674 garage spaces have been added in the Speck and Matthews Street Garages, replacing 822 surface parking spaces;
- Concho Green has been created out of a former surface lot;
- Bobcat Trail will be converted from a congested parking lot into a shaded walkway (The Bobcat Trail redevelopment project described in the Plan is a pedestrian walkway from McCoy Hall to the Academic Support Building. However, the project was on hold at the time of printing (2011) due to funding and scheduling issues. As of March 2016, the project is about 75% complete.);
- Construction of a second bus terminal is proposed on Woods Street between LBJ and Guadalupe Streets;
- Clarify circulation patterns at high-traffic pedestrian and vehicular junctions. Study North LBJ Bus Loop and Pleasant Street Garage;
- Consider a satellite commuter lot to address IH-35 commuting;
- Reconsider location of parking garages in the Long Term Plan (Plan identifies several new locations;
- Continue to work with the City of San Marcos on the design of the Aquarena Springs Drive overpass;
- Improve pedestrian activity and safety with raised crosswalks, flashing crosswalk signage, ADA compliance, etc., and
- Enhance east-west connections with pedestrian-only walking signal at the intersections of Aquarena Springs Drive, W. Sessom Drive and University Drive.

Because many students commute from the northeast of campus, the Plan determines that creating a variety of transportation connections is vital. This includes bike lanes and sidewalks along Aquarena Springs Drive, which would allow students to reach the campus core from the east side. The City and TxDOT also planned to designate a new overpass at the rail crossing on Aquarena Springs Drive and a dedicated bike path within the right-of-way. The University has proposed two campus bike paths to meet demand for bicycle mobility:

1. Bobcat Village through Aquarena Center
2. East Stadium Commuter Lot, behind Jowers, through Sewell Park to University Drive

Figure 14:
TSU Campus Master Plan Proposed Bike Paths

Conflicts and Inconsistencies with the Comprehensive Plan

The transportation and urban design recommendations of the Texas State University Campus Master Plan are consistent with the Comprehensive Plan's policies for the creation of a more balanced system of transportation facilities, with an emphasis on walking and biking. The replacement of surface parking lots with strategically located garages on the campus will contribute to a more walkable and attractive central city, consistent with the vision for Downtown and the surrounding neighborhoods.

9. ITE Context Sensitive Design Manual (2010)

In collaboration with the Congress for New Urbanism (CNU), the Institute of Transportation Engineers (ITE) adopted recommended practices for the design of walkable thoroughfares. Entitled Designing Walkable Thoroughfares: A Context Sensitive Approach, the document focuses on best practices for the design of arterial and collector roadways in urban environments, "where development intensity, the mix of land uses, and design features combine to make walking, transit and biking efficient and attractive transportation choices". The manual promotes multimodal transportation systems that serve all users and are conducive to community environments, enhancing both livability and sustainability.

Whereas conventional thoroughfare design had frequently been driven by traffic demand and level-of-service objectives, this ITE manual strives to balance goals of travel time and speed with issues of neighborhood design, livability and safety, and with other transportation objectives related to freight deliveries, emergency response, local business access and transit operations. The manual emphasizes a collaborative and multidisciplinary approach to thoroughfare design, beginning with long-range transportation and land use planning processes and continuing throughout the entire project development process.

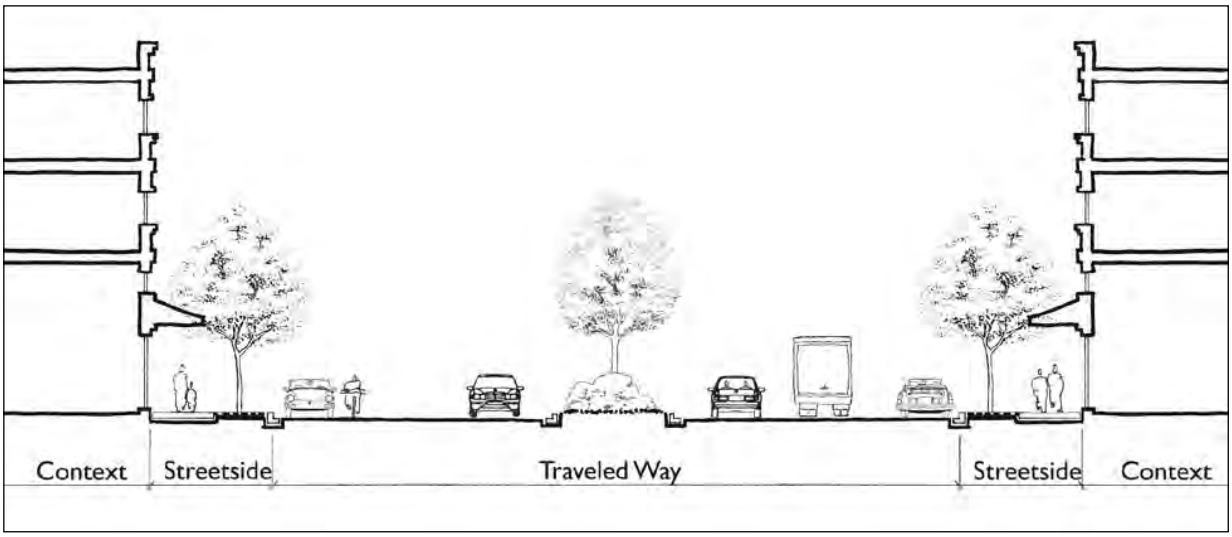


Figure 5.1 Components of an urban thoroughfare. Source: Community, Design + Architecture.

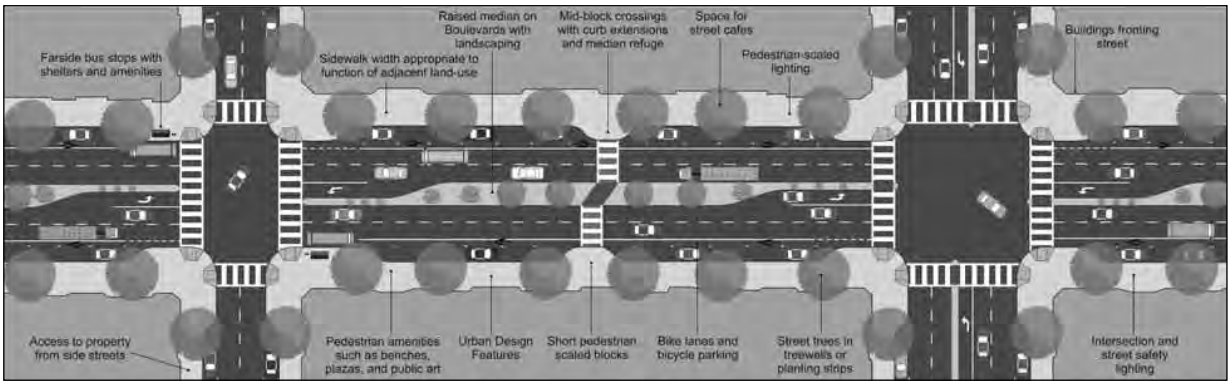


Figure 5.2 An illustration of the elements of a context sensitive thoroughfare. Source: Concept by Community, Design + Architecture, illustration by Digital Media Productions.

Figure 15:
ITE Context Sensitive Design Manual Thoroughfare Elements

Context Zones

The Context Sensitive approach applies four distinct context zones to the design of thoroughfares, ranging from "walkable suburban" to "urban downtowns". Similar to the "transects" of a Smart Code, each of these zones is characterized by the mix and type of land uses; the way buildings, circulation and parking are placed on a site and their relationship with the street; and the form and orientation of buildings that help shape the feel and space of the street. As part of the planning process, the manual calls for the thoroughfare designer to:

- Consider existing and future conditions;
- Assess area plans and policies, zoning and community goals;
- Consider dividing the area into multiple context zones;
- Identify current and future levels of pedestrian, bike and transit activity; and
- Consider characteristics of the neighborhood beyond the thoroughfare.

Thoroughfare Types

Three types of multi-modal thoroughfares are identified:

- *Boulevards* (35 mph or greater) are divided arterial thoroughfares that serve multimodal movement, a mix of regional and local traffic and transit routes. They are typically four lanes or more, serve longer trips, and combine higher capacity and higher speed vehicular movement with pedestrian-oriented edges. They could include one-way access lanes on either side to create a "multi-way boulevard".
- *Avenues* (30 to 35 mph) are generally shorter in length than boulevards; they are primary pedestrian and bike routes, may serve local transit, and often provide curbside parking. They do not exceed four lanes, and could include a raised landscaped median.
- *Streets* (25 mph) are generally two lanes serving local traffic and access to abutting properties.

Before selecting a thoroughfare type, the manual calls for the designer to consider the:

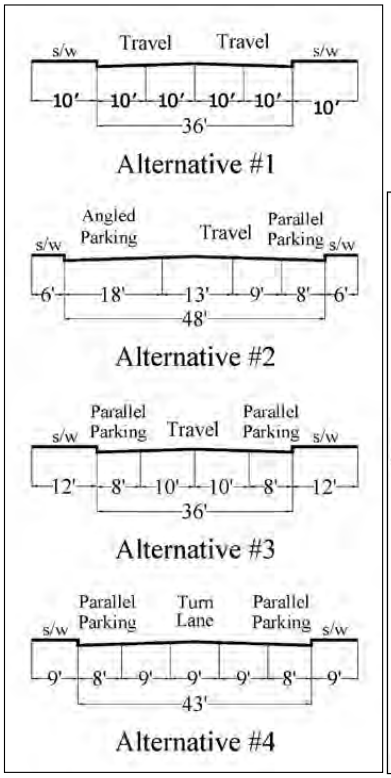
- continuity or length of the roadway;
- the purpose or length of trip;
- the level of access to the adjacent land use and the level of access management;

- the type of freight service;
- the need for emergency response; and
- the types of transit operating on the street.

Design Criteria

Where conventional thoroughfare design is based on a design vehicle (i.e., typically the largest vehicle that can use the facility e.g., a tractor trailer truck), the context sensitive design approach takes an analytical approach that includes traffic engineering, safety, land use, livability and sustainability impacts. Rather than designing the thoroughfare for the largest vehicle that occasionally uses the facility, the context sensitive approach designs for the largest design vehicle that will use the facility with considerable frequency and recommends consideration of two types of vehicles:

- A design vehicle that must be regularly accommodated without encroachment into the opposing lanes or the street side area; and
- The control vehicle that infrequently uses the facility and must be accommodated, allowing for encroachment into opposing lanes, the street side area, and/or for multiple turns.



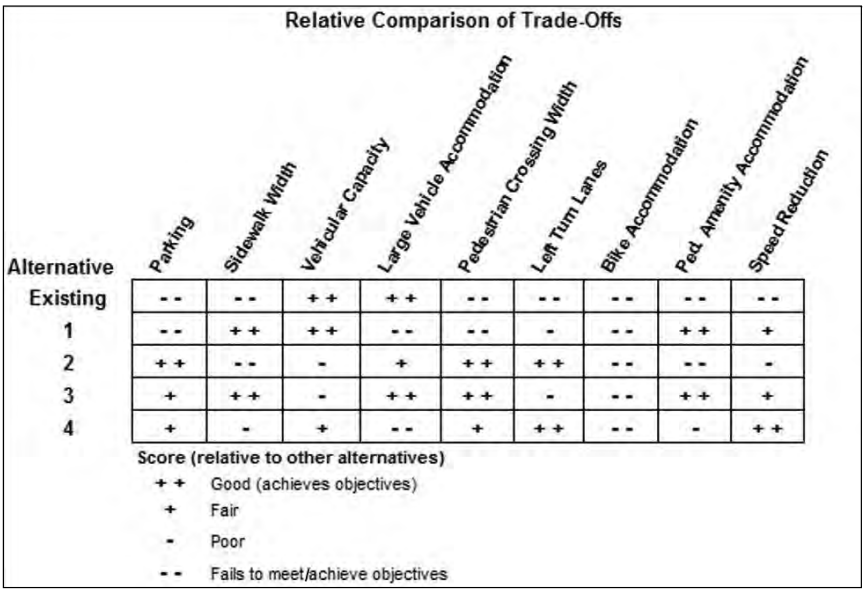


Figure 16:
ITE Context Sensitive Design Manual Cross Section Examples

Design speeds for major thoroughfares are recommended to be maintained at 25-35mph to improve the user's perception of the street and to better allow for the types of maneuvers associated with constrained, multimodal urban places. In order to control speeds and to provide more pedestrian-friendly crossings, the manual calls for lane widths and the overall street width to be minimized. Travel lanes of 10 to 11 feet are recommended for most thoroughfares and in all context zones, recognizing that larger lane widths may be needed for major bus routes.

Streetside areas (i.e., the area back of curb that includes the sidewalk, planting and street furniture) are recommended to be between 19.5 and 21.5 feet in width, depending on the context zone. This includes: an 18 inch edge or curb and gutter zone; a six to seven foot furnishing or landscape zone; a nine to 10 foot clear "throughway" sidewalk, and an additional three feet of setback area.

The manual lays out specific design criteria for each type of thoroughfare within each of the Context Zones, and provides specific context sensitive design recommendations for residential neighborhoods and downtown districts.

Capacity and Level of Service

Context-sensitive design considers traffic projections and LOS, but balances the need for all users, emphasizing in some cases one mode over another, depending on the context and circumstances. For example in a dense downtown district, pedestrian circulation and safety may take priority over vehicular movement. Rather than focusing on the capacity of the individual thoroughfare, context sensitive solutions emphasize network capacity. The manual also points out that "LOS and capacity are only two of many factors that should be considered in the design of roadways….In urban areas, traffic capacity may be subjugated to economic development or historic preservation."

Conflicts and Inconsistencies with the Comprehensive Plan

The City of San Marcos Comprehensive Plan's emphasis on multi-modal solutions and the need for a more comprehensive and integrated transportation network is consistent with the context-sensitive planning and design principles set forth in the ITE manual. However, as discussed above, the City's Transportation Master Plan (2004), and the corresponding

Transportation Design Manual will need to be updated to incorporate the ITE's design principles and best practices for context sensitive and walkable multi-modal thoroughfares.

10. Agreements with TxDOT

A key barrier to change in San Marcos' streetscapes is TxDOT jurisdiction over various thoroughfares, including in Downtown. Without direct City control of design and development, TxDOT roadways may provide a lack of flexibility when redesigning or retrofitting streets to comply with the latest vision in the Comprehensive Plan. Additionally, TxDOT requirements may not be harmonized with those of the Downtown Master Plan or the SmartCode, causing potential gaps in a comprehensive design and traffic strategy. The following sections cover the agreements that the City of San Marcos has entered into with TxDOT regarding roads within the city limits and how they may influence municipal planning efforts.

Municipal Maintenance Agreement, 1978 between TxDOT and the City of San Marcos provides for State participation in the maintenance of all controlled access highways (i.e., IH-35) and certain non-controlled highways.

- The agreement gives TxDOT the right to establish traffic regulations including speed limits subject to traffic and engineering surveys;
- It allows street lighting to be installed by the City provided the City pay all capital, maintenance and operating costs;
- It defines the authority and responsibility of both parties for maintenance of highway routes through the City;
- It requires the City to prevent any encroachments into the right of-way of highway routes;
- It gives TxDOT the right to review and permit installation of all traffic control devices;
- It confirms that the City will assure that all driveways adjoining state facilities are in compliance with TxDOT regulations; and
- It requires the City to perform biennial inspections of all bridges and bridge- classified culverts and submit the inspection and inventory data to the State.

Non-Controlled Highways

The agreement lists the non-controlled State highways within the City limits, including: SH 123, Loop 82, RM 12, FM 621, FM 2439, SH 80, and Loop 82.

The State's responsibilities for these roadways are to:

- Maintain the pavement base including shoulders, curbs and gutters;
- Install normal highway markings for directing traffic;
- Assist the City in sweeping and leaning pavement, mowing and cleaning of litter, and in maintaining ditches; and
- Assist in snow and ice control.

The City's responsibilities are to:

- Prohibit angle parking, except upon approval by the State subject to traffic and engineering surveys;
- Install and maintain all parking restriction signs, school safety devices, pedestrian crosswalks, parking strips and special guide signs subject to State approval;
- Installation, repair, removal or adjustment of publicly or privately-owned utilities or services, in accordance with TxDOT standards and subject to State approval;

Controlled Highways

The agreement covers IH-35 within the San Marcos city limits.

The State's responsibilities are to:

- Maintain the traveled surface of the through lanes, ramps and frontage roads;
- Mow and clean litter along the highway;
- Sweep the through lanes, ramps and frontage roads;
- Remove snow and ice;
- Erect and maintain all normal markings and signs; and
- Maintain drainage facilities within the right-of-way.

The City's responsibilities are to:

- Restrict parking on frontage roads to parallel parking on one side only;
- When considered desirable by both the City and State, pass and enforce an ordinance providing for one-way traffic on the frontage road;
- Secure approval from the State for any utility installation, repair, removal or adjustment within or across the right-of-way; and
- Pass ordinances to enforce controlled access to the freeway.

IH-35 Highway Illumination Agreement, 1990 between TxDOT and the City of San Marcos provides for the State to contribute financial aid in the construction, maintenance and operation of a highway illumination system along IH-35.

The State's responsibilities under this agreement are to prepare or provide for the plans and specifications, bidding and construction of the lighting system, subject to the City's consent. The State assumes maintenance of the concrete traffic barrier and the anchor bolts, nuts, washers and conduits associated with the lighting system.

The City is responsible for providing the electrical energy for proper operation, and for maintaining and operating the system in an efficient and "sightly" condition, providing all equipment and labor at no cost to the State.

Agreement for Use of State Highway Right-of-Way for Parades, 2002 between TxDOT and the City of San Marcos states that prior to any special event or parade within the State's right-of-way, this agreement requires the City to submit a written request to TxDOT, accompanied by a traffic control plan, insurance certification and a right-of-way use agreement.

11. San Marcos Land Development Code

The current version of the Land Development Code is already under consideration for major revision, but some elements, particularly in the zoning districts and standards section of the Code, are of particular relevance to future transportation planning.

For the areas that are not covered by the form-based Downtown SmartCode, the remainder of the Land Development Code regulates development standards and, with that, some transportation standards, including block lengths, curb cuts, building setbacks, and lot sizes.

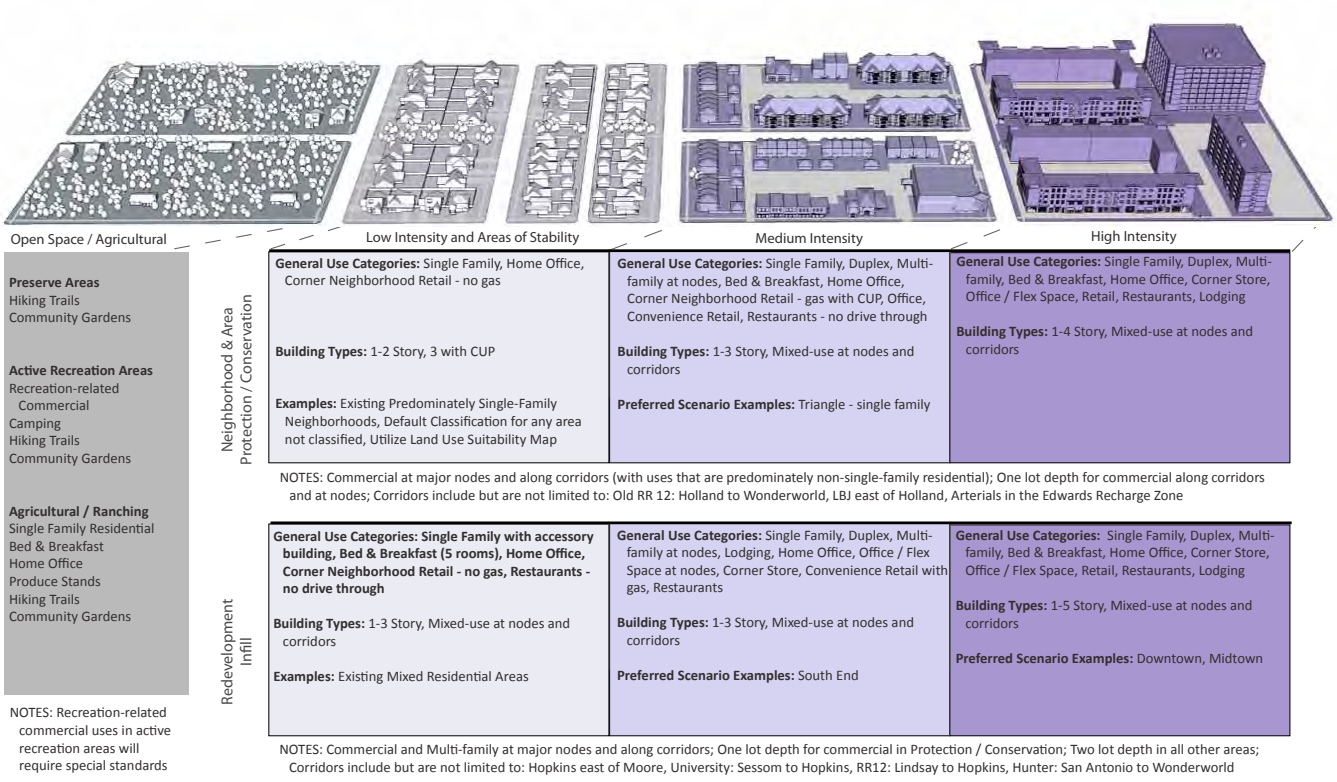


Figure 17:
Comprehensive Plan Land Use Intensity Matrix

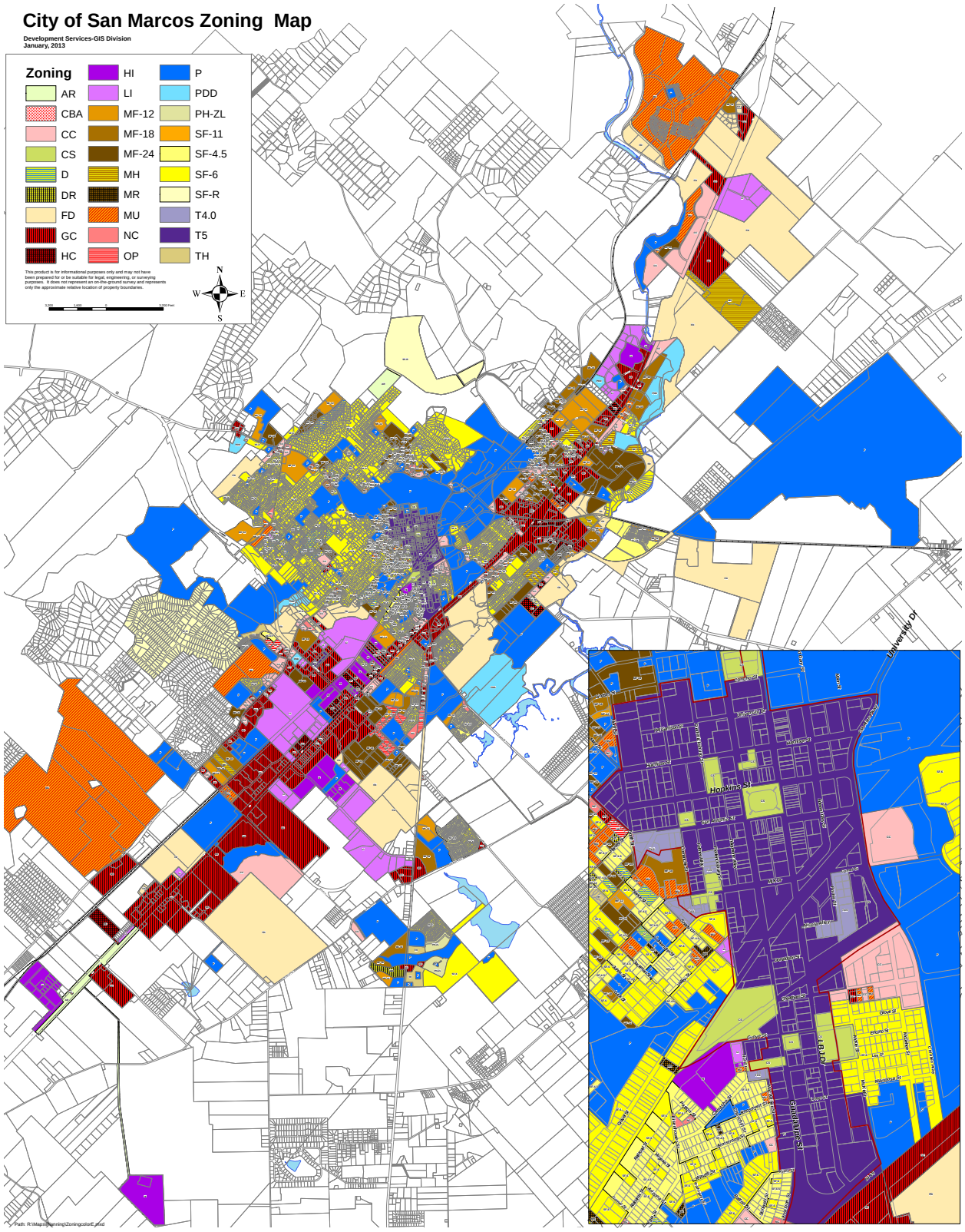


Figure 18:
San Marcos Current Zoning Map

The following chapters of the Code are the most germane to transportation issues:

- Chapter 4 – Zoning Regulations
- Chapter 6 – Development Standards
- Chapter 7 – Public Facilities Standards

Conflicts and Inconsistencies with the Comprehensive Plan

While San Marcos has implemented a SmartCode of form-based zoning standards for much of the downtown area, much of the City is covered by traditional use-based zoning regulations. While this type of regulatory framework can serve an important role, it can also be a limiting factor if not applied carefully. The language of the Comprehensive Plan is very direct in its critique of traditional zoning regulations: "Zoning is conservative in nature and has a bias toward maintaining the status quo." (p. 83)

It goes on to explain that zoning should not be viewed as the goal, but rather one tool in a suite of many to implement the vision of the Comprehensive Plan. Consequently, zoning policies outside of the Downtown SmartCode area should be carefully considered with respect to their effects on transportation.

The zoning map does not currently reflect the preferred scenario outlined in the Comprehensive Plan. This has major implications for transportation planning, particularly when considering connections between important identified activity centers. With different land uses and intensities projected and planned for the future, context-sensitive multimodal transportation connections are of paramount importance. The Land Use Matrix (Sec. 4.3.1.2) should be reviewed in conjunction with the zoning map to ensure that transit-supportive densities can be achieved along targeted corridors.

Other current zoning, subdivision and development standards that may require review to act in concert with the Comprehensive Plan vision for future transportation may include:

- Minimum block lengths of 600 ft. (Maximum of 1,200-1,600ft.) (Sec. 6.7.1.1 and 7.4.1.4): This policy discourages a more compact pattern of streets and blocks.
- "Discouragement of Traffic Through Residential Streets" (Sec. 7.4.1.4): This policy may prevent some logical street network planning.
- Minimum curb cut widths for a variety of development types (Sec. 7.4.2.5 – Table 7-1): Minimum widths, including 15ft. for Townhomes and 25ft. for "Banks, Service Stations, and Convenience Stores with

Fuel Pumps" seem excessive, as curb cuts should be minimized to prevent vehicular crossing of sidewalks and the interruption of curbside planting. When required, maximum curb cut widths should be incorporated into the code.

- Dimensional and Development Standards (Sec. 4.1.6.1): Minimum Setbacks should be reviewed and in some cases reduced– most are more than 20 ft., which may compromise the goal of creating active street frontages. Smaller setbacks, or even "build-to lines" can promote a more pedestrian friendly environment by creating a more human scale "street wall" and the perception of more accessible destinations.
- Minimum lot frontages should be reviewed to allow for small-lot, transit-supportive development.
- Smaller lots may provide for "missing middle" housing types that provide greater housing diversity and density that is more supportive of transit.
- Maximum building heights should be reviewed and in some cases increased to achieve greater residential and commercial densities.

Further recommendations for amendments to the Land Development Code will be developed in a future paper as part of the Transportation Master Plan process when task 7 is completed.

SUMMARY OF RECOMMENDATIONS

The Comprehensive Plan outlines the need to update policies to ensure that the current vision of the plan is implemented. To that end, this report has identified inconsistencies between the Comprehensive Plan's vision of a multi-modal transportation system and current transportation policies and standards in key City policy documents. The following provides a summary of the recommendations for each of these policy documents:

1. San Marcos Transportation Master Plan (2004)

- Develop a full set of street sections that provide for the accommodation of pedestrian and bicycle facilities within each functional classification, applying best practices including the criteria set forth in the Institute of Transportation Engineer's Context Sensitive Design Manual;
- Update the Thoroughfare Map to support the Comprehensive Plan's Preferred Scenario with its defined Activity Centers.

- Re-evaluate some of the recommended roadway alignments of the 2004 Plan, based on the prioritization of environmental protection in the Comprehensive Plan and the observation that a number of the proposed alignments (particularly those west of IH-35) pose "serious threats" to the environment,

2. The San Marcos Transportation Design Manual (2004)

- Functional Classification should be revised and terminology should move away from strictly use-based determinations, i.e. "Residential Street" or "Commercial/Multifamily Collector". Roadway typologies and the specific context should be considered in the design, not simply projected trip counts based on typical uses.
- The spacing of cross streets for arterials should be reviewed and potentially revised downward. The current 1,000 ft. spacing recommendation could be detrimental to neighborhood connectivity goals.
- Minimum lane widths should be reviewed and potentially revised downward. The recommended 12 ft. lane widths on arterials could be revised to 10 ft. or 11 ft., depending on the specific context. Less space devoted to car travel could make valuable right-of-way available for pedestrian and bicycle facilities recommended by the Comprehensive Plan.
- The gutter pan could be included as part of the functioning roadway (e.g., as part of the 8-foot parking lane).
- On local residential streets where traffic volumes are minimal, the standards should allow for "queuing" streets with roadway widths of 28 feet and parking on both sides.
- Street standards should provide for street trees in a zone of 6 to 7 feet along the curb edge, providing a green edge to the street and a clear separation between the sidewalk and the road.
- The "alternative" standards without curbs and gutters should provide for a separated sidewalk, perhaps with rain gardens that provide drainage and water quality functions.
- Protected bike lanes should be considered along streets with greater traffic volumes.
- Uninterrupted pavement widths greater than 40 feet (i.e., without a median or a bulb-out) should be avoided as much as possible, as they create difficult and unsafe pedestrian crossing conditions.

3. City of San Marcos Parks, Recreation & Open Space Master Plan (2004)

- The recommendations and policies of the Parks, Recreation & Open Space Master Plan are consistent with the policies of the Comprehensive Plan.

4. The San Marcos Downtown Master Plan (2008)

- Revise the draft street cross sections to increase sidewalk widths to a minimum of 12 feet between the curb face and building frontages to provide for adequate walking and planting areas.
- Develop cross sections for LBJ St. and Guadalupe St. in response to the City Council's approved its conversion to two-way traffic.

5. The San Marcos Five-Year Transit Plan (2014)

- The principles of strengthening local transit service are generally consistent with the policies of the Comprehensive Plan, especially considering the gradual phasing out of CARTS service dependency for San Marcos.

6. Downtown Parking Initiative (2012)

- The recommendations and policies of the Downtown Parking Initiative are consistent with the policies of the Comprehensive Plan.

7. Hays County Parks, Open Space & Natural Areas Master Plan (2012)

- The recommendations and policies of the Parks, Open Space & Natural Areas Master Plan are consistent with the policies of the Comprehensive Plan.

8. Texas State University Campus Master Plan 2006-2015 (Update 2012-2017)

- The recommendations and policies of the Texas State University Campus Master Plan are consistent with the policies of the Comprehensive Plan.

9. ITE Context Sensitive Design Manual (2010)

- The design criteria and best practices set forth in the Context Sensitive Design Manual are consistent with the policies of the Comprehensive Plan.

10. Agreements with TxDOT

- The details of these agreements must be considered when performing long-range planning exercises for streets within the San Marcos city limits.

11. San Marcos Land Development Code

- Zoning policies outside of the Downtown SmartCode area should be carefully considered with respect to their effects on transportation.
- The zoning map should be updated to support the preferred scenario outlined in the Comprehensive Plan.
- Context-sensitive multimodal transportation connections between Activity Centers should be developed.
- Review the Land Use Matrix (Sec. 4.3.1.2) to ensure that transit-supportive densities can be achieved along targeted corridors.
- Review the policy for minimum block lengths of 600 ft. (Maximum of 1,200-1,600ft.) (Sec. 6.7.1.1 and 7.4.1.4), which discourages a more compact pattern of streets and blocks.
- Review policies related to "Discouragement of Traffic Through Residential Streets" (Sec. 7.4.1.4), as they may prevent some logical street network planning.
- Review minimum curb cut widths for a variety of development types (Sec. 7.4.2.5 – Table 7-1) to minimize vehicular crossing of sidewalks and the interruption of curbside planting. Consider adding maximum curb cut widths into the code.
- Minimum Setbacks should be reviewed and in some cases reduced – most are more than 20 ft., and "build-to lines" should be considered to promote a more pedestrian friendly environment with a clearly defined "street wall". (Sec. 4.1.6.1).
- Minimum lot frontages should be reviewed to allow for small-lot, transit-supportive development. Smaller lots may provide for "missing middle" housing types that provide greater housing diversity and density that is more supportive of transit.
- Maximum building heights should be reviewed and in some cases increased to achieve greater residential and commercial densities.
- Further recommendations for amendments to the Land Development Code will be developed in a future paper as part of the Transportation Master Plan process when task 7 is completed.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SAN MARCOS

Appendix A: Existing Conditions

Summary of Data Collection and Projections Memo

CITY OF SAN MARCOS TRANSPORTATION MASTER PLAN UPDATE

SUMMARY OF DATA COLLECTION AND PROJECTIONS

Prepared by HDR Engineering, Inc.

May 16, 2015

CITY OF SAN MARCOS TRANSPORTATION MASTER PLAN UPDATE
SUMMARY OF DATA COLLECTION AND PROJECTIONS

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INTRODUCTION

A systematic work program was designed to develop an effective and successful City of San Marcos Transportation Master Plan (TMP) Update. This technical memorandum summarizes the results of the Data Collection and Projections Task. This report provides a summary of the methodologies for collection and projection of technical data pertaining to existing conditions in the City of San Marcos.

ROADWAY

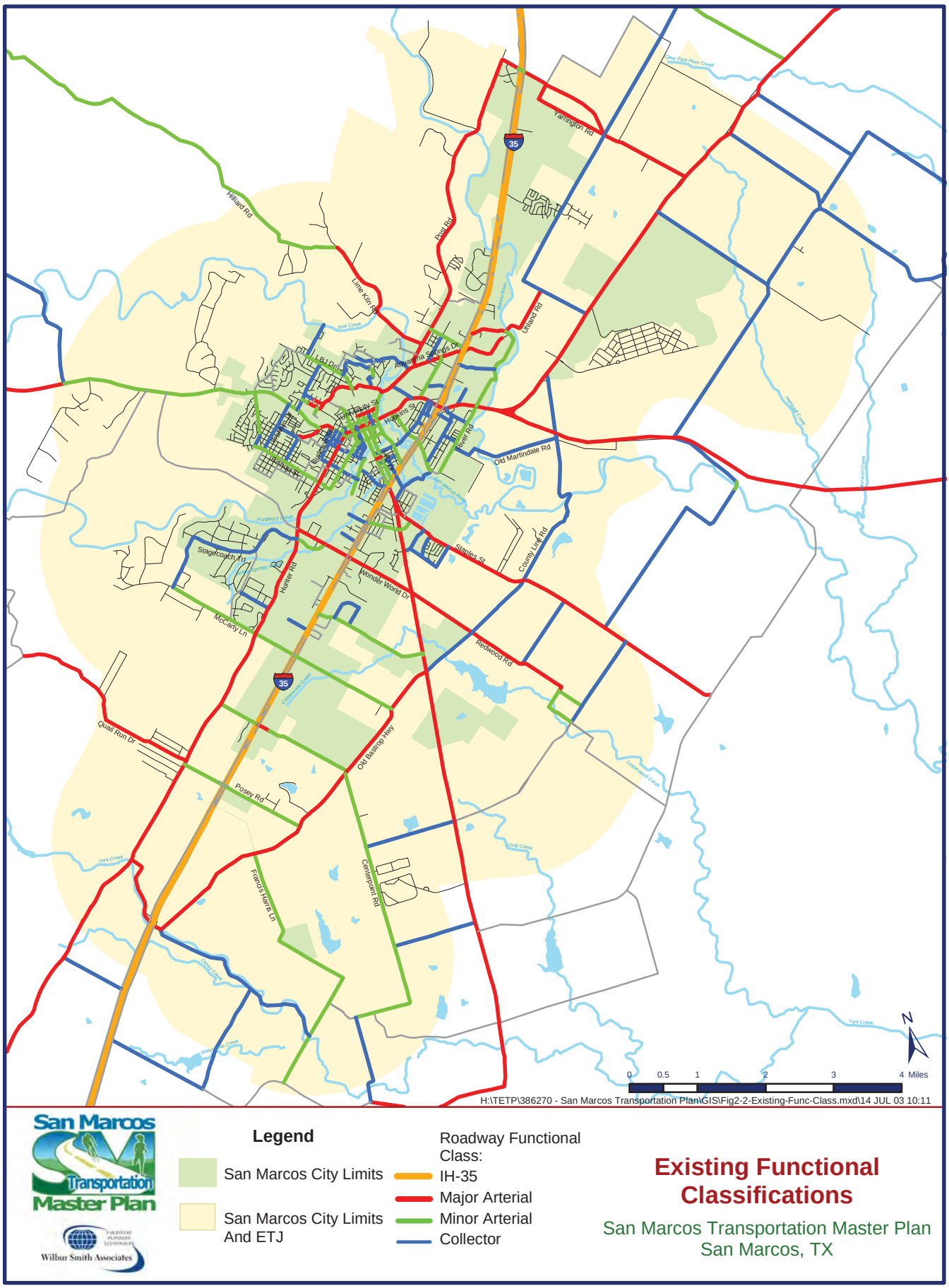
Roadway Classifications

The City of San Marcos aims to support and enhance quality of life for residents, businesses, and visitors through its transportation network. **Map 1** shows the Existing Functional Classifications of San Marcos roadways as per the 2004 Transportation Master Plan (TMP). Functional classifications of transportation facilities are designed to describe the hierarchical arrangement and interaction between various roadways. These classifications may change over time, as the function of a roadway changes to serve different land uses or other transportation facilities. As an area becomes more developed, roads that have previously been classified in one category may be reclassified to a higher category. This map categorizes existing roadways by considering adjacent land uses, property access along the roadway, and the type of vehicles the roadway is meant to accommodate. The City of San Marcos' current functional classification system classifies the City's roadway network into the categories defined in **Table 1**. The functional classes established on this map include freeways, major arterials, minor arterials, and collectors.

Table 1:
Existing Functional Classifications

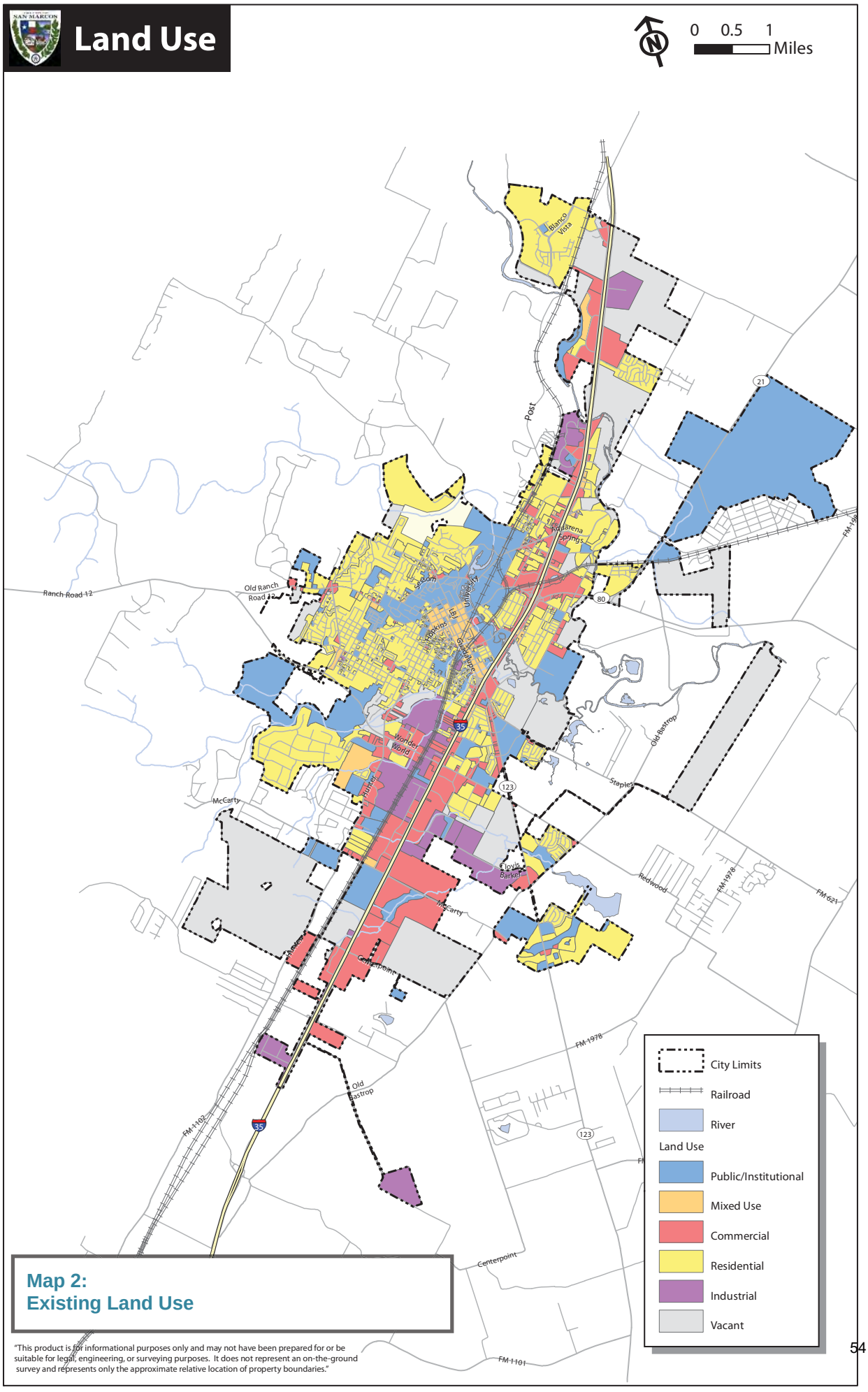
Freeways/Expressways	These facilities include interstate highways, freeways, expressways, and loops and provide for the rapid and efficient movement of large volumes of traffic between regions and across the urban area. Direct access to abutting property is not an intended function of these facilities. Design characteristics support the function of traffic movement by providing multiple travel lanes, a high degree of access control, and few or no at-grade intersections.
Parkways	Parkways are designed to provide for high-speed traffic movement, with minimal property access. This category provides a classification that combines higher speed travel (greater than 45 mph) and high volume movement of a freeway with limited property access, such as an arterial provides.
Arterial Streets	Arterials primarily provide for traffic movement, with a secondary function being the provision of direct access to abutting property. Major arterials typically serve as connections between major traffic generators and land use concentrations, and facilitate large volumes of through traffic traveling across the community. Minor arterials typically serve as connections between local/collector streets and major arterials, and facilitate the movement of large traffic volumes over shorter distances within the community. Because direct access to abutting property is a secondary function of arterial streets, access should be carefully managed to avoid adverse impacts on the movement intended for these facilities.
Collector Streets	Collector streets provide for a balance of the traffic movement and property access functions. Traffic movement is often internal to local areas and connects residential neighborhoods, parks, churches, etc., with the arterial street system. As compared to arterial streets, collector streets accommodate smaller traffic volumes over shorter distances.
Local Streets	Local streets function to provide access to abutting property and to collect and distribute traffic between parcels of land and collector or arterial streets.

Map 2 shows the City's current land use map and **Map 3** shows an inventory of travel lanes for the City's roadway network.



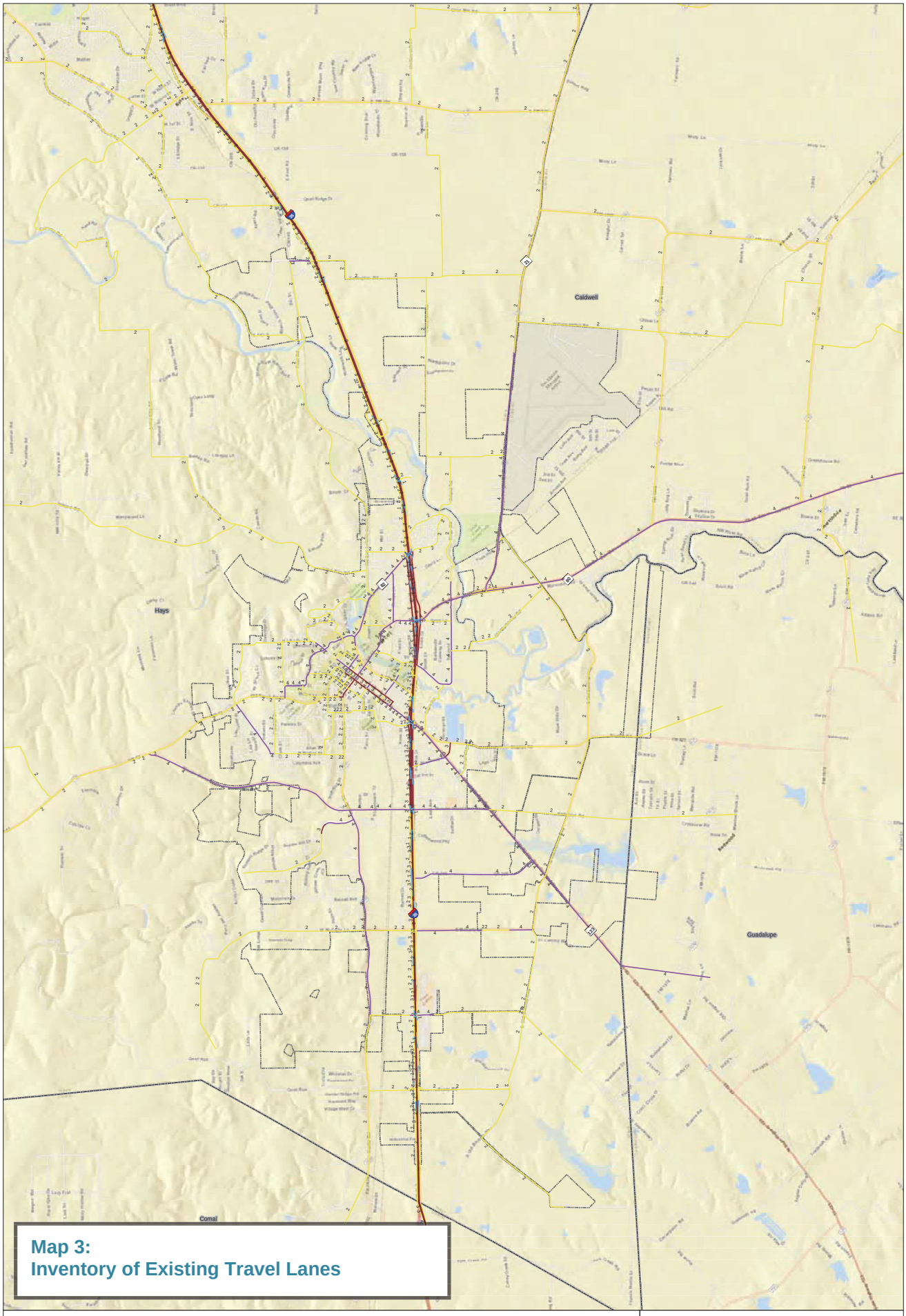
Map 1: 2004 Transportation Master Plan Functional Classifications

Land Use



Map 2:
Existing Land Use

"This product is for informational purposes only and may not have been prepared for or be suitable for legal, engineering, or surveying purposes. It does not represent an on-the-ground survey and represents only the approximate relative location of property boundaries."



Map 3:
Inventory of Existing Travel Lanes

Legend

Lanes 2010
- 1
- 2
- 3
- 4
- 5
- 6
- 8

San Marcos City Limits

County Boundary

0 1 2 4 Miles

San Marcos RPM

Year 2010

Model Lanes

Major Roadways

IH 35 is the only interstate that services San Marcos and adjacent communities. A six-lane controlled access facility, IH 35 spans the southeastern portion of Hays County and provides access to major cities such as Austin to the north and San Antonio to the south. IH 35 is accessed by grade separated interchanges and has frontage roads on both sides.

A series of state highways maintained by the Texas Department of Transportation (TxDOT), classified as "major arterials" in **Map 1**, act as connectors to San Marcos's minor arterials, collectors, and local streets. These state highways include SH 80, SH 123, SH 21, Loop 82, and RR 12. SH 80 serves the east side of San Marcos providing connections to RR 12, Hopkins Street, and downtown San Marcos to the west of IH 35. SH 123, a 4-lane facility, originates in Seguin to the south and terminates at IH 35. It becomes Guadalupe Street (Loop 82) west of IH 35 as it approaches downtown San Marcos. SH 21 begins at SH 80 on the east side of San Marcos and runs northeast toward Bastrop County. Loop 82, also known as Aquarena Springs, begins at IH 35 and runs through San Marcos where it intersects with IH 35 again as Guadalupe Street. RR 12 connects the City of Wimberly through San Marcos to IH 35. State maintained roadways pose a challenge to the City of San Marcos as they have no jurisdiction over them. In order to provide pedestrian, bicycle and transit accommodations along these state facilities to fulfill the Comprehensive Plan vision, it is critical to maintain close coordination with TxDOT. The City should have a long range vision for taking over maintenance of these corridors to help facilitate the activity centers and convert these high speed facilities to complete streets.

Traffic Signals

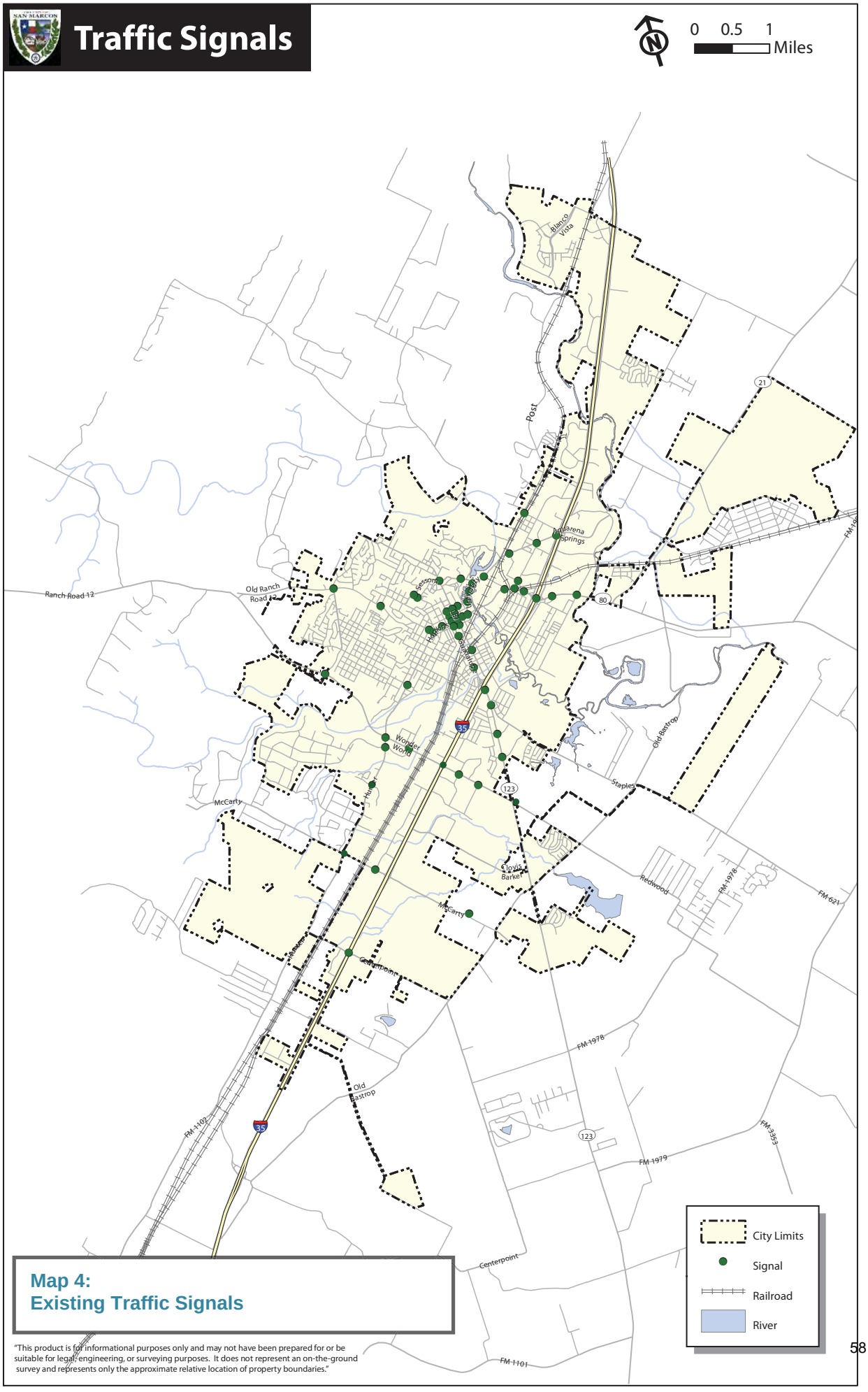
Map 4 provides the locations of the City's 51 traffic signals. Approximately 25 percent of these traffic signals are located within the downtown area. These signals are maintained by the City and TxDOT. A majority of the traffic signals communicate wirelessly with the City's Traffic Management Center. The traffic signals generally operate with video detection systems and emergency vehicle preemption. Signal timing for the signalized intersections was provided by the City of San Marcos and TxDOT.

Existing Conditions Intersection Analysis

An assessment of existing traffic conditions helps identify current issues such as safety, roadway deficiencies, and motorized and non-motorized mobility in San Marcos. The analysis of existing traffic operations required the collection of data on the major roadways and intersections. The City of San Marcos Staff provided guidance in selecting 26 signalized and unsignalized intersections where turning movement counts (TMCs) were collected during AM and PM peak periods in January of 2015. **Map 5** depicts these collected turning volumes. 24-hour bi-directional tube counts were also collected along the

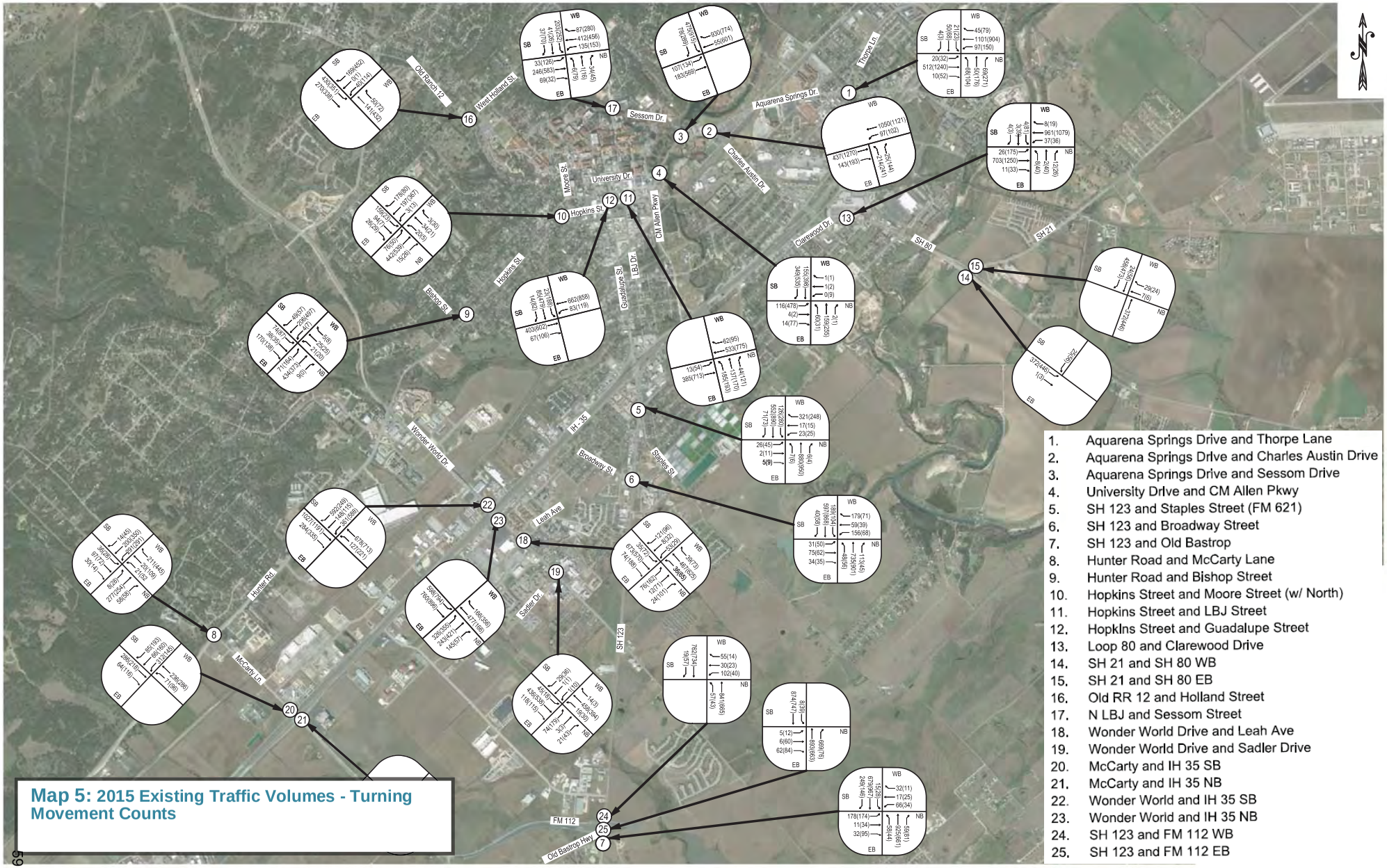
City's major roadways identifying daily traffic volumes at various city locations. This information, shown in **Map 6**, is supplemented with TxDOT historical counts for comparison. These counts are utilized in assessing existing traffic conditions in the Transportation Master Plan. The City of San Marcos routinely collects traffic counts and these counts are shown in **Map 7**.

Traffic Signals

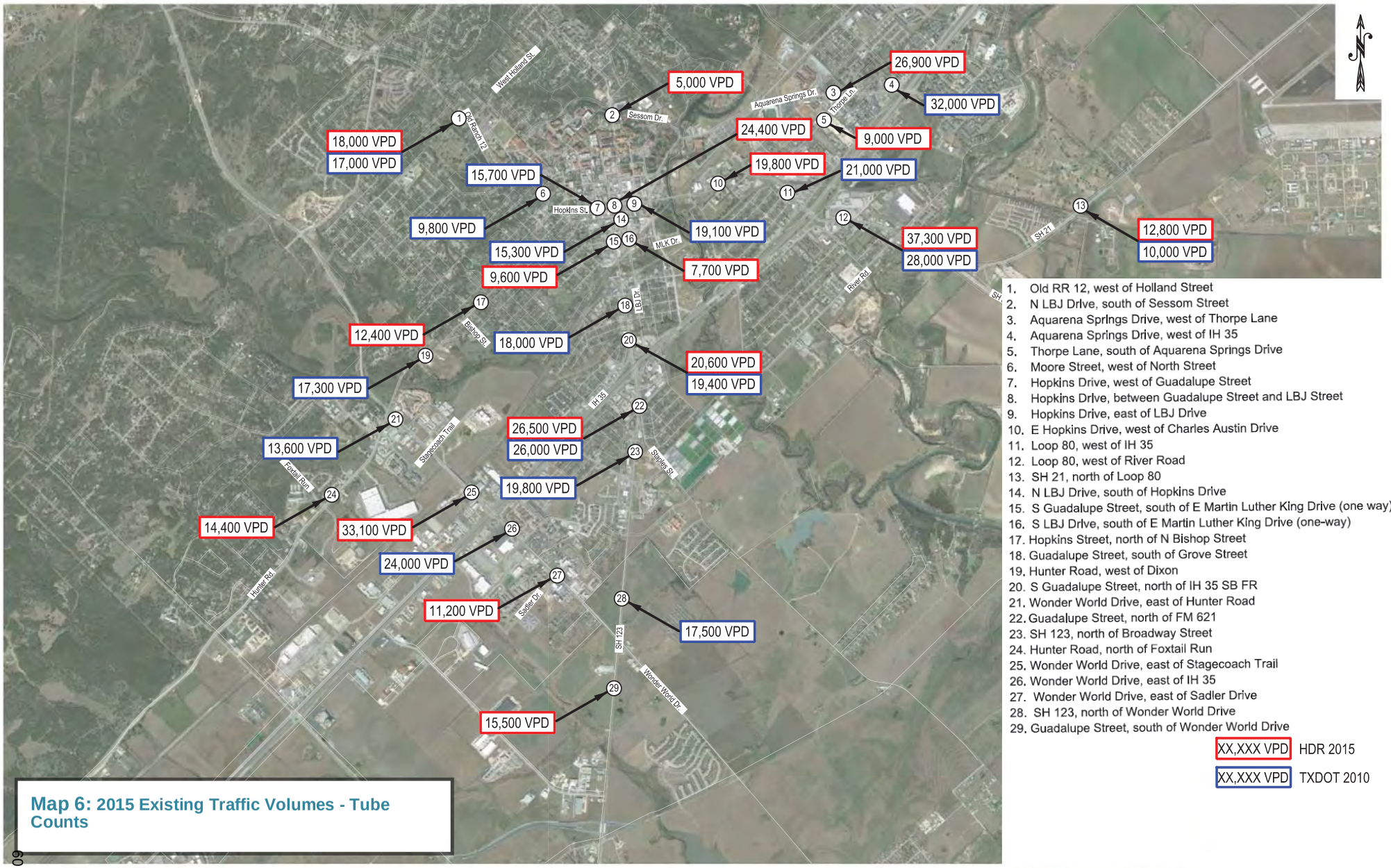


Map 4:
Existing Traffic Signals

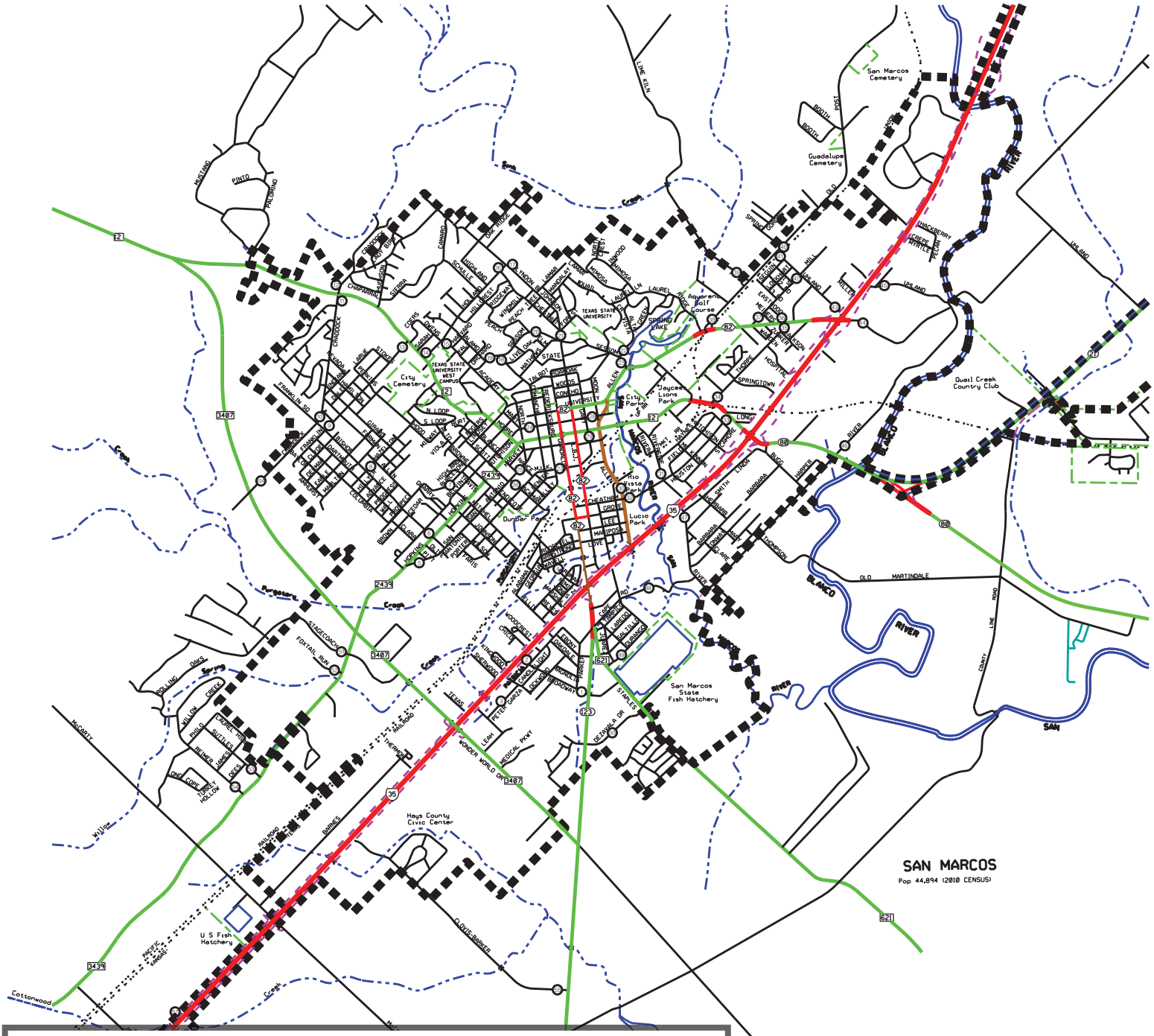
"This product is for informational purposes only and may not have been prepared for or be suitable for legal, engineering, or surveying purposes. It does not represent an on-the-ground survey and represents only the approximate relative location of property boundaries."



Map 5: 2015 Existing Traffic Volumes - Turning Movement Counts



Map 6: 2015 Existing Traffic Volumes - Tube Counts



Map 7:

Existing Traffic Volumes - City of San Marcos
2013 Traffic Map

Prepared by:

THE CITY OF SAN MARCOS

2013 TRAFFIC MAP

INDEX

NO.	STREET	LOCATION	COUNTS
1	BROADWAY	SH 123	2700
2	BROADWAY	IH 35	1500
3	PETER GARZA	DEL SOL	1900
4	PAYTON	BISHOP	2500
5	S. SAN ANTONIO	HOPKINS	1900
6	BISHOP	HOPKINS	5100
7	BURLESON	TRAVIS	600
8	HAZELTON	BISHOP	1000
9	FRANKLIN	BISHOP	1200
10	S. CRADDOCK AVE	BISHOP	1800
10A	S. CRADDOCK AVE	WONDERWORLD	8400
11	S. CRADDOCK AVE	RR 12	6300
12	N. CRADDOCK AVE	RR 12	4200
13	FRANKLIN	RR 12	2400
14	HOLLAND	RR 12	9500
15	AGADEMY	HOLLAND	7800
16	HOLLAND	N. L.B.J.	1600
17	N. L.B.J.	HOLLAND	3500
18	COMANCHE	SESSOMS	9600
19	SESSOMS	COMANCHE	12200
20	SESSOMS	N. L.B.J.	12800
21	N. L.B.J.	SESSOMS	11200
22	SO J.L. GREEN	SESSOMS	550
23	SESSOMS	LP 82	21100
24	HUTCHISON	NORTH	5500
25	S. SAN ANTONIO	NANCE	1900
26	JACKMAN	W.L.K.	600
27	W.L.K.	GUADALUPE	2200
28	HUTCHISON	EDWARD GARY	3300
29	EDWARD GARY	HOPKINS	(2012) 3400
30	CM ALLEN	CHEATHAM	4000
31	RIVERSIDE	CHEATHAM	1200
32	CHEATHAM	CM ALLEN	2600
33	CHEATHAM	HOPKINS	2300
34	THORPE	HOPKINS	9300
35	THORPE	AQUARENA SPRINGS	7000
36	EASTWOOD	AQUARENA SPRINGS	5500
37	WILL	AQUARENA SPRINGS	5700
38	POST RD	AQUARENA SPRINGS	9700
39	LIME KILN	POST RD	7400
40	POST RD	UHLAND	4800
41	UHLAND	POST RD	6700
42	WILL	UHLAND	2000
43	UHLAND	IH 35 *SB*	2500
44	AQUARENA SPRINGS	IH 35 *NB*	10800
45	UHLAND	IH 35 *NB*	4400
46	RIVER ROAD	SH 80	5000
47	RIVER ROAD	IH 35 *NB*	3300
48	CAPE RD	SAN MARCOS RIVER	1000
49	DURANGO	JUAREZ	1000
50	PEZUVALA	SH 123	1600
51	STAGECOACH	WONDERWORLD	5000
52	FOXTAIL RUN	HUNTER RD	1100
53	BUTTLES	JAMES	700
54	REIMER	JAMES	1300
55	GLOVIS-BARKER	SH 123	2000
56	OLD BASTROP RD	SH 123	4400
57	SBFR IH 35	CENTERPOINT	17900
58	NBFR IH 35	CENTERPOINT	19500
59	CENTERPOINT	IH 35 *SB*	8600
60	CENTERPOINT	IH 35 *NB*	9500

N

NOTES:
THESE TRAFFIC VOLUMES REPRESENT 24-HOUR, NON-ADJUSTED WEEKDAY COUNTS EXCEPT FOR COUNT 57, 58, 59 AND 60. COUNTS 57, 58, 59 AND 60 REPRESENT 24-HOUR THANKSGIVING HOLIDAY VOLUMES FOR FRIDAY, 11/29/13.

NOTICE
This map has been prepared for internal use within the City of San Marcos. Accuracy is limited to the validity of available data as of dates shown.

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DRAWN BY: CG DATE: 09/16/13
CHECKED BY: CG DATE: 09/16/13
REVISED BY: CG DATE: 12/03/13

P:\ENGSRVCS\TRAFFIC\TRAFFIC FILES\TRAFFIC COUNT MAPS\2012\C2012.DGN

Analysis Methodology

The standard measure of effectiveness (MOE) used to evaluate traffic conditions at intersections is level of service (LOS), which is a qualitative measure of the effect of a number of factors such as speed, volume of traffic, geometric features, traffic interruptions, freedom to maneuver, safety, driving comfort, convenience, and operating cost.

Two types of intersections to be evaluated are signalized and unsignalized, which use different criteria for assessment of operating levels. The analysis procedures are described in the following sections.

Signalized Intersection Level of Service

Signalized intersection LOS is defined in terms of delay, which is a direct and/or indirect measure of driver discomfort, frustration, fuel consumption, and lost travel time. The levels of service have been established based on driver acceptability of various delays. The delay for each approach lane group is calculated based on a number of factors including lane geometrics, percentage of trucks, peak hour factor, number of lanes, signal progression, volume, signal green time to total cycle time ratio, roadway grades, parking conditions, and pedestrian flows.

Because delay is a complex measure, its relationship to capacity is also complex. The City of San Marcos generally considers overall intersection levels of service A to D to be acceptable, while an overall LOS of E and F is unacceptable.

Table 2 summarizes the levels of service that are appropriate for different levels of average control delay, and a qualitative description for each. The 2010 Highway Capacity Manual (HCM) uses the criteria of average control delay. Average control delay includes initial deceleration, delay, queue move-up time, stopped delay, and final acceleration delay.

Table 2.
Signalized Intersection:
Level of Service Measurement and Qualitative Descriptions

Level of Service	Control Delay Per Vehicle (sec)	Qualitative Description
A	≤ 10	Good progression and short cycle lengths
B	> 10 and ≤ 20	Good progression or short cycle lengths, more vehicle stops
C	> 20 and ≤ 35	Fair progression and/or longer cycle lengths, some cycle failures
D	> 35 and ≤ 55	Congestion becomes noticeable, high volume to capacity ratio
E	> 55 and ≤ 80	Limit of acceptable delay, poor progression, long cycles, and/or high volume
F	> 80	Unacceptable to drivers, volume greater than capacity

Unsignalized Intersection Level of Service

Unsignalized intersection LOS is defined in terms of average control delay and, in some cases, V/C ratio. Control delay is that portion of total delay attributed to traffic control measures, either traffic signals or stop signs. Control delay includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay.

For two-way stop-controlled intersections, the analysis method assumes that major street through traffic is not affected by minor street flows. Major street left-turning traffic and the traffic on the minor approaches will be affected by opposing movements. Stop or yield signs are used to assign the right-of-way to the major street. This designation forces drivers on the controlled street to select gaps in the major street flow through which to execute crossing or turning maneuvers. Thus, the capacity of the controlled legs is based upon two factors:

- The distribution of gaps in the major street traffic stream.
- Driver judgment in selecting gaps through which to execute their desired maneuvers.

The LOS procedure computes a capacity for each movement based upon the critical time gap required to complete the maneuver and the volume of traffic that is opposing the movement. The average control delay for any particular movement is calculated as a function of the capacity of the approach and the degree of saturation (V/C ratio). The degree of saturation is defined as the volume for a movement, expressed as an hourly flow rate, divided by the capacity of the movement, expressed as an hourly flow rate. With the 2010 HCM methodology, overall intersection LOS is best quantified based on minor street movement average control delay. The 2010 HCM methodology adjusts individual movement delay to account for a degree of saturation (V/C ratio) that is greater than 1.0. Those movements are assigned an LOS of F, regardless of the average control delay. Engineering judgment must be used to determine which minor street movement controls for overall intersection LOS, and whether unacceptable LOS on minor street movements appropriately reflects unacceptable LOS for the overall intersection.

Table 3 shows the relationship between the average control delay and the LOS. The LOS range for unsignalized intersections is different than that for signalized intersections. This difference is due to the fact that drivers expect different levels of performance from different kinds of transportation facilities. Unsignalized intersections carry less traffic volume than signalized intersections and delays at unsignalized intersections are variable. For these reasons, control delay would be less for an unsignalized intersection than for a signalized intersection. The overall approach LOS is computed as a weighted average of the vehicle delay for each movement; therefore, an approach may have an overall LOS C or D and have individual movements which are LOS E or F.

Analysis was performed using the microcomputer program "Synchro 8.0" by Trafficware and TransCAD, which is based on the procedures contained in the Highway Capacity Manual.

Table 3.
Unsignalized Intersection: Level of Service Measurement

Level of Service	Control Delay per Vehicle (sec)
A	< 10
B	> 10 and < 15
C	> 15 and < 25
D	> 25 and < 35
E	> 35 and < 50
F	> 50

Intersection Analysis

Intersections along the major corridors in San Marcos and at interchanges along IH 35 were identified as congested intersections based on the travel demand model. With input from the Technical Committee, several intersections were selected for further corridor analysis. 21 of the 26 selected intersections are currently signalized including:

- Aquarena Springs Drive and Thorpe Lane
- Aquarena Springs Drive and Charles Austin Drive
- Aquarena Springs Drive and Sessom Drive
- University Drive and CM Allen Pkwy
- SH 123 and Staples Street (FM 621)
- SH 123 and Broadway Street
- SH 123 and Old Bastrop
- Hunter Road and McCarty Lane
- Hunter Road and Bishop Street
- Hopkins Street and Moore Street
- Hopkins Street and LBJ Street
- Hopkins Street and Guadalupe Street
- SH 80 and Clarewood Drive
- Old RR 12 and Holland Street
- N LBJ and Sessom Street
- Wonder World Drive and Leah Ave

- Wonder World Drive and Sadler Drive
- McCarty and IH 35 SB
- McCarty and IH 35 NB
- Wonder World and IH 35 SB
- Wonder World and IH 35 NB

The remaining five intersections analyzed are unsignalized intersections including:

- SH 21 and SH 80 WB
- SH 21 and SH 80 EB
- SH 123 and FM 112 WB
- SH 123 and FM 112 EB
- Hopkins Street and North Street

Signal timing for signalized intersections was provided by the City of San Marcos and TxDOT. **Table 4** shows the Existing LOS at all study intersections:

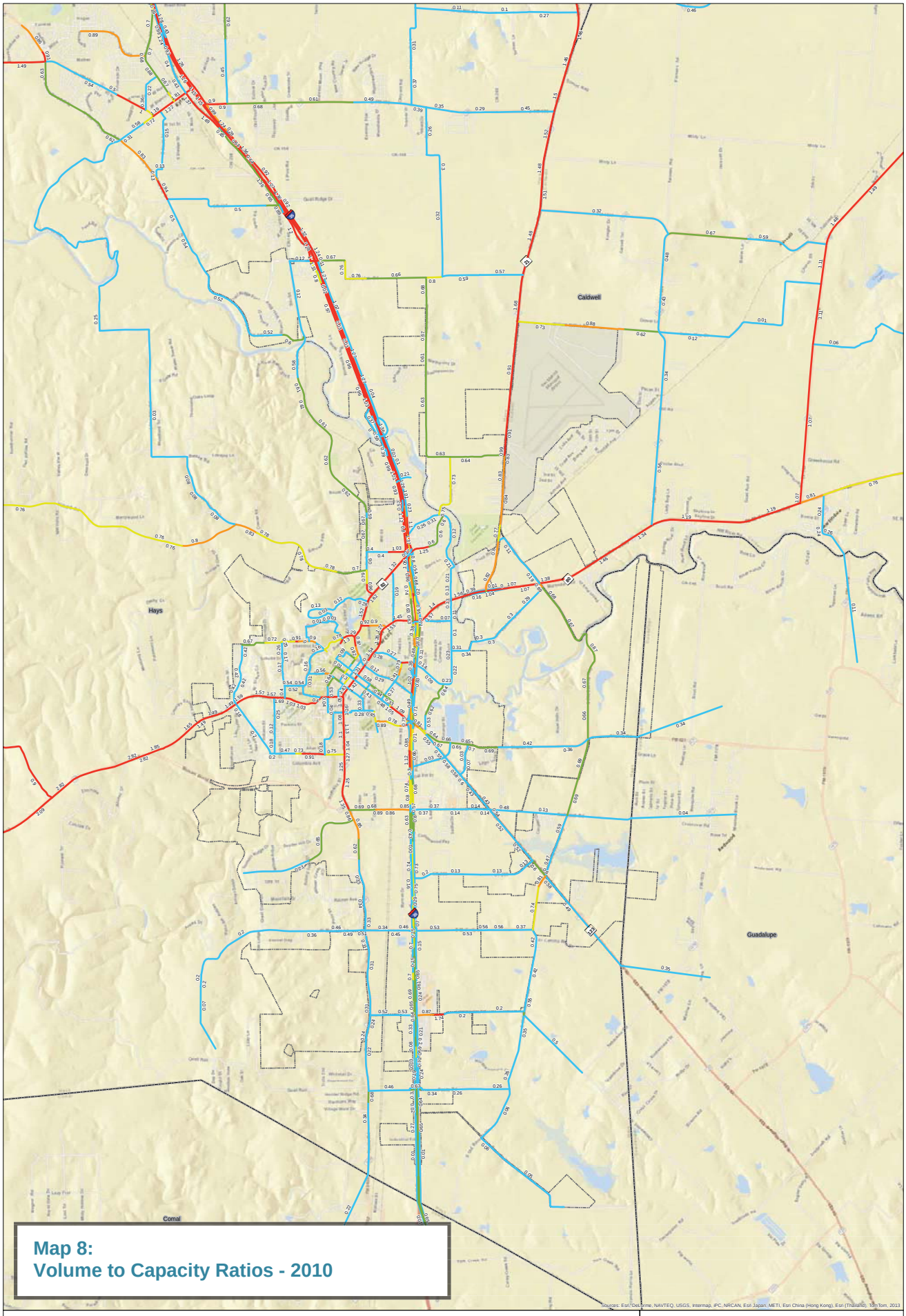
Table 4:
Existing LOS Results

	AM		PM	
	Delay (s/veh)	LOS	Delay (s/veh)	LOS
Aquarena Springs Drive and Thorpe Lane	17.4	B	28.2	C
Aquarena Springs Drive and Charles Austin Drive	35.5	D	20.6	C
Aquarena Springs Drive and Sessom Drive	21.1	C	22.0	C
University Drive and CM Allen Pkwy	9.6	A	18.1	B
SH 123 and Staples Street (FM 621)	21.4	C	19.7	B
SH 123 and Broadway Street	29.2	C	20.1	C
SH 123 and Old Bastrop	62.4	E	19.5	B
Hunter Road and McCarty Lane	16.2	B	14.4	B
Hunter Road and Bishop Street	31.3	C	47.8	D
Hopkins Street and Moore Street	26.1	C	26.2	C
Hopkins Street and LBJ Street	12.7	B	14.0	B
Hopkins Street and Guadalupe Street	14.6	B	44.6	D
Loop 80 and Clarewood Drive	7.0	A	34.5	C
SH 21 and SH 80 WB*	17.6	C	16.6	C
SH 21 and SH 80 EB*				
Old RR 12 and Holland Street	12.4	B	21.6	C
N LBJ and Sessom Street	17.9	B	26.4	C
Wonder World Drive and Leah Ave	22.0	C	21.2	C
Wonder World Drive and Sadler Drive	17.5	B	21.3	C
McCarty and IH 35 SB*	38.1	E	17.0	C
McCarty and IH 35 NB*				
Wonder World and IH 35 SB	47.4	D	74.4	E
Wonder World and IH 35 NB				
SH 123 and FM 110 WB*	33.5	C	3.4	A
SH 123 and FM 110 EB*				
Hopkins Street and North Street*	4.4	A	18.7	C

*Unsignalized Intersection

Existing Conditions Roadway Analysis

Similar to LOS, volume to capacity (V/C) ratio is also an indicator of the level of congestion a roadway or intersection experiences. V/C is a conventional level-of-service measure for roadways in planning projects, comparing roadway demand (vehicle volumes) with roadway supply (carrying capacity). This measure can alert transportation planners to areas where traffic mitigation measures should be considered. Each roadway, based on roadway functionality in the model, is assigned with an estimated capacity in terms of maximum number of vehicles it can carry before experiencing operational failure. In the past, exceeding a V/C ratio of 0.85 was considered a capacity deficiency. Today, a V/C of 1.0 is considered a more appropriate threshold due to a greater awareness of environmental issues, providing for multimodal choices, limited financial resources, and system operations. **Map 8** are link V/C ratios for the 2010 AM Peak generated by the Travel Demand Model, completed as part of the San Marcos Comprehensive Master Plan and updated by HDR.



Map 8:
Volume to Capacity Ratios - 2010

Legend

Level of Service

- LOS A (0.00 to 0.60)
- LOS B (0.61 to 0.70)
- LOS C (0.71 to 0.80)
- LOS D (0.81 to 0.90)
- LOS F (Over 0.90)

County Boundary

0 1 2 4 Miles

San Marcos RPM

Year 2010

Volume/Capacity (AM Peak)

Crash Data

Crash data for the City of San Marcos was obtained from TxDOT. As seen in **Figure 1**, The City of San Marcos saw a significant increase in reported crashes on major corridors after the year 2009. Since then, between 350 and 400 crashes have been reported each year.

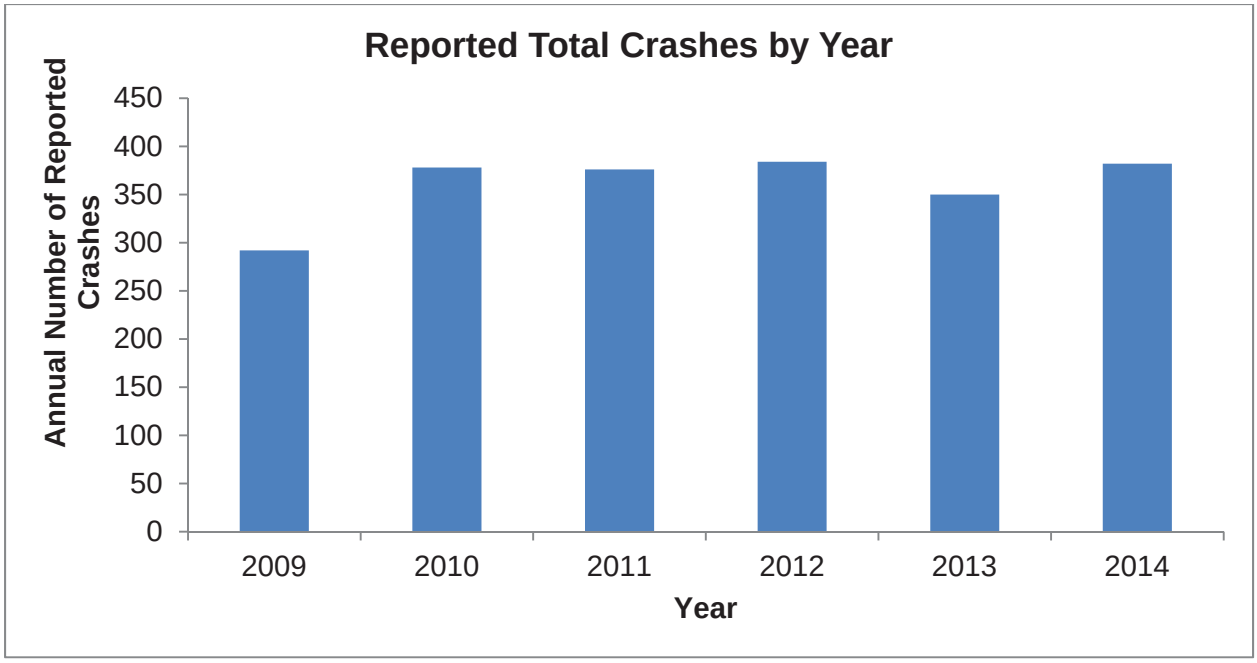


Figure 1
Reported Total Crashes by Year

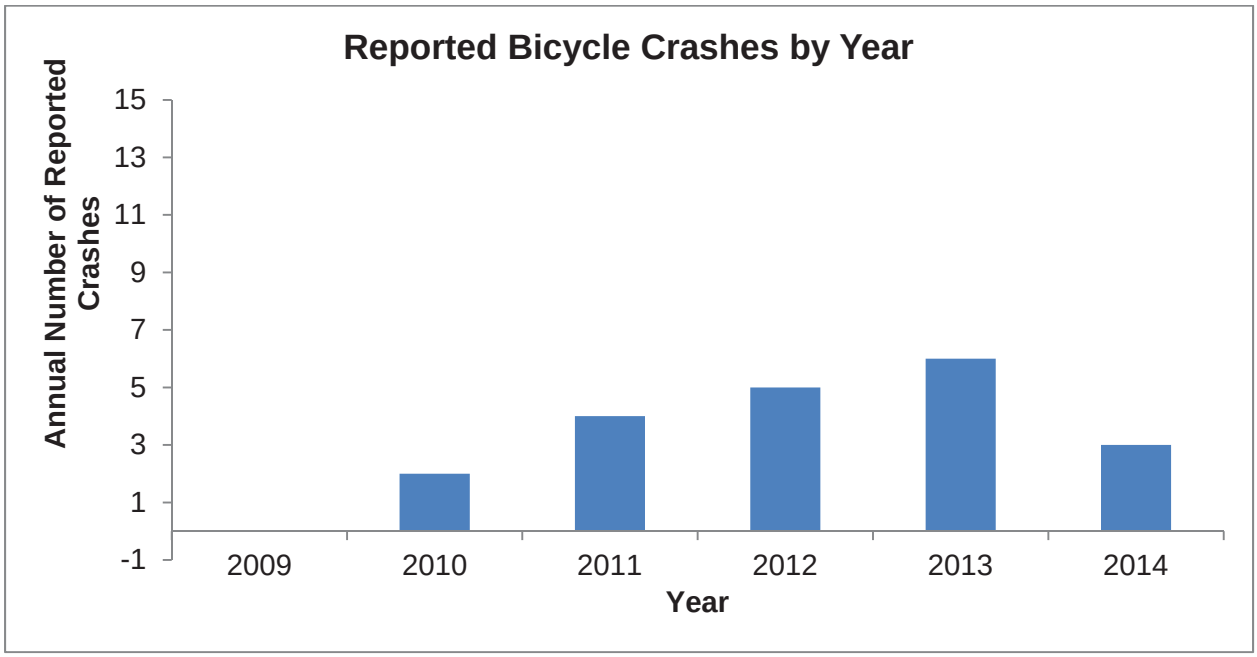


Figure 2
Reported Bicycle Crashes by Year

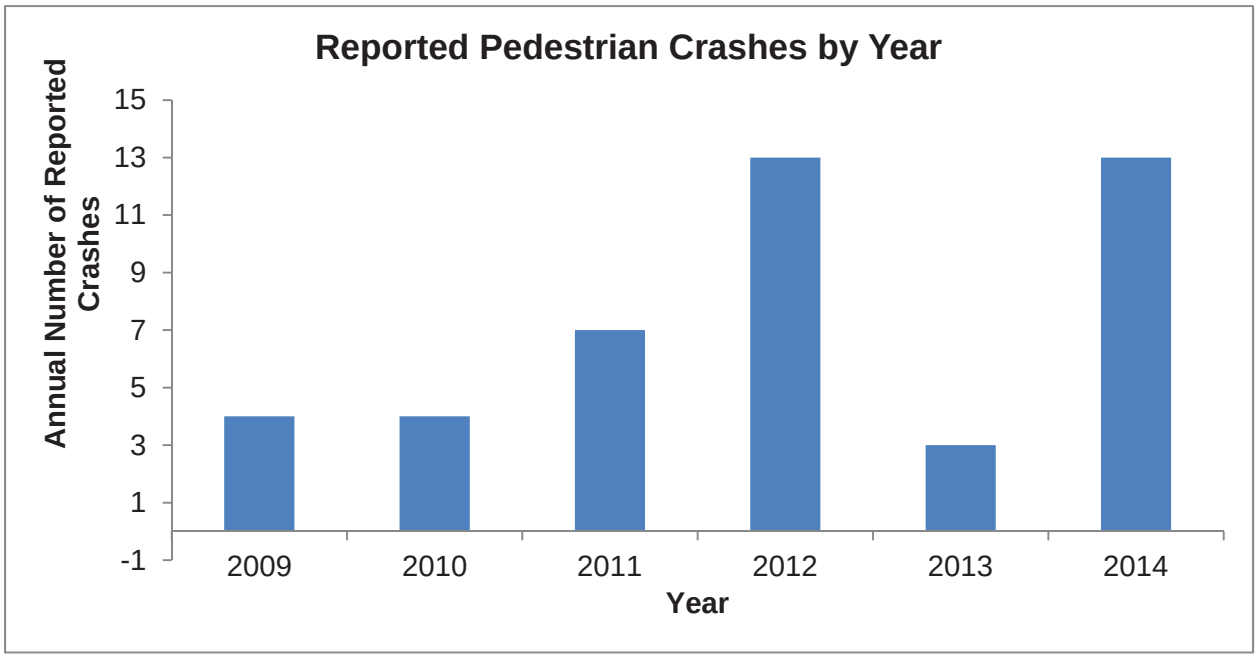


Figure 3
Reported Pedestrian Crashes by Year

SH 80 and Loop 82 have seen the most crashes with approximately 660 crashes between 2009 and 2014. This accounts for approximately 60% of the total crashes reported during this time frame. **Figure 2** shows total reported crashes between 2009 and 2014 by major corridor.

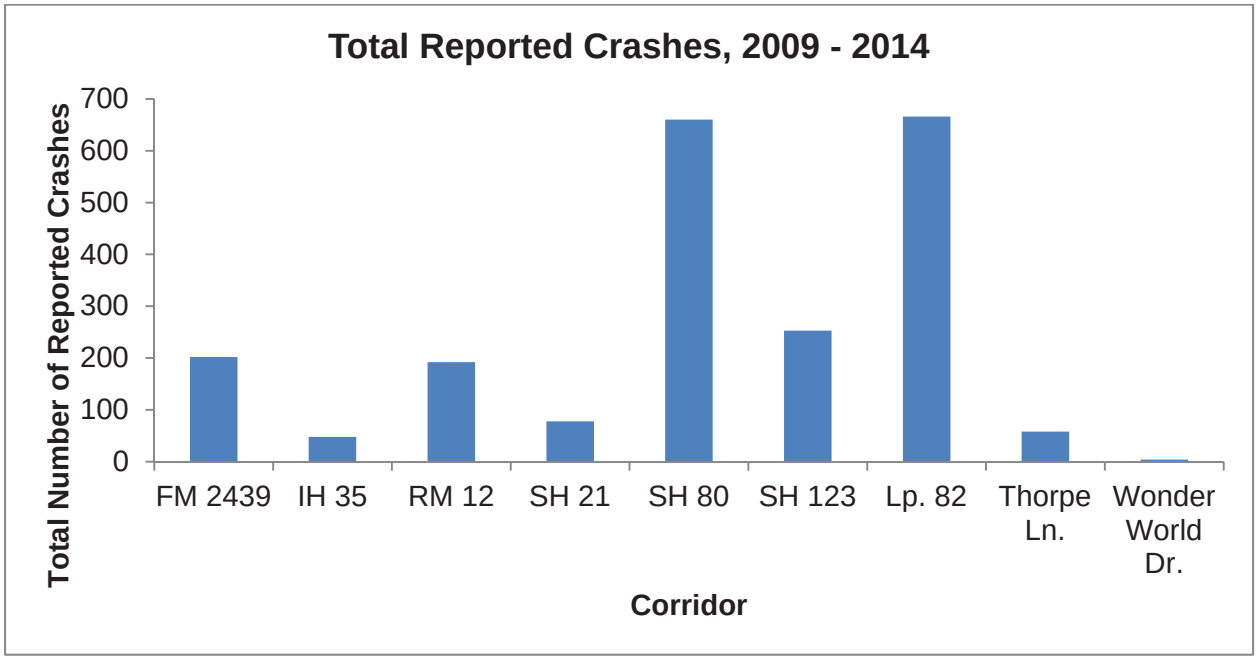


Figure 4

Total Reported Crashes by Corridor between 2009 and 2014

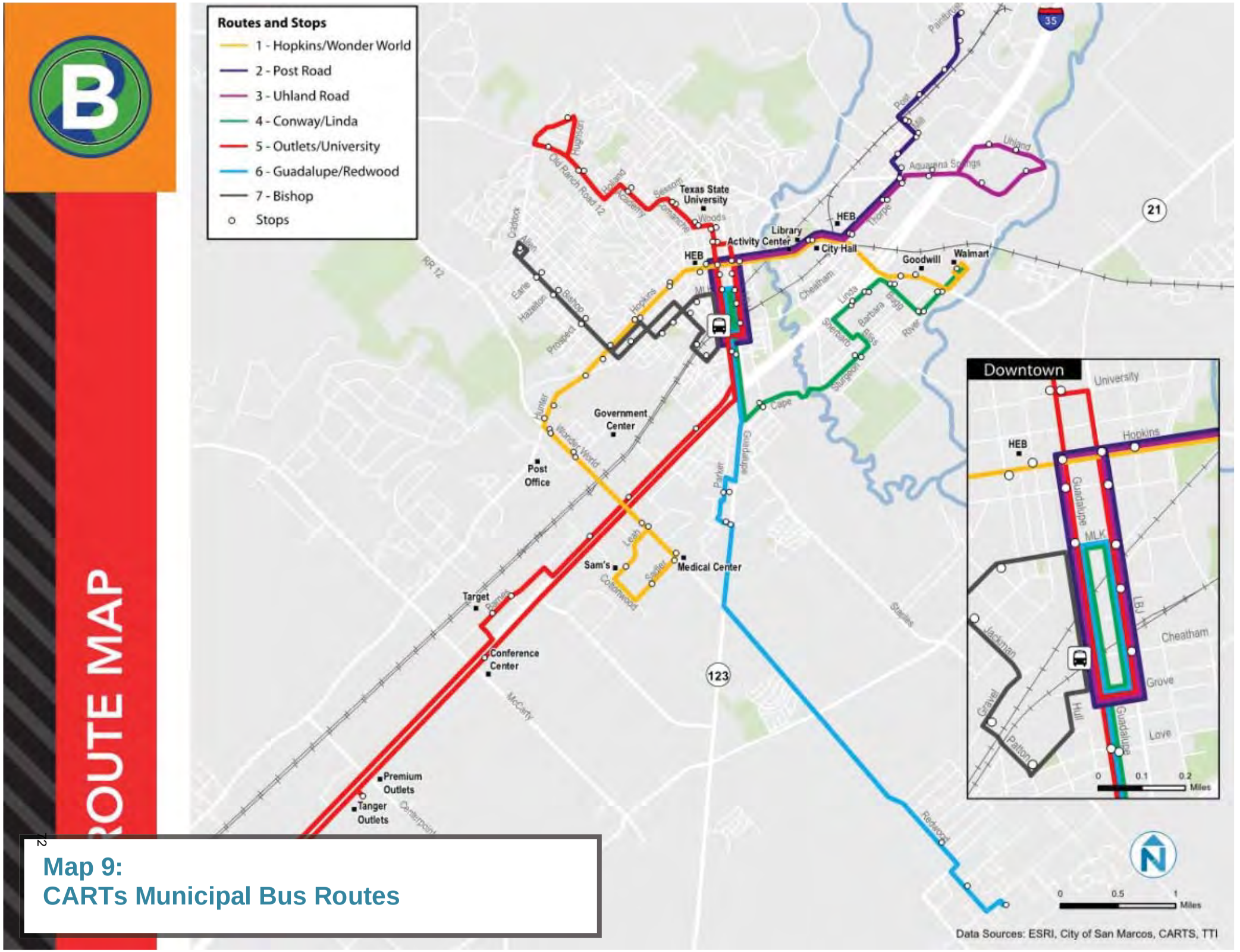
MULTIMODAL

Transit

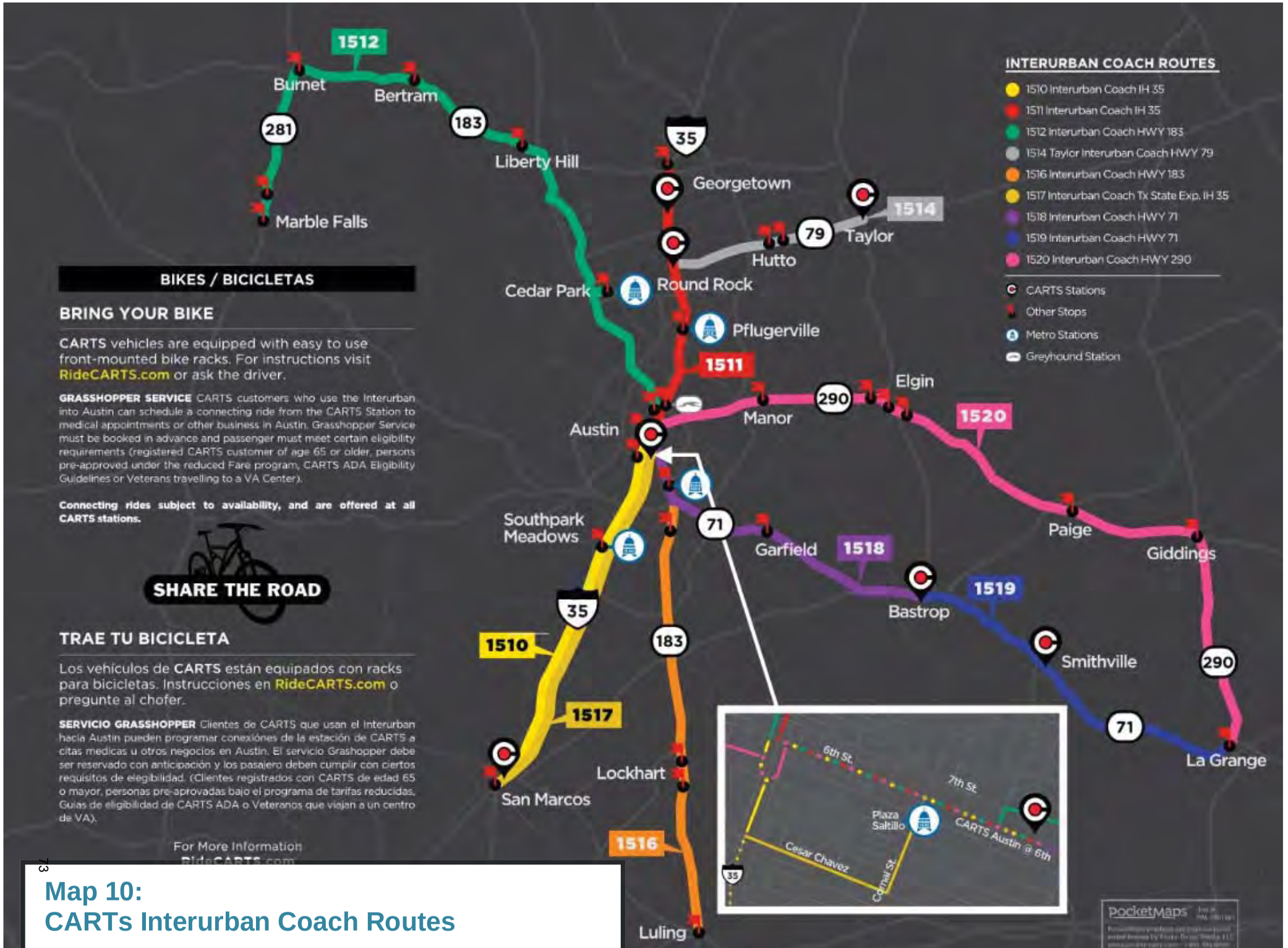
Existing transit service in San Marcos includes Capital Area Rural Transportation System (CARTS) as well as Bobcat Shuttle service offered by Texas State University. CARTs is a rural/urban transit district organized under Chapter 458 of the Texas Transportation Code. As shown in **Map 9**, CARTS operates seven municipal bus service routes throughout San Marcos from 7:00 AM to 6:00 PM, Monday through Friday. Additionally, CARTS operates two Interurban Coach routes between San Marcos and Austin on weekdays as shown in **Map 10** and a County Bus that provide complementary paratransit to eligible people living in or visiting the City of San Marcos. Bobcat Shuttle operates eleven routes that are shown in **Map 11.**

The City of San Marcos Intermodal Station, south of downtown San Marcos, acts as a hub for transit services ranging from the local and regional CARTS routes to national intercity transit services such as Amtrak and Greyhound.

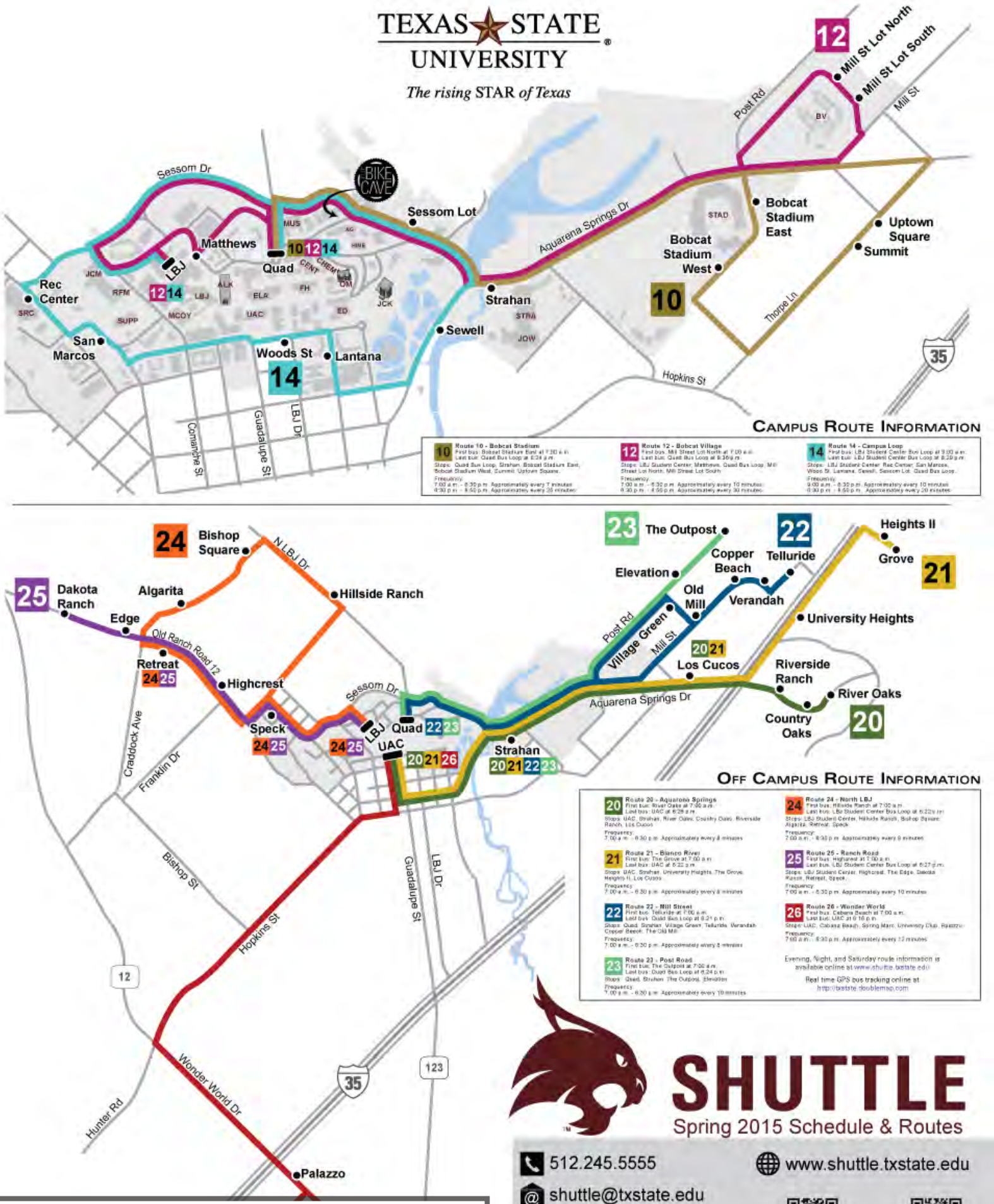
In 2003, the Lone Star Rail District was created to evaluate and operate a commuter rail service connecting San Antonio to Georgetown alongside IH 35 with a station in downtown San Marcos. The Lone Star Rail plans to operate 32 trains in each direction throughout the day. In 2035, 3.2 to 5.8 million annual boardings are predicted and the service could provide savings of 726,000 to 1,288,000 passenger-hours annually.



Map 9:
CARTs Municipal Bus Routes



Map 10:
CARTs Interurban Coach Routes



Map 11:
Bobcat Shuttles

Bicycle/Pedestrian

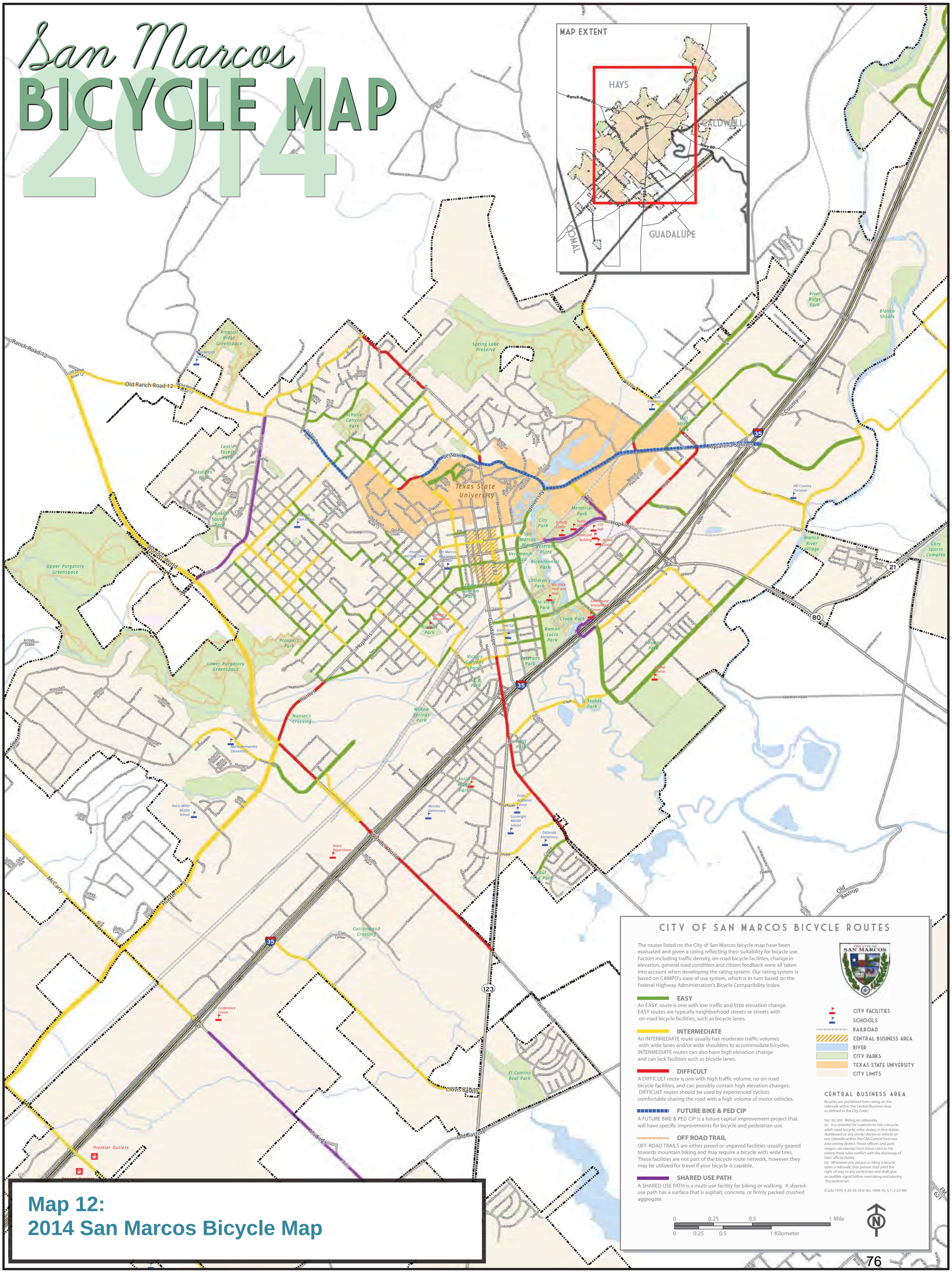
A connected and comprehensive bicycle and pedestrian network is a crucial part of a City's multimodal transportation system. According to the San Marcos Comprehensive Plan, from 2008 to 2010, 5.3 percent of San Marcos' workforce walked or used a bicycle to get to work or school. As seen in the Public Comments section, results from the Rhythm of the Streets public forum in July of 2014 indicate that approximately 43% would consider walking and bicycling as an alternative mode of transportation. **Map 12** is the 2014 San Marcos Bicycle Map. San Marcos establishes bicycle routes by considering the following factors:

- Traffic Density
- On-Road Bicycle Facilities
- Change in Elevation
- Roadway Conditions
- Citizen Feedback

Sidewalks provide pedestrians with safe, dedicated space removed from the adjacent roadway. According to FHWA, roadways without sidewalks are more than twice as likely to have pedestrian involved crashes as sites with sidewalks. **Map 13** shows the City's existing sidewalk network. Existing sidewalk conditions range from poor to good as indicated on the map.

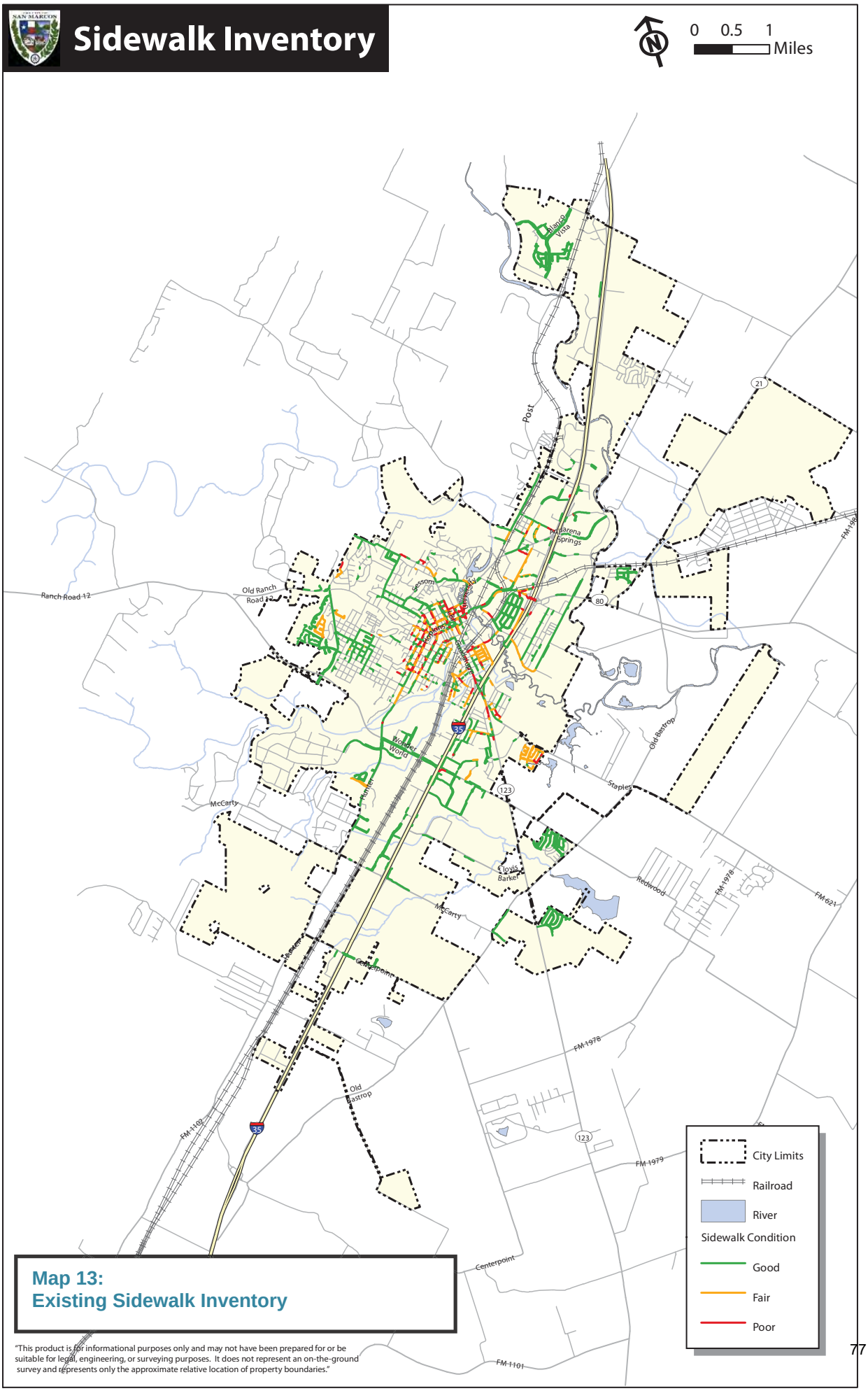
Rail Facilities

Union Pacific (UP) Railroad and Missouri Pacific Railroad (MOPAC) each operate rail lines within the City of San Marcos including a north-south line that parallels IH 35 and an east-west segment that starts near the City's center. These lines result in 24 at-grade railroad crossings within the City as shown in **Map 14**. Since the 2004 Transportation Master Plan, the grade crossing on Wonder World Drive (#5) has been grade-separated. Post Road (#24) is a low water crossing. Loop 82 (Aquarena Springs Drive) is currently under construction to remove at-grade railroad crossings (#18).



Map 12:
2014 San Marcos Bicycle Map

Sidewalk Inventory



Map 13:
Existing Sidewalk Inventory

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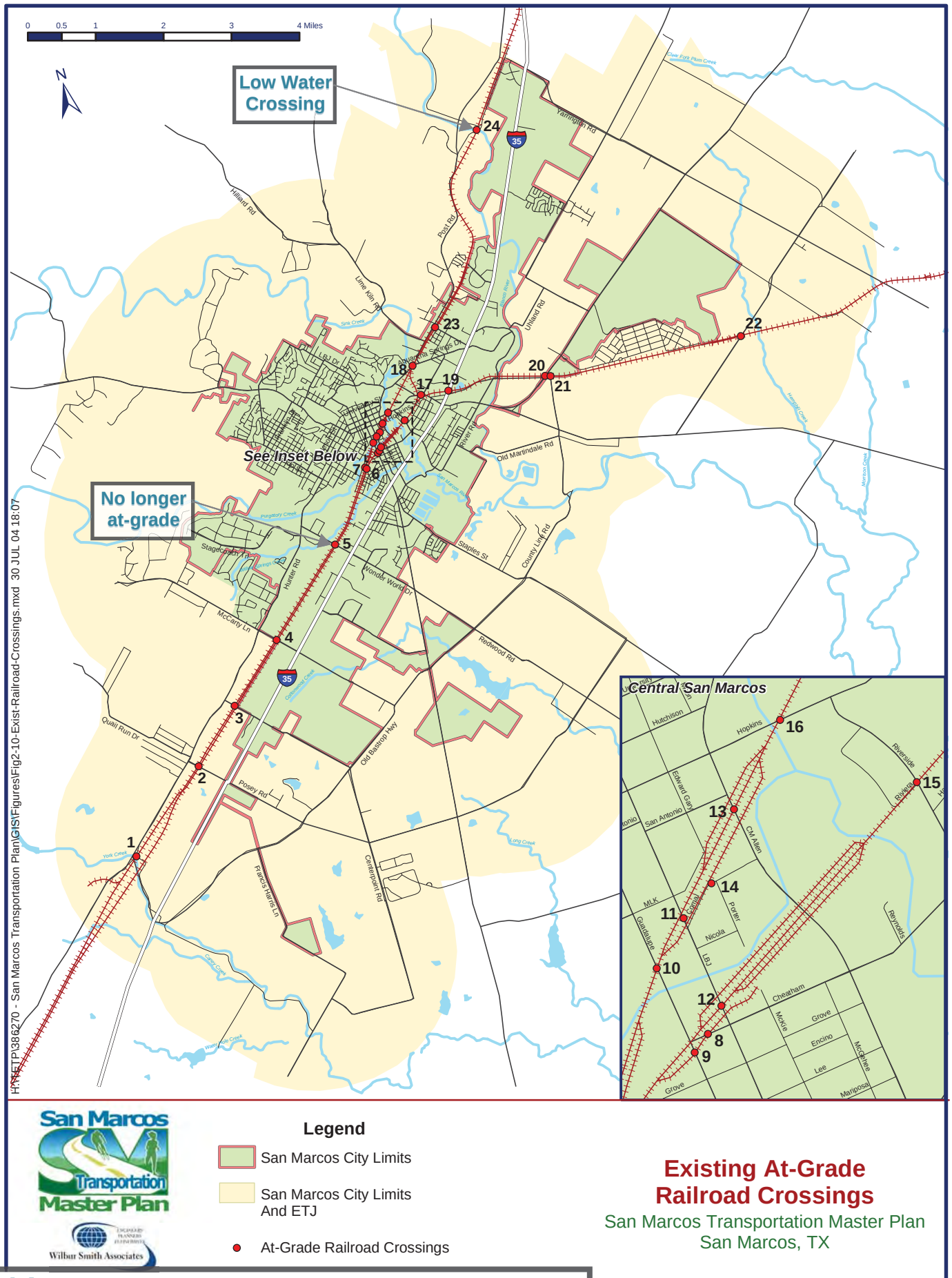


Map 14:
Existing At-Grade Railroad Crossings

OTHER CONSIDERATIONS

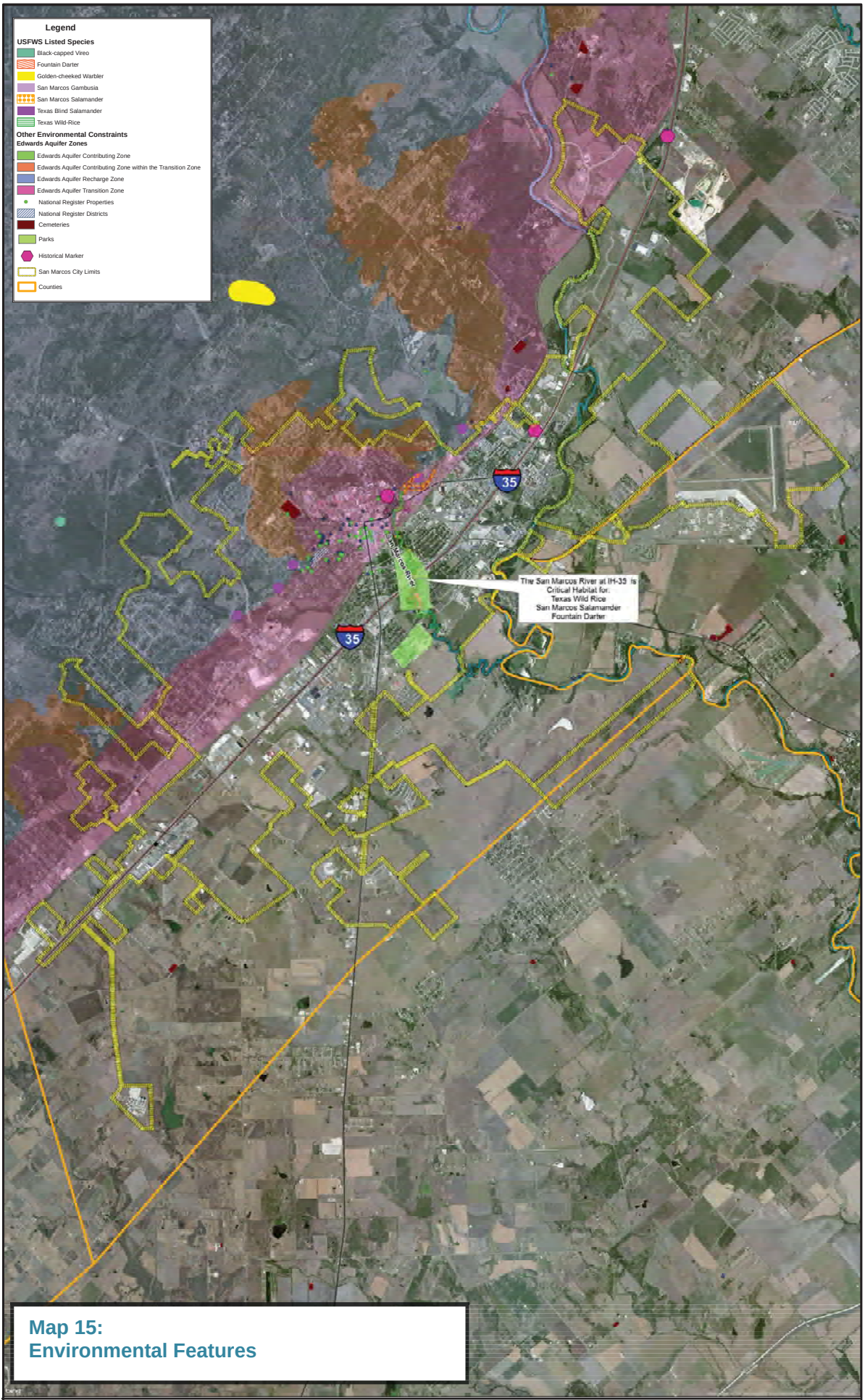
Environmental Constraints

Map 15 shows environmental features of the City of San Marcos. These features result in a number of constraints that impact development within the City. Development west of the UP railroad tracks running parallel to IH 35 is constrained by the transition zones associated with Edward's Aquifer. Rivers and creeks throughout the City create floodways that also constrain development.

Special Traffic Generators

Special traffic generators influence traffic volumes and flow patterns in the City of San Marcos. San Marcos special generators include:

- City of San Marcos and Hays County government offices (i.e. City Hall, the County Courthouse)
- San Marcos Municipal Airport
- Texas State University
- Bobcat Stadium
- Outlet malls
- Central Texas Medical Center
- San Marcos Consolidated Independent School District
- Parks and Recreation Facilities (i.e. Wonder World and Aquarena Center)



Map 15: Environmental Features

0 1 2 4 Miles

N

Environmental Constraints
San Marcos, Texas

PUBLIC PERCEPTION

On July 26th, 2014, the City of San Marcos held Rhythm of the Streets, a public forum with the intent of engaging the public regarding the Transportation Master Plan Update and Code SMTX, a project that will rewrite the City's land development code. **Table 5** includes a summary of public comments regarding automobiles, bikes, pedestrians, and transit collected during the nine hour event. **Figures 3 and 4** show the results of two survey questions including: "How do you get around town?" and "What alternatives would you consider? These results reinforce future multimodal priorities outlined in the Comprehensive Master Plan.

Table 5:
Rhythm of the Streets Public Survey Summary

Automobiles	• Two-way conversions will increase congestion and create safety issues • Potential new traffic patterns are confusing • Need to consider the presence of students • Downtown deliveries are a concern • Too many traffic lights • More progressive traffic planning
Bikes	• Shared auto/bike lanes are scary for cyclists • Buffers between autos and bikes are a good idea • Cycle tracks would be most beneficial on the heavier traveled roadways
Pedestrians	• Shade trees make the City more walkable. • There should be sidewalks in all neighborhoods. • Wider sidewalks • Driver awareness of pedestrians at signals is a problem • Trails should be accessible
Transit	• Keep the citizens informed of transit projects • Buses should be available to the public • Need more transit options • Public transit should be attractive • Streetcars on thoroughfares

Figure 5:

Transportation Survey Results: "How do you get around town?"

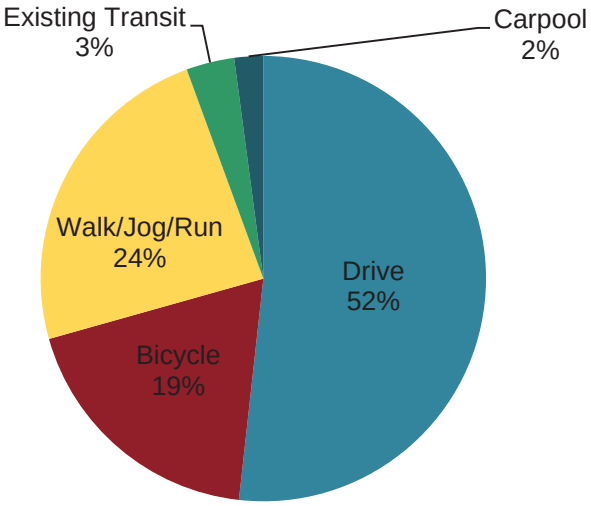
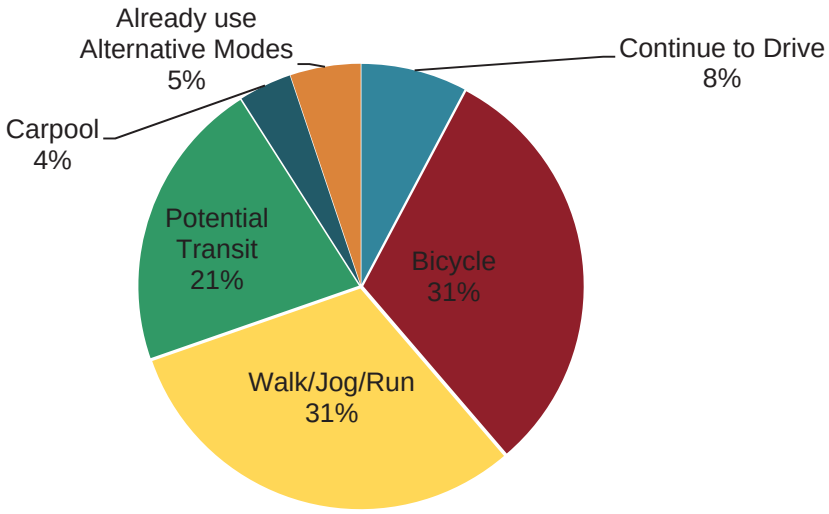


Figure 6:

Transportation Survey Results: "What alternatives would you consider?"



FORECASTING AND PROJECTIONS

The traffic forecasting for different transportation scenarios considered in the City of San Marcos Transportation Master Plan was conducted using Capital Area Metropolitan Planning Organization's (CAMPO) regional travel demand model. The scenarios included:

- Base (2010): Represents 2010 base year conditions
- Interim Conditions (2025): Provides an evaluation of interim demographic and roadway network conditions; and,
- Preferred Land Use Scenario (2035): Focuses on promoting efficient and sustainable growth in key areas and providing multimodal mobility options that connect the activity centers.

The CAMPO model simulates travel on the entire highway and transit system in the counties of Bastrop, Caldwell, Hays, Travis, and Williamson in Texas. The highway system embedded in the model includes all express highways and principal arterial roadways as well as minor arterial and some local roadways. On the transit side, the model contains information on service frequency (i.e. how often buses/trains arrive at any given transit stop), routing, intermodal connections, travel time and transit fares for all transit lines. Outputs of the model contain detailed information relating to the transportation system. The highway side of the model provides output data on traffic volumes, congested travel speeds, vehicle miles traveled, and average travel times on the roadway links.

The CAMPO model is a trip-based model that uses the traditional Four-Step, sequential process including:

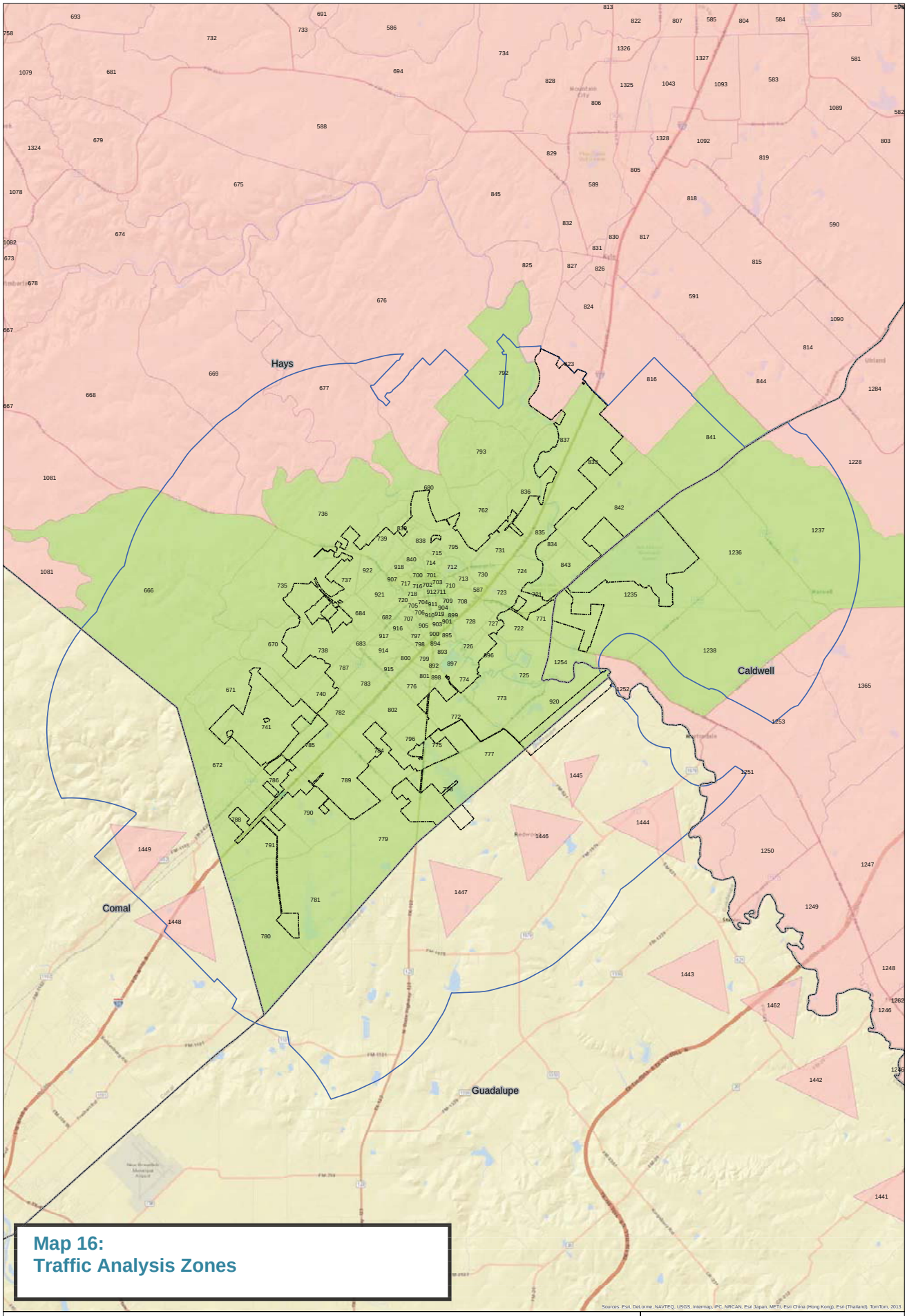
- Trip Generation;
- Trip Distribution;
- Mode Choice; and
- Trip Assignment.

This Four-Step process is used to estimate average traffic volumes and transit ridership, based on the best available population and employment forecasts, projected highway travel conditions (including downtown parking costs) and projected transit service.

The geographic area represented in the CAMPO model is divided into smaller areas known as Traffic Analysis Zones (TAZs). There are 1,413 internal and 49 external TAZs, for a total of 1,462 zones in the CAMPO model. The zone geography covers the full extent of Bastrop, Caldwell, Hays, Travis, and Williamson Counties. The number of zones in each county is representative of its population and employment density. There are 127 zones in Bastrop, 92 zones in Caldwell, 251 in Hays, 590 in Travis, and 353 zones in Williamson County. TAZ boundaries are defined primarily based on US Census geography and regionally significant roadways. In some cases, zones are further defined along natural

boundaries such as water features. For the City of San Marcos TMP study area, the model consists of 146 TAZs and 6 external zones. These TAZs are shown in **Map 16**.

The Updated CAMPO model was run for the 2010 base year as well as two forecast years (2025 and 2035) using the demographic and land use inputs and future year network assumptions provided by the City of San Marcos. One of the major assumptions of the future year network is a conceptual transit framework to serve trips between some key activity centers identified in the Comprehensive Plan. Activity centers include Downtown, Texas State University, Midtown, South End, Medical District, Airport, STAR Park, and East Village). These activity centers as part of the Comprehensive Plan Preferred Scenario are shown in **Map 17.** Provision of transit alternatives has potential to reduce VMT significantly, provided it is well designed to capture key travel markets. **Map 18** shows the transit proposed service plan which consists of five main routes emanating from the major activity centers and serving downtown directly and three circulator routes to distribute passengers close to their destinations.



Map 16:
Traffic Analysis Zones

Legend

- County Boundary
- San Marco City Limits
- San Marcos ETJ

Model TAZs

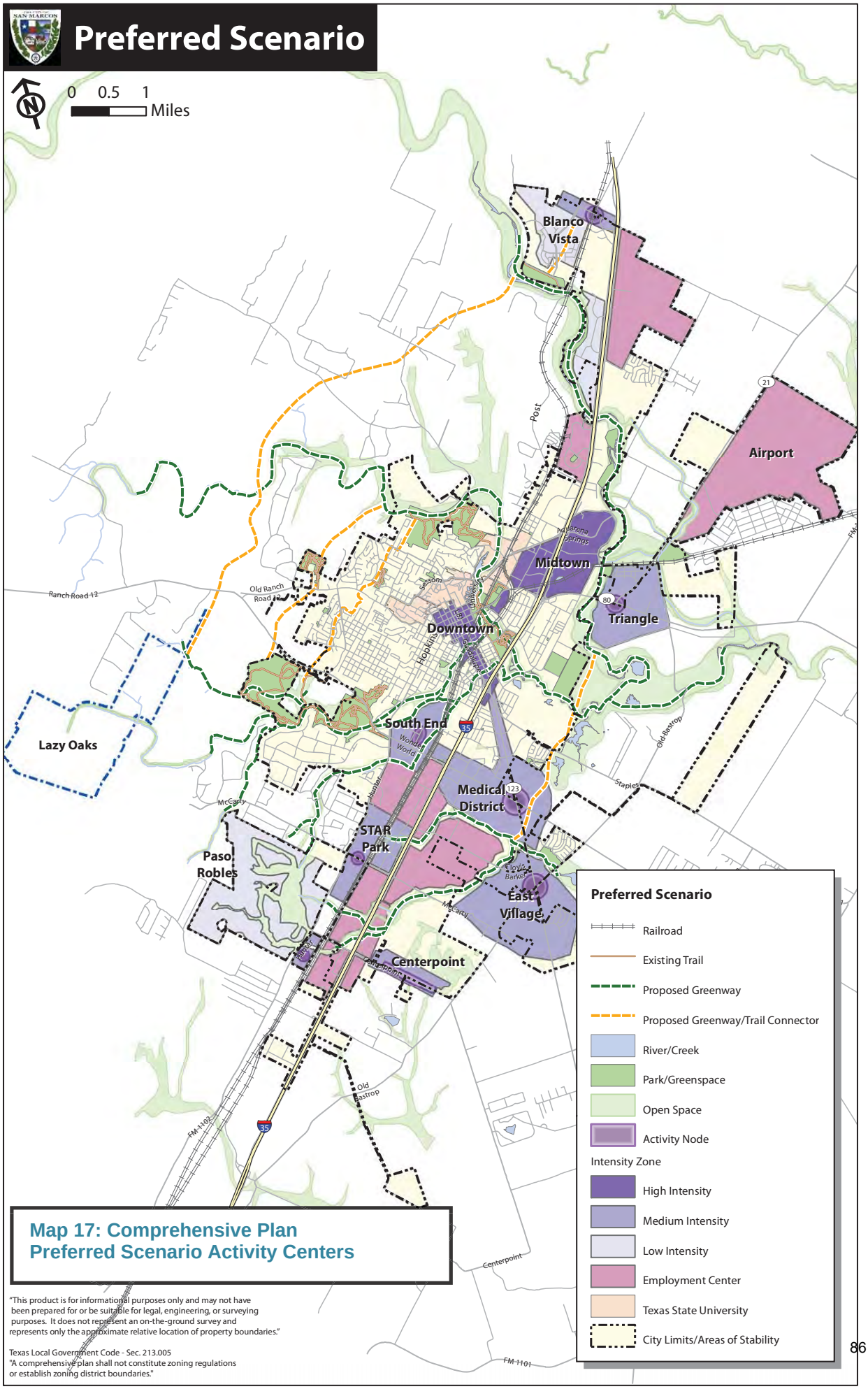
- CAMPO Region
- San Marcos Study Area
- World Street Map

0 1.75 3.5 7 Miles

San Marcos RPM

Model TAZ Structure

Preferred Scenario



Map 17: Comprehensive Plan Preferred Scenario Activity Centers

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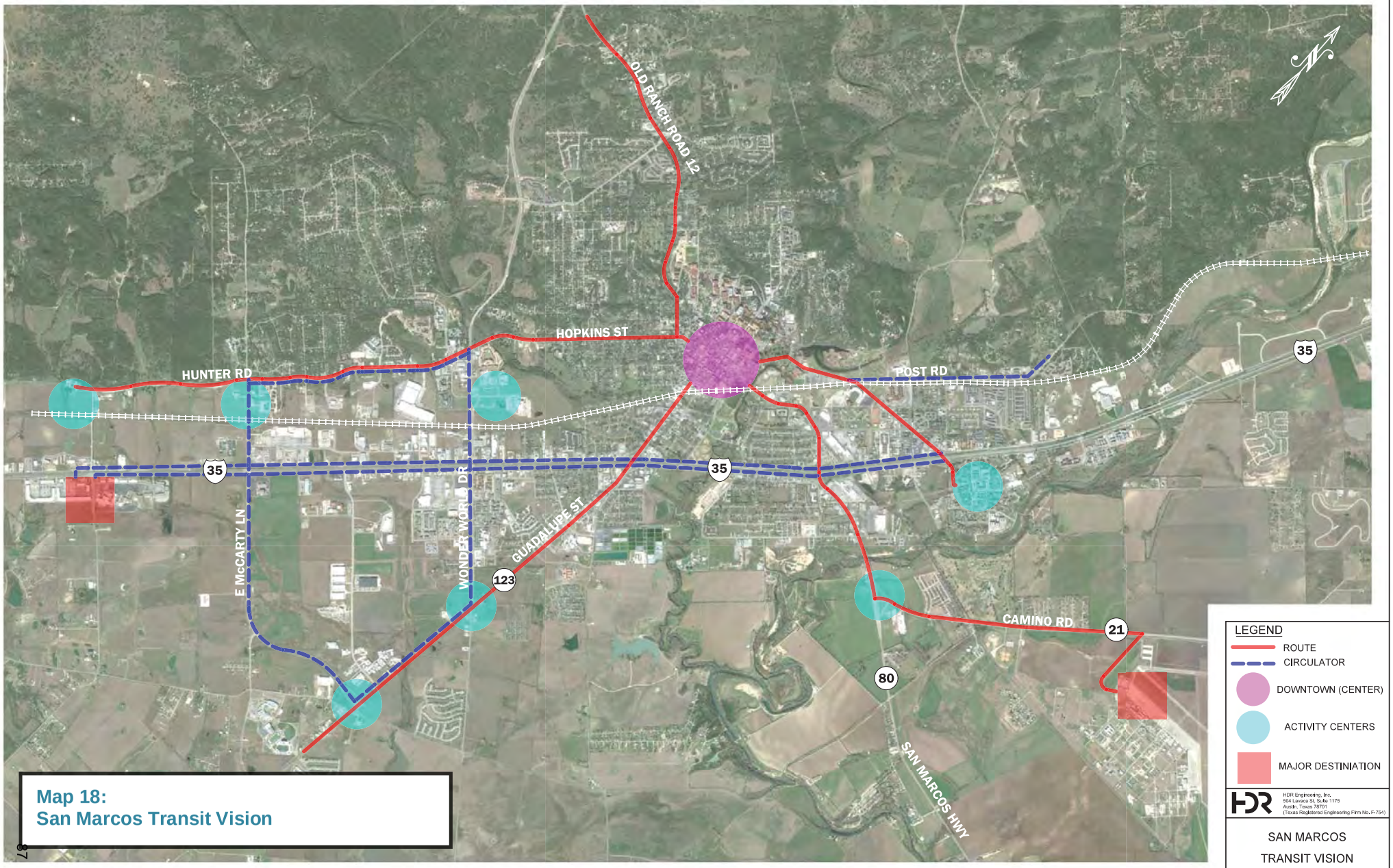
Texas Local Government Code - Sec. 213.005
"A comprehensive plan shall not constitute zoning regulations or establish zoning district boundaries."



Map 18:
San Marcos Transit Vision

Demographics

The City of San Marcos is ranked by the Census Bureau as the fastest growing city in the U.S. and the Greater San Marcos Region is one of the fastest growing areas in the country. Over the past fifteen years, the City's population has grown by 31 percent and employment has risen by 38 percent. Recent population counts indicate the City's daytime service population is about 22 percent higher than its resident population. According to CAMPO's forecasts, the City's population is projected to reach 90,500 by 2025 and 130,200 by 2035 which represents a growth of 37 percent and 96 percent, respectively. Employment projections indicate the labor force would increase by 37 percent in 2025 and 77 percent in 2035. This robust growth is expected to place a heavy demand on City's infrastructure including water, sewer, energy and the transportation system**.** **Figures 5 and 6** show the projected trend in City's population and employment.

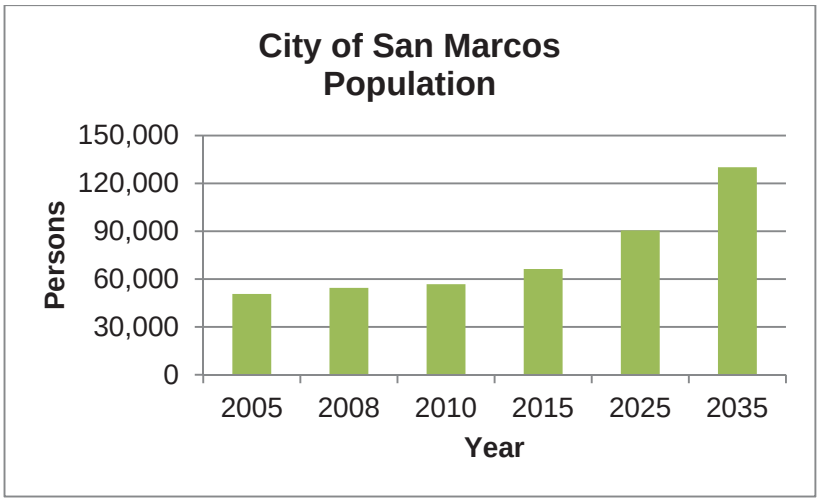


Figure 7:
Population Trends for City of San Marcos

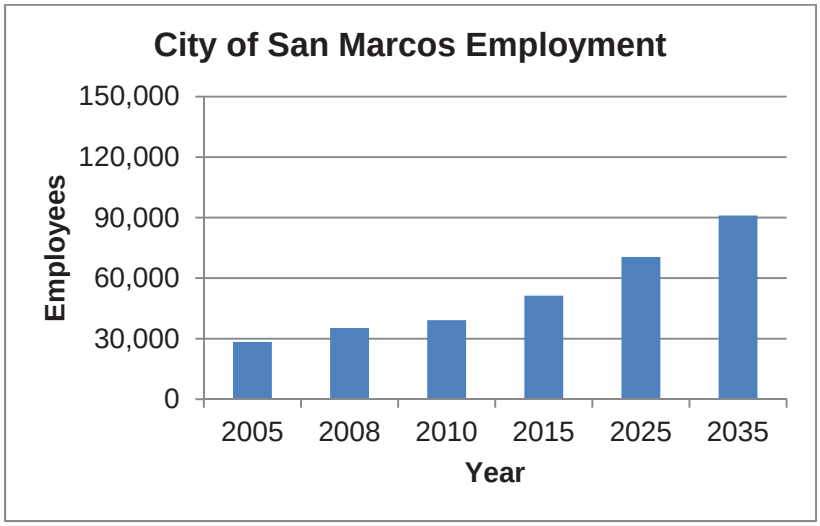
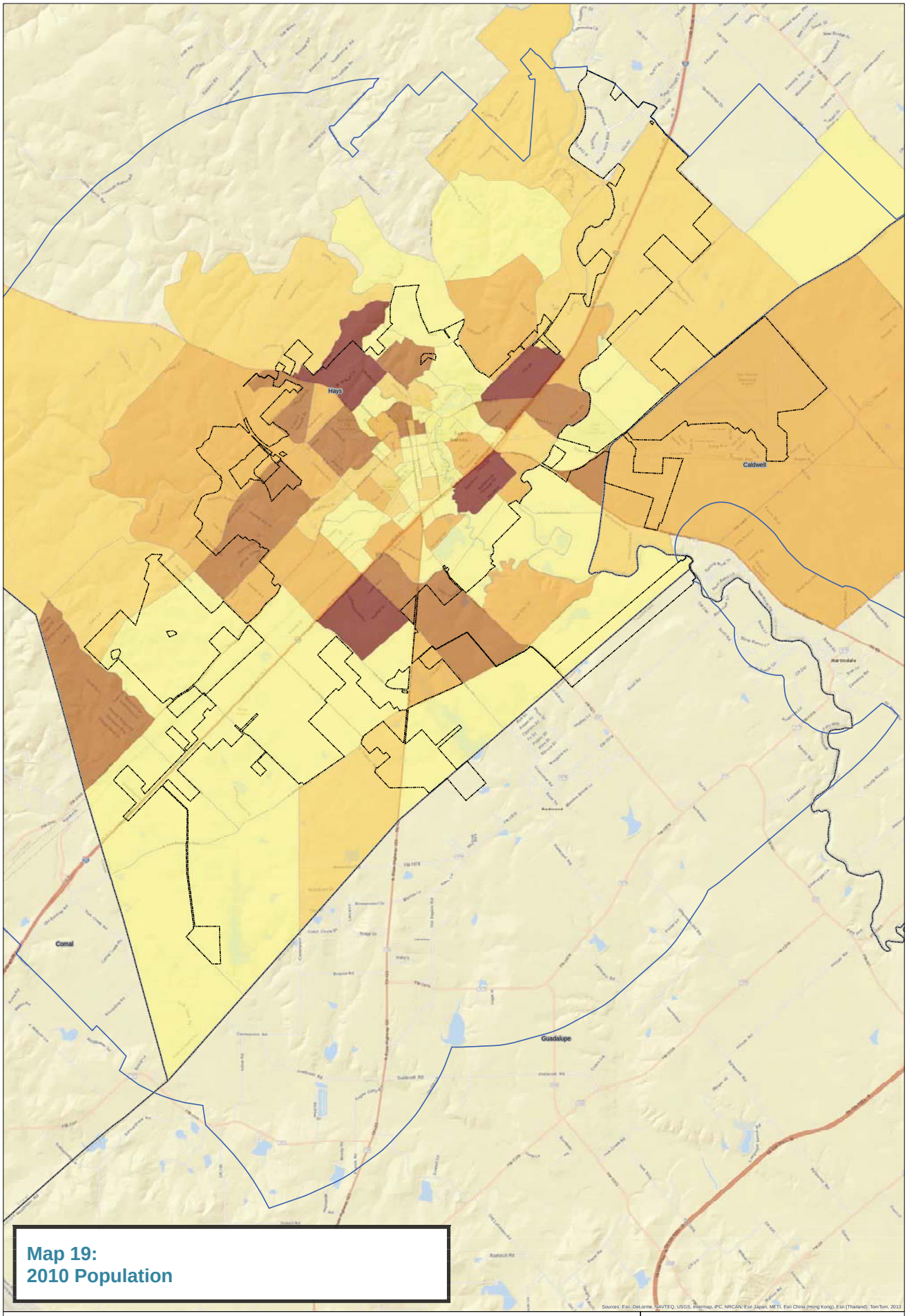


Figure 8:
Employment Trends for City of San Marcos

Projected population and employment information associated with the preferred scenario of the Comprehensive Plan was used in the travel demand forecasting as part of the Transportation Master Plan Update process. **Maps 19 through 26** show current and projected demographic information in San Marcos for population and employment. 2010 Base Year traffic volumes and 2025 and 2035 travel demand forecasts are summarized in a separate memo.



Map 19:
2010 Population

Sources: Esri, DeLorme, NAVTEQ, USGS, Intermap, iPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, 2013

Legend

2010 Population
- 0 - 250
- 251 - 500
- 501 - 1,000
- 1,001 - 2,000
- 2,001 - 3,036

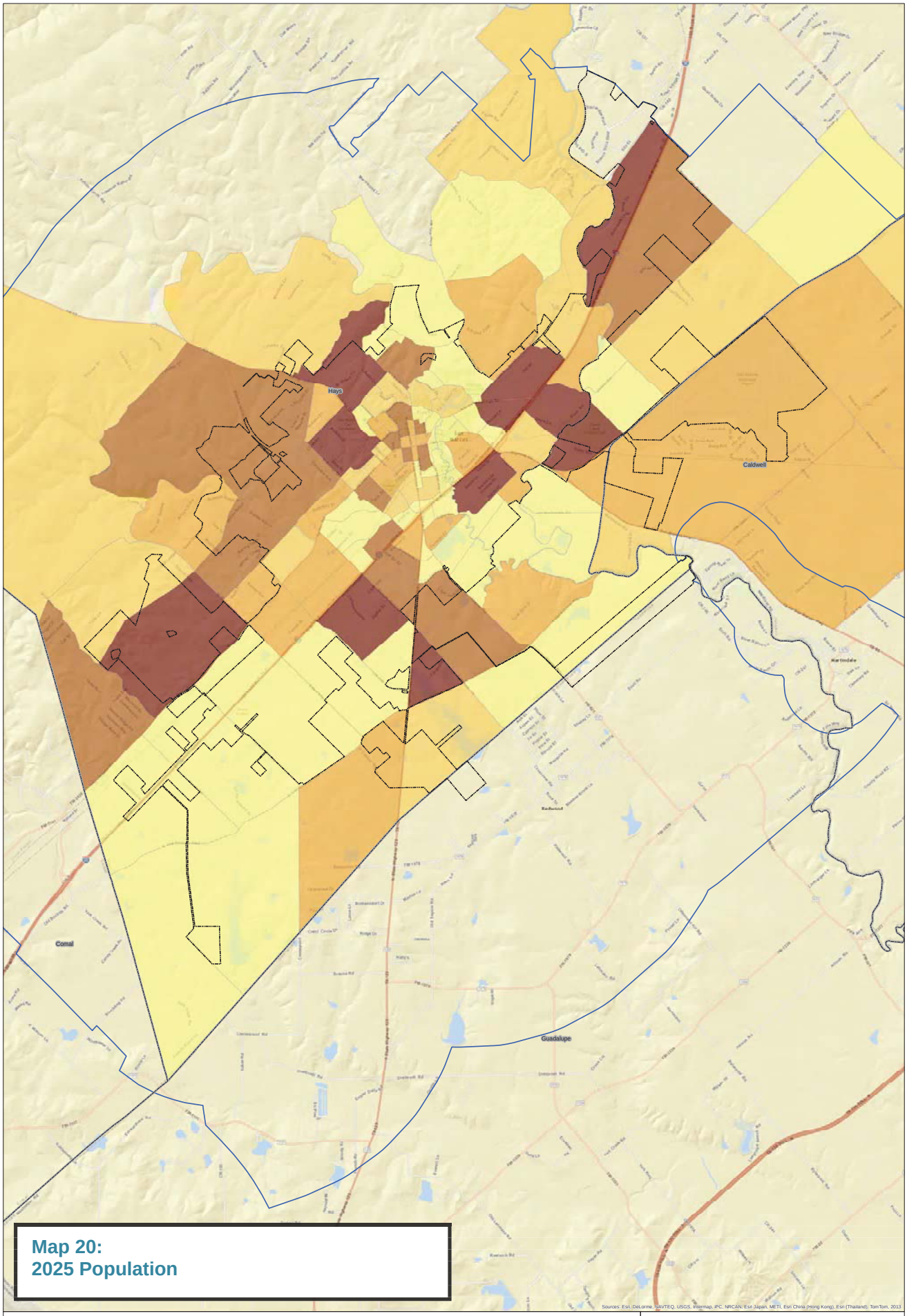
- San Marco City Limits
- County Boundary
- San Marcos ETJ
- World Street Map

0 1 2 4 Miles

San Marcos RPM

Year 2010

Population by TAZ



Map 20:
2025 Population

Legend

2025 Population
- 0 - 250
- 251 - 500
- 501 - 1,000
- 1,001 - 2,000
- 2,001 - 8,274

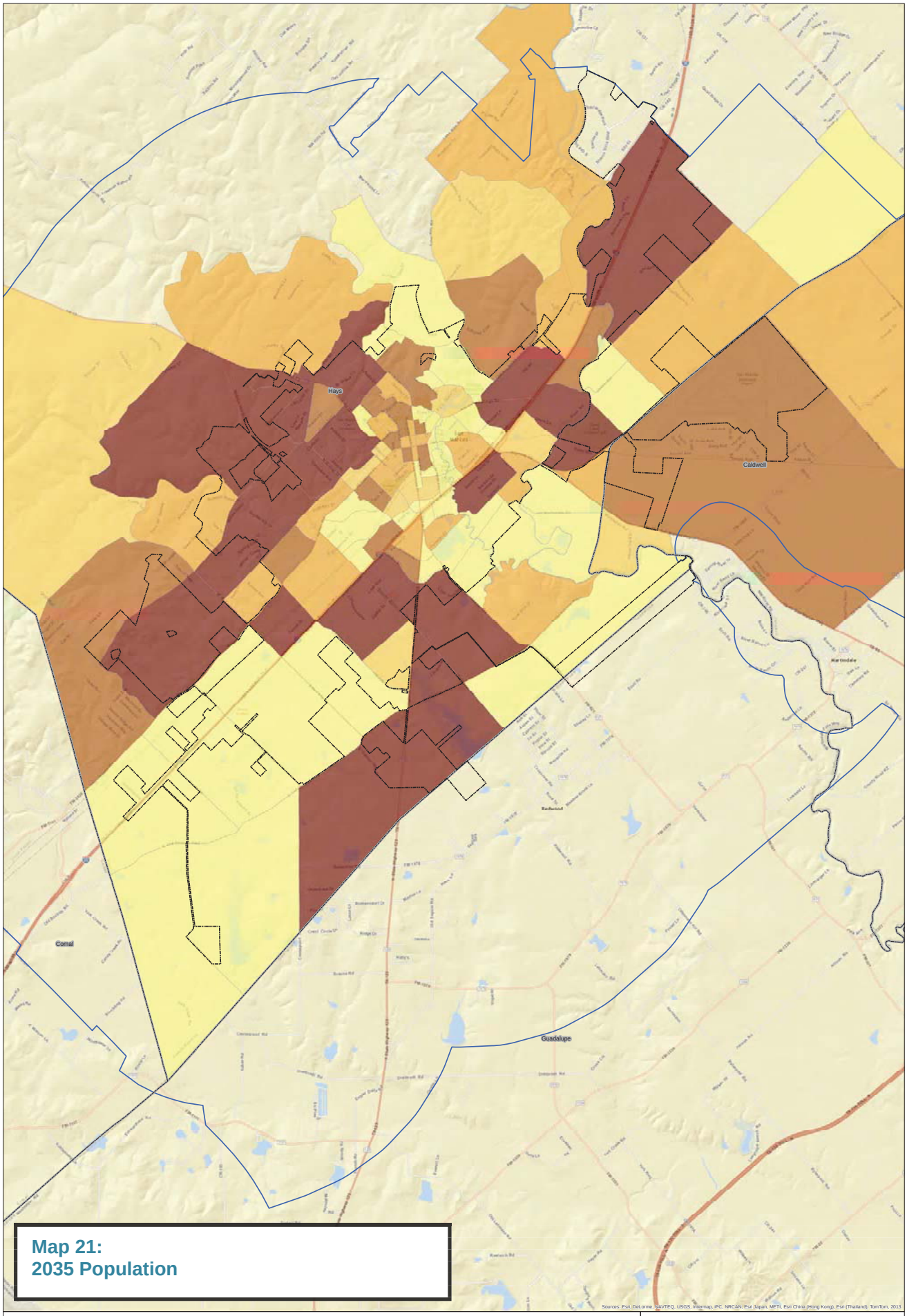
- San Marco City Limits
- County Boundary
- San Marcos ETJ
- World Street Map

0 1 2 4 Miles

San Marcos RPM

Year 2025

Population by TAZ



Map 21:
2035 Population

Legend

2035 Population
- 0 - 250
- 251 - 500
- 501 - 1,000
- 1,001 - 2,000
- 2,001 - 8,427

- San Marco City Limits
- County Boundary
- San Marcos ETJ
- World Street Map

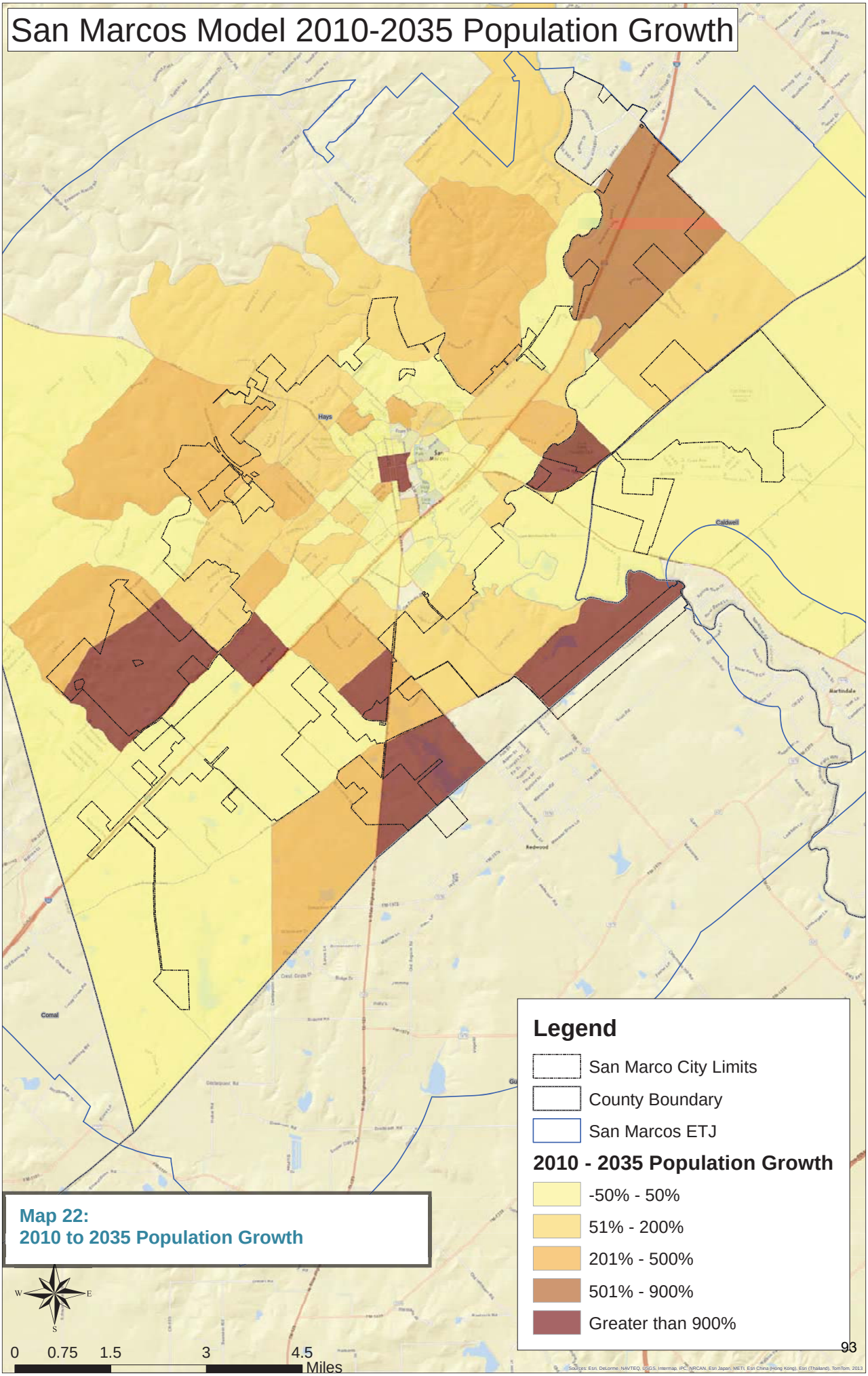
0 1 2 4 Miles

San Marcos RPM

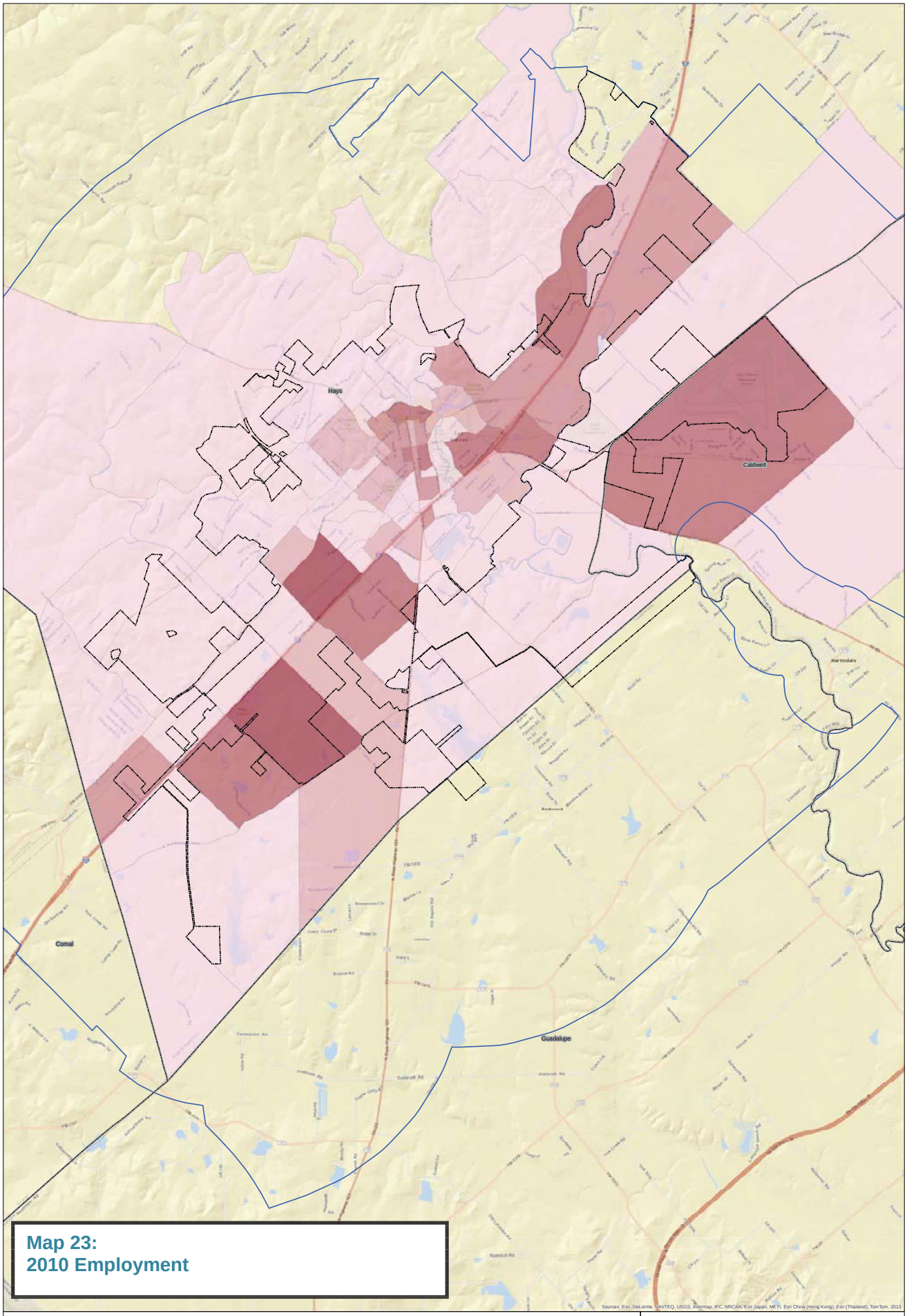
Year 2035

Population by TAZ

San Marcos Model 2010-2035 Population Growth



Map 22:
2010 to 2035 Population Growth



Map 23:
2010 Employment

Sources: Esri, DeLorme, NAVTEQ, USGS, Intermap, iPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, 2013

Legend

2010 Employment
- 0 - 200
- 201 - 400
- 401 - 800
- 801 - 1,600
- 1,601 - 2,752

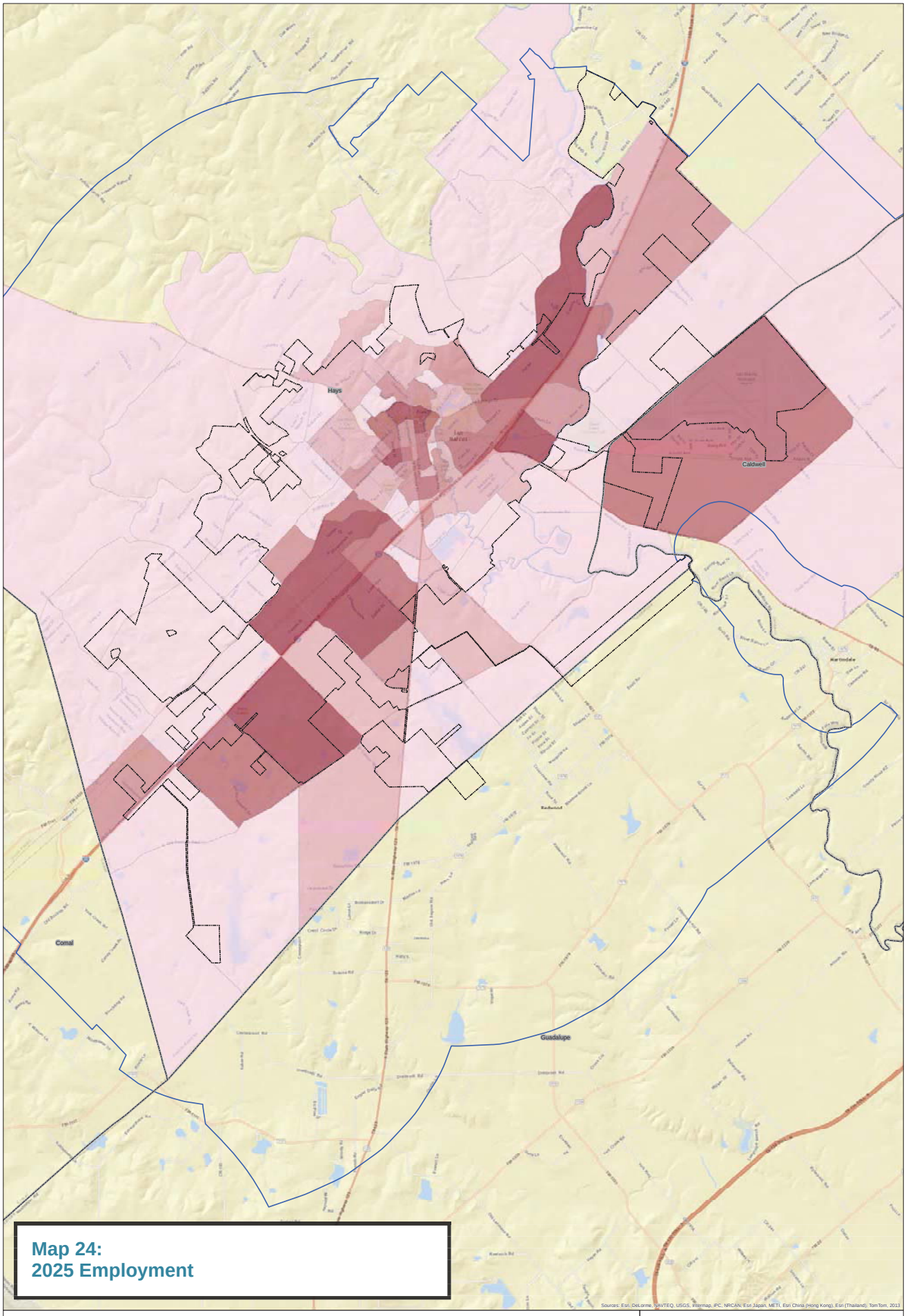
- San Marco City Limits
- County Boundary
- San Marcos ETJ
- World Street Map

0 1 2 4 Miles

San Marcos RPM

Year 2010

Employment by TAZ



Map 24:
2025 Employment

Sources: Esri, DeLorme, NAVTEQ, USGS, Intermap, iPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, 2013

Legend

2025 Employment
- 0 - 200
- 201 - 400
- 401 - 800
- 801 - 1,600
- 1,601 - 3,892

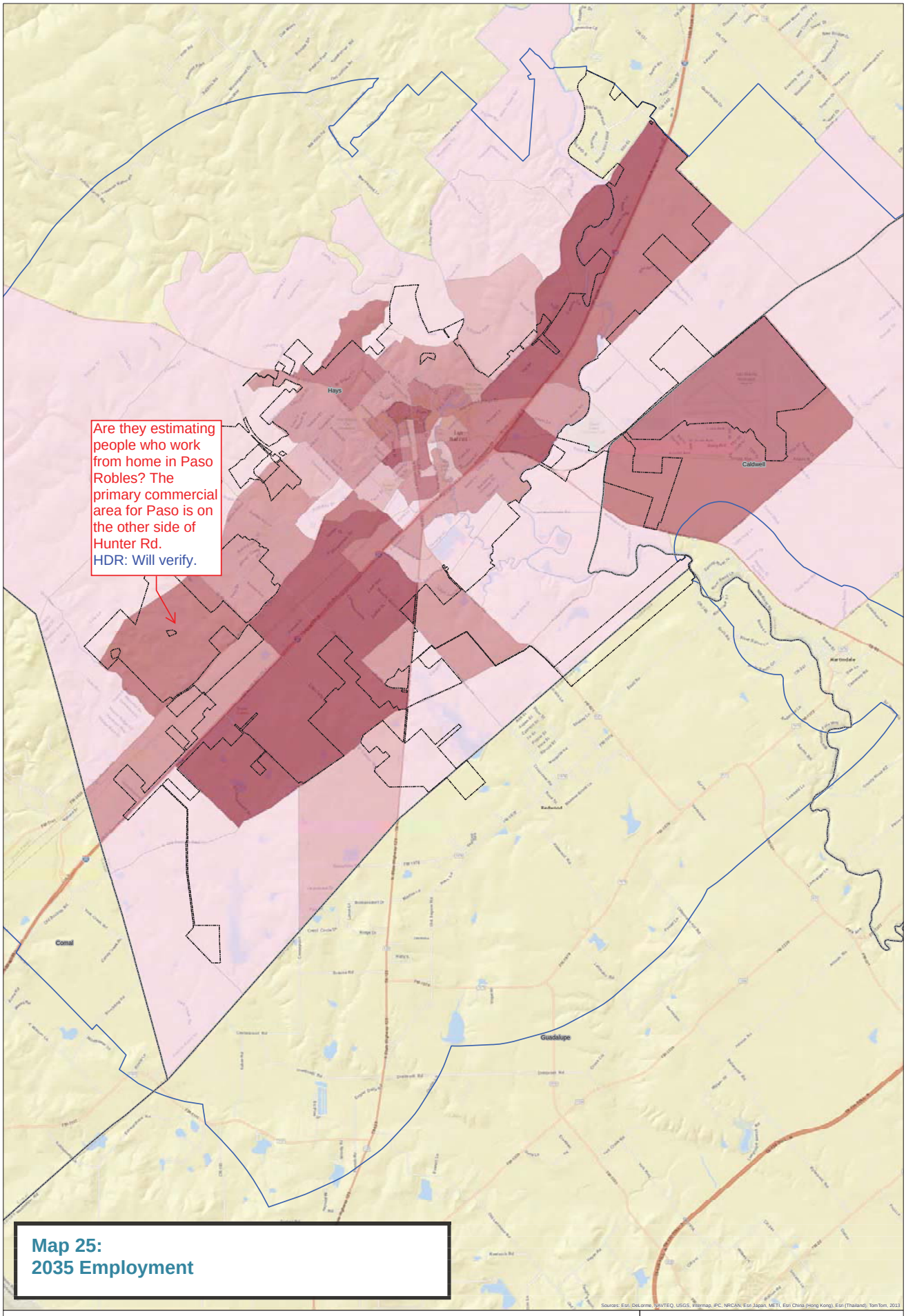
- San Marco City Limits
- County Boundary
- San Marcos ETJ
- World Street Map

0 1 2 4 Miles

San Marcos RPM

Year 2025

Employment by TAZ



Map 25:
2035 Employment

Legend

2035 Employment
- 0 - 200
- 201 - 400
- 401 - 800
- 801 - 1,600
- 1,601 - 3,894

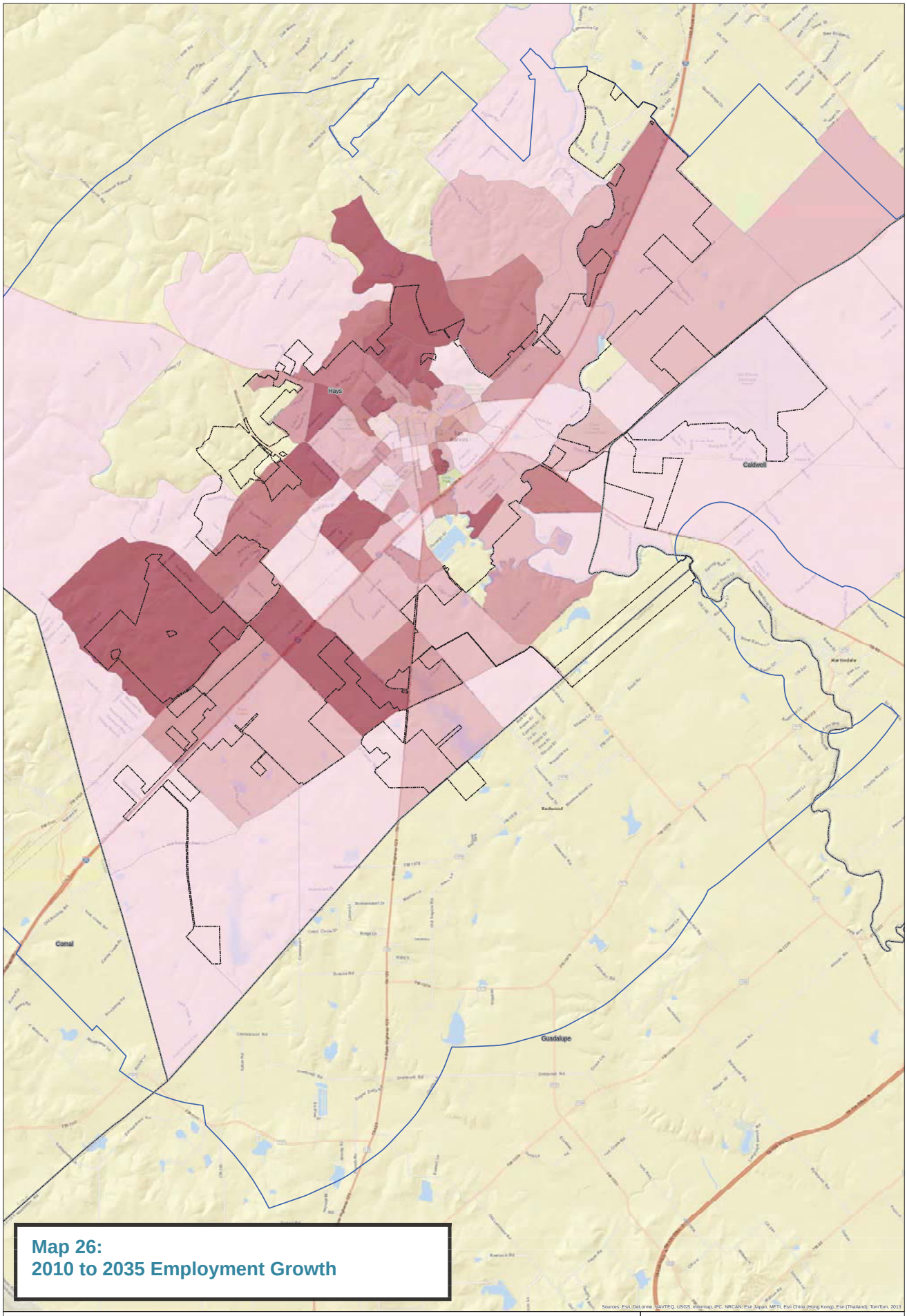
- San Marco City Limits
- County Boundary
- San Marcos ETJ
- World Street Map

0 1 2 4 Miles

San Marcos RPM

Year 2035

Employment by TAZ



Map 26:
2010 to 2035 Employment Growth

Legend

2010 - 2035 Employment Growth
- 0% - 50%
- 51% - 200%
- 201% - 500%
- 501% - 900%
- Greater than 900%

- San Marco City Limits
- County Boundary
- San Marcos ETJ
- World Street Map

0 1 2 4 Miles

San Marcos RPM

Year 2010 - 2035

Employment Growth by TAZ