

Sahuarita/El Toro Corridor Study

Final Report

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Prepared for

ADOT



Prepared by

JACOBS

ACKNOWLEDGEMENTS

Town of Sahuarita Council Members

Bill Bracco

Kara Egbert

Gil Lusk

Melissa Smith

Josh Matthews

Technical Advisory Committee (TAC)

Matt Carpenter, Project Manager, Arizona Department of Transportation Multimodal Planning Division

Dave Pfordt, Public Works, Town of Sahuarita

Linda Ritter, Public Information Officer, Arizona Department of Transportation

Paki Rico, Public Information Officer, Arizona Department of Transportation

Scott Beck, Southern Regional Traffic Engineer, Arizona Department of Transportation

Mark Pugh, Principal Planner, San Xavier District of Tohono O'odham Nation

Nathan Barrett, Senior Transportation Planner, Pima Association of Governments

Robert Young, Pima County Department of Transportation

Nanette Slusser, Pima County Department of Transportation

Patrizia Gonella, Project Manager, Jacobs

Vamshi Yellisetty, Senior Transportation Planner, Jacobs

Melissa Anguiz, Public Involvement Specialist, Gordley Design Group

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1.0 INTRODUCTION

Purpose of the Study

The Sahuarita/El Toro Corridor Study is a joint effort by the Town of Sahuarita and the Arizona Department of Transportation (ADOT). The purpose of the study is to assess the feasibility of a transportation corridor that will provide adequate capacity for the potential future growth of the Town of Sahuarita and surrounding areas as well as increase local and regional connectivity in Pima County. The study is being funded by Federal Highway Administration's (FHWA) State Planning and Research Program and administered through ADOT's Multimodal Planning Division (MPD).

Located approximately 15 miles south of the City of Tucson and 47 miles north of the City of Nogales in the historic Santa Cruz Valley, the study area encompasses 100 square miles including a large portion of the Town of Sahuarita. The primary roadway access to the study area is I-19 which connects Tucson to the U.S./Mexico border at Nogales and is also part of the international trade corridor CANAMEX linking Mexico to Canada. Nogales Hwy, the other major north-south facility, links the Town of Sahuarita to the Tucson metropolitan area. As the only major east-west route, Sahuarita Rd provides regional and local access to businesses and residences. Figure 1.1 presents the Sahuarita/El Toro corridor study area boundary, which represents the limits of the corridor needs analysis.

In the completed *Town of Sahuarita Transportation Study*, it was recommended that El Toro Rd be constructed as a six-lane parkway to alleviate the severely congested principal thoroughfares due to the future growth identified in that study.

Study Objectives

The principal focus of this study is to define a preliminary transportation corridor that would serve as a foundation for future planning and engineering design for the Town of Sahuarita. With guidance from the Technical Advisory Committee (TAC) and other local stakeholders, the following objectives for this study were identified:

- Determine the feasibility of a potential east-west corridor along or parallel to El Toro Rd.
- Promote economic growth.
- Be attentive to the environmental and cultural setting of the study area.
- Enhance the mobility and connectivity of the transportation system at a regional and local level.
- Consider multi-modal transportation opportunities.
- Continued communication with the public.



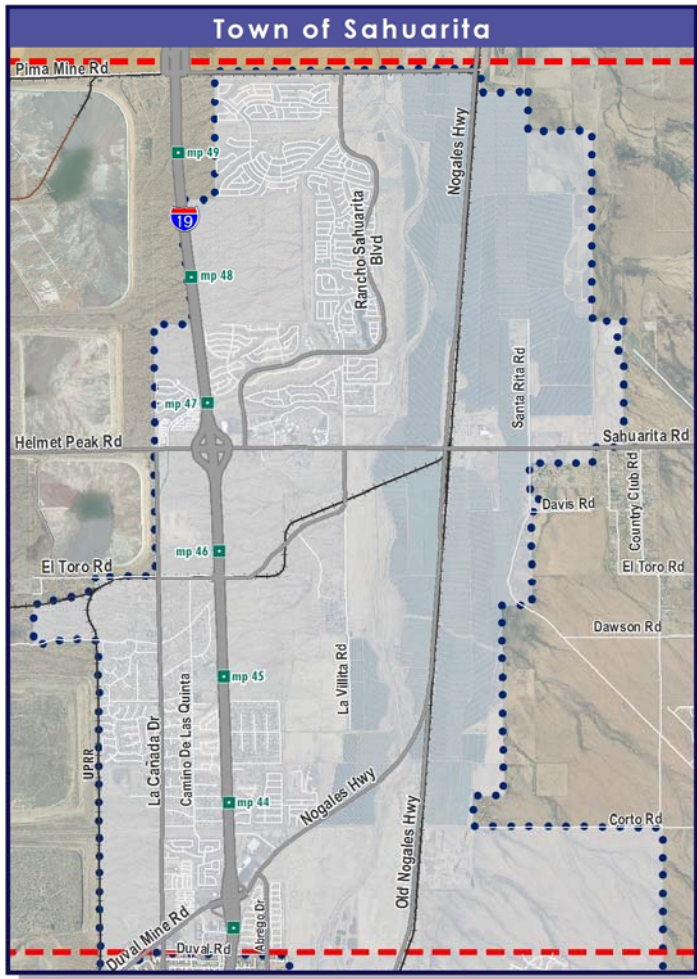
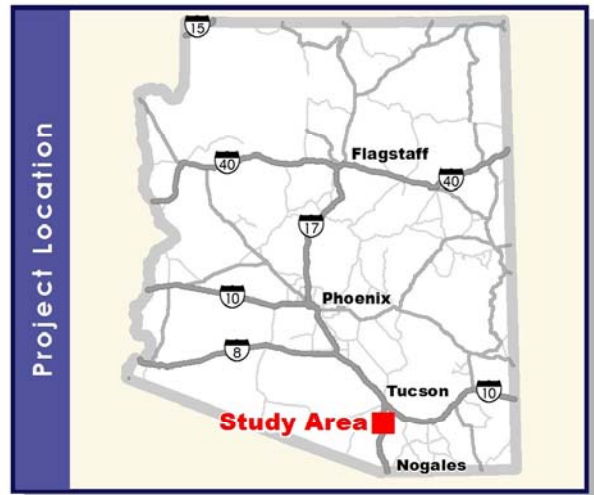
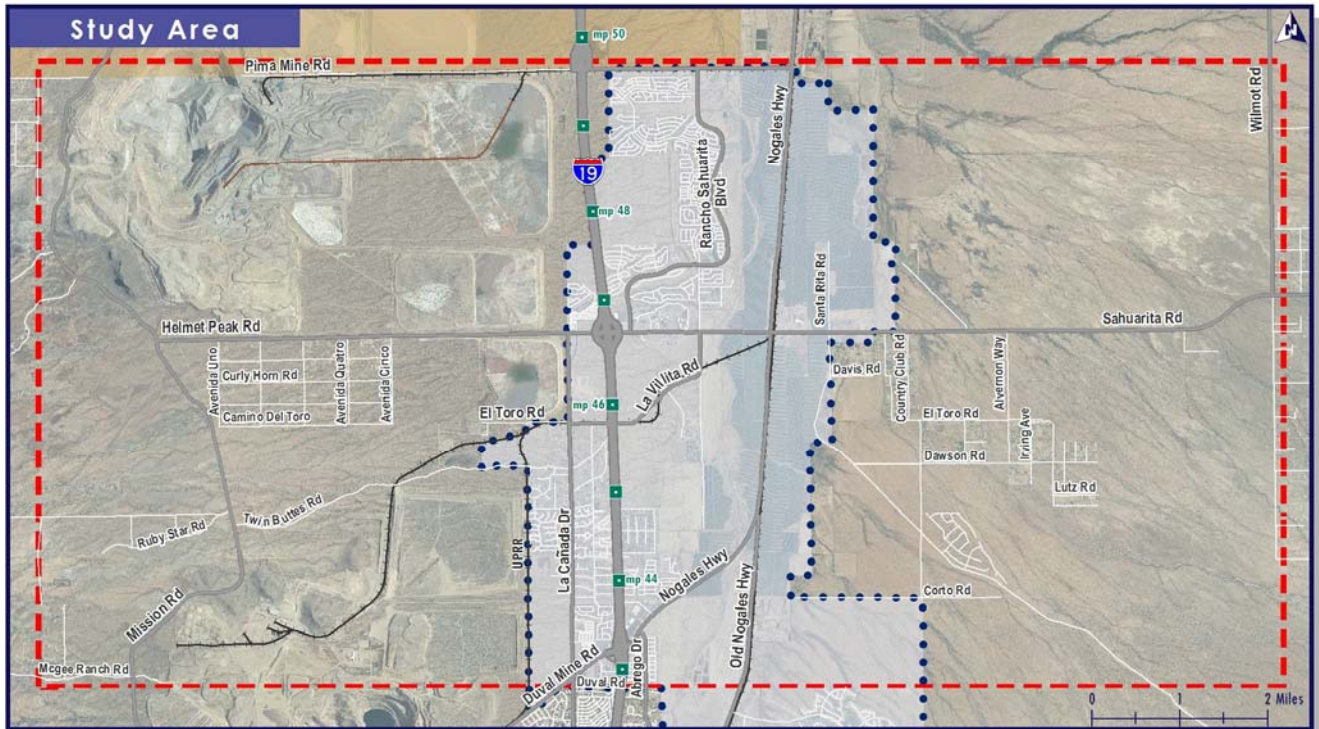


FIGURE 1.1: STUDY AREA

- Milepost
- Interstate
- Major Roads
- Frontage Road
- Other Roads
- Railroad
- Abandoned Railroad
- Tohono O'odham Nation
- Town of Sahuarita
- Study Area



Sources: Pima County DOT, ALRIS, and ADOT



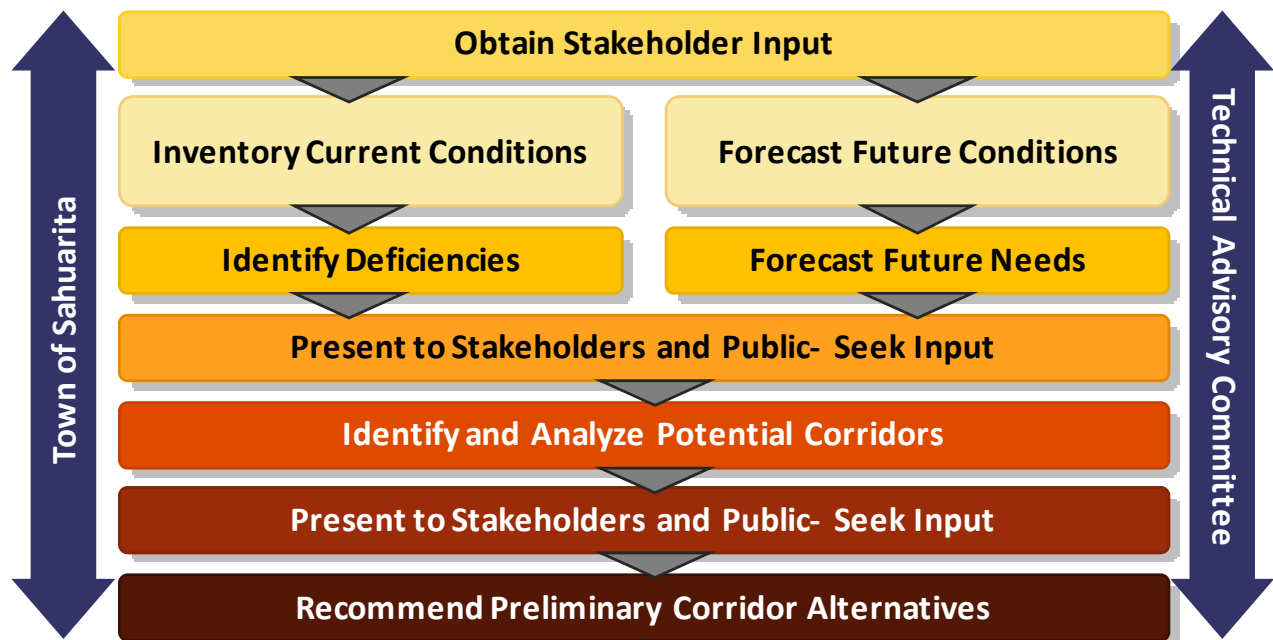
Study Process

The study was guided by a TAC that included representatives from:

- Town of Sahuarita
- ADOT – Tucson District
- ADOT – Multimodal Planning Division (MPD)
- Pima County Department of Transportation
- ADOT – Communication and Community Partnerships (CCP)
- Pima Association of Governments (PAG)
- ADOT – Environmental Group
- San Xavier District Tohono O’odham Nation (TON)

The role of the TAC was to provide guidance, support, advice, suggestions, and recommendations, and to perform document reviews throughout the study process. The first of two public open houses was conducted in May 2012 to present existing and projected transportation conditions and issues. The second open house was held in October 2012 to present corridor alternatives and to seek input from the public. Figure 1.2 illustrates the process utilized to complete this study.

FIGURE 1.2: STUDY PROCESS



2.0 PUBLIC INVOLEMENT OVERIVIEW

The public involvement activities provide opportunities to educate stakeholders and the public about the study, provide opportunities for community input, and to create a process for consensus building in support of the study recommendations. For this study, public involvement consisted of a series of stakeholder interviews and two public meetings. Meeting summaries are included in Appendix A.

Stakeholder Meetings

A total of eight stakeholders interviews were conducted from September 28, 2011 to October 21, 2011. Stakeholders were asked to provide input about the transportation needs and issues, questions and concerns as well as expectations of the study. Other key stakeholders included:

- Sahuarita School District
- Rancho Sahuarita Company
- Farmers Investment Company (FICO)
- Rural/Metro Fire Department
- Green Valley Fire District
- Asarco LLC
- Union Pacific Railroad (UPRR)
- Regional Transportation Authority (RTA)
- Green Valley Council
- Santa Cruz Valley Bicycle Advocate Committee
- Pima County Development Services
Department - Planning Division
- Pima County Office of Sustainability and
Conservation
- Arizona State Land Department
- LVA/FICO
- Kimley-Horn/FICO

Highlights include:

- The function of the corridor should first be established before evaluating possible alignments. If the function of the new corridor would be to accommodate bypass traffic, then Pima Mine Rd would be a better option. If economic development in Town is the function, then El Toro Rd or Duval Mine Rd are better options.
- However, Pima Mine Rd could pose significant challenges. One other possible option is to consider an alignment half-mile south of El Toro Rd.
- Although there are no current plans or timeframe for double tracking by UPRR, the potential corridor should provide ROW to accommodate at least 2-3 tracks. In addition, it is preferred that an overpass be a grade separate facility over the railroad with a clear span across.
- The corridor should provide multimodal opportunities that could include walking paths, bike lanes, and transit. In addition, any corridor should be cognizant of high level of cultural resource and environmentally sensitive areas such as riparian areas and wildlife habitat. As well as serve environmental justice populations.



Public Meeting # 1

The first set of public meetings was held March 8, 2012 to introduce the study to the community, present 2010 socioeconomic data, environmental and cultural constraints, and future needs and deficiencies as well as solicit public input in regards to the current transportation issues and potential corridor opportunities within the study area. A total of 31 persons attended the public meeting. Four comment forms were completed and returned, and are summarized in Table 2.1.

TABLE 2.1: SUMMARY OF PUBLIC MEETING #1 COMMENTS

Public Comment
<ul style="list-style-type: none"> ■ A new corridor should also have facilities for bicyclists & pedestrians. The ROW should include bike lane (paved shoulders) and parallel separated paved 12 ft wide multi-use paths.
<ul style="list-style-type: none"> ■ Unclear population slide in the presentation; US Census – 2010 Sahuarita pop was over 25,000. So is “study area” 23,000?
<ul style="list-style-type: none"> ■ La Villita Rd is labeled incorrectly.
<ul style="list-style-type: none"> ■ If El Toro Rd corridor should interfere with the old tailing ponds from the old mill, will the tailing pond waste be remediated?
<ul style="list-style-type: none"> ■ If and when El Toro Rd corridor goes forward and realignment begins, will Gonzalez Farm Rd have access to the Gonzalez property? <ul style="list-style-type: none"> - Will Gonzalez Farm Rd be maintained by the Town of Sahuarita after realignment of El Toro Rd? - Will The Town of Sahuarita pave Gonzalez Farm Rd when El Toro Rd corridor is completed?
<ul style="list-style-type: none"> ■ Will the properties along and adjacent to the new El Toro Rd corridor be re-zoned?
<ul style="list-style-type: none"> ■ El Toro is not the best place to put an east/west corridor; Pima Mine Rd is the better location.
<ul style="list-style-type: none"> ■ The local Tucson television news reported that the Nogales Mariposa entrance into the United States from Mexico is being expanded to 20 lanes. Additional customs agents will be hired.
<ul style="list-style-type: none"> ■ If El Toro is selected, extra noise protection is needed especially with more trucks on I-19 and the possible El Toro corridor. Residential areas are already impacted with noise from I-19 and an additional interchange at El Toro would generate additional noise with trucks lowering and revving their engines as they move to/from I-19 and El Toro. Plans should include a noise abatement plan such as tall walls and restrictions on truck noise.
<ul style="list-style-type: none"> ■ If a major east-west transportation route has already been designated as a hazardous waste route. It is preferred that hazardous waste should not be moved through the community at all, especially along Sahuarita Rd where the large complex of schools are located or along the proposed El Toro corridor among residential areas.
<ul style="list-style-type: none"> ■ There is an old mill site with waste tailings with lead contamination located on El Toro, plans should be made to clean up that site by the owners of the land.



Public Meeting # 2

The second public meeting was held October 18, 2012 to present the potential corridors, evaluation criteria and analysis, and solicit public input in determination of preferred corridor(s). A total of 11 persons attended the public meeting. Three comment forms were completed and returned, as part of the comment form the public was asked to rank the different alternatives from a scale of 1 = Preferred to 4=Exclude. Table 2.2 presents a summary of the public comment.

TABLE 2.2: SUMMARY OF PUBLIC MEETING #2 COMMENTS

Public Comment	Alternative Preference			
	1	2	3	4
<ul style="list-style-type: none"> ■ As specific design begins be certain that a proper and appropriate crossing for the Anza Trail is included that enhances cultural/historic reuses. ■ Don't leave out the connection with I-10 from Mexico. 	2	1	No	3
<ul style="list-style-type: none"> ■ Extension of Pima Mine to Wilmot and I-10 is very important to growth of Sahuarita. A second parkway from El Toro would be excellent for Sahuarita. One railroad crossing only. ■ El Toro Rd alone out to Wilmot will not meet our needs and will lead to congestion. Several rail crossings and difficult interchange issues at El Toro Rd. ■ For local people repair the two railroad crossing on El Toro. ■ With balance of money use for I-10 and Sahuarita Rd exit, also improve Sahuarita Rd. to Nogales Hwy. 	4	1	4	1



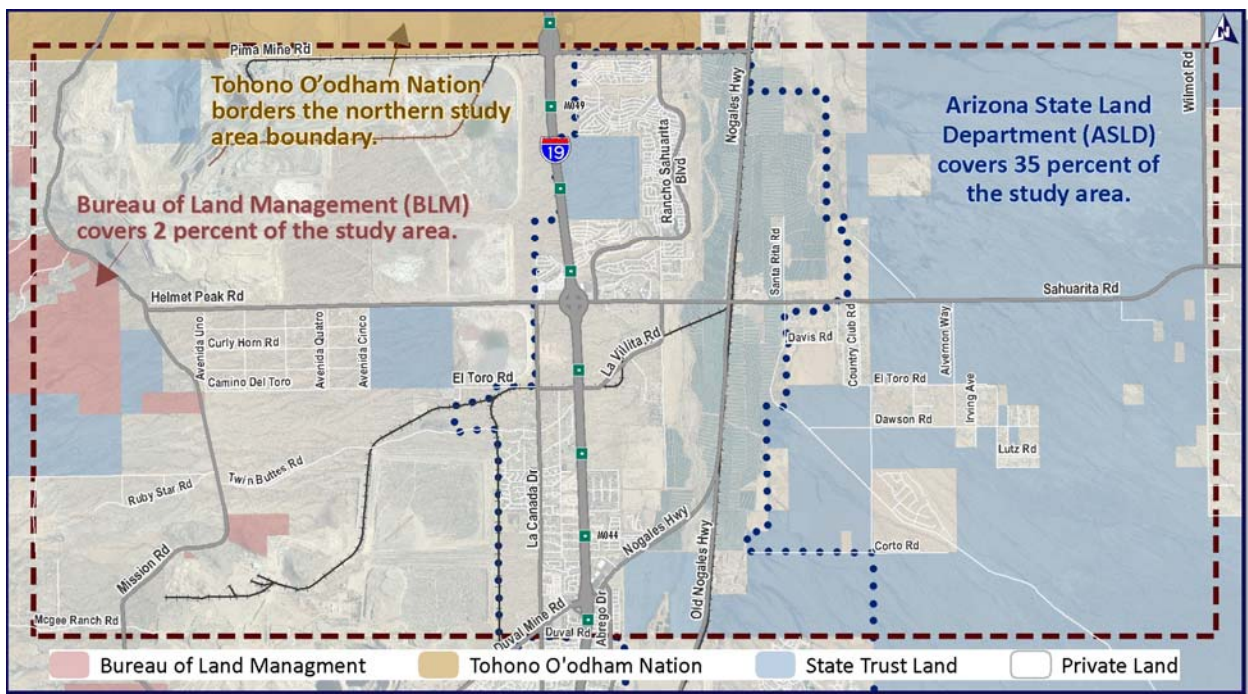
3.0 EXISTING CONDITIONS

This section summarizes current land use, socioeconomic conditions, characteristics of the physical and natural environments, environmental justice population review (Title VI), and cultural resources inventory for the study area.

Land Ownership Status

Privately owned land accounts for more than 60 percent of the land coverage in the study area, as shown in Figure 3.1, while State Trust lands cover roughly 35 percent of the remaining portion of the study area.

FIGURE 3.1: LAND OWNERSHIP



Socioeconomic Conditions

Creating an inventory of the study area's socioeconomic characteristics and understanding this data is a critical element of any transportation corridor planning study. Key statistics for the study area include:

- Land Area: 100 square miles
- Population (Year 2010): 23,289*
- Total Housing Units (Year 2010): 9,001*
- Occupied Housing Units (Year 2010): 7,865*
- Principal Economic Activities: Mining, Agriculture, and Retail

*Source: 2010 U.S. Census Bureau, Arizona Department of Commerce



Population and Housing Unit Growth Trends

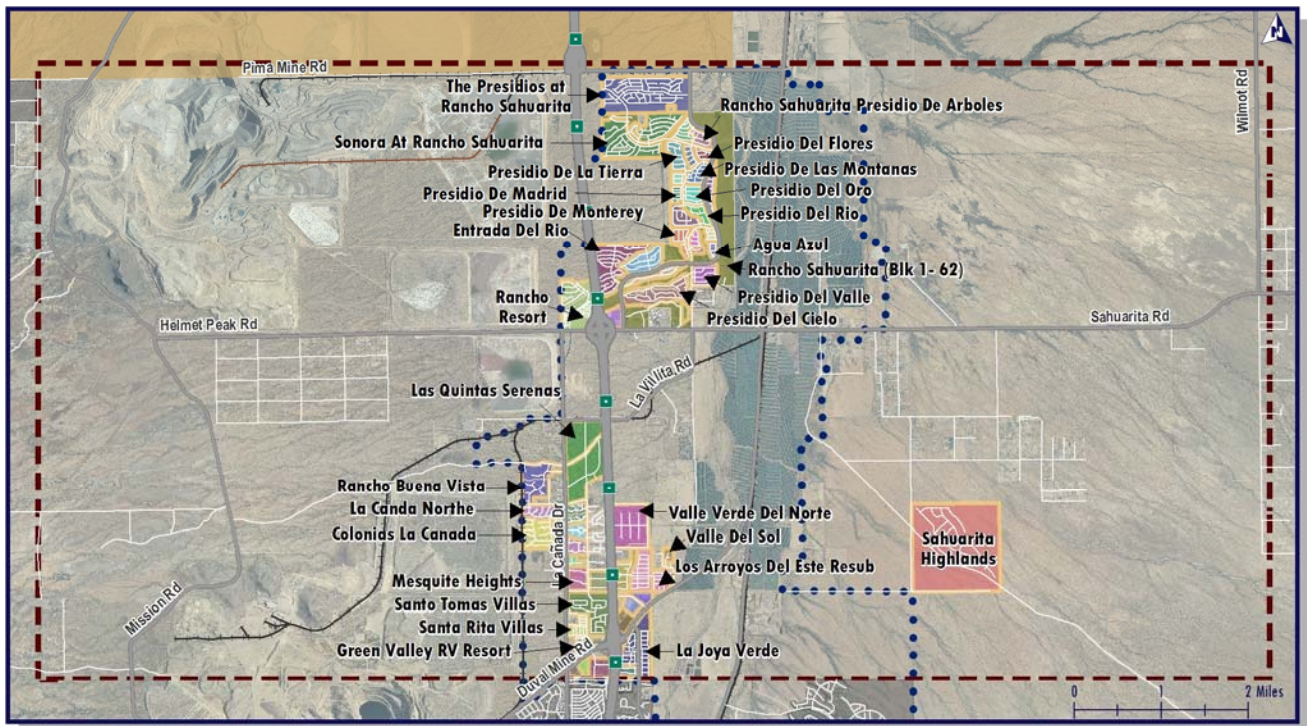
According to the 2010 U.S. Census the study area had a population of approximately 23,289 residents, 90 percent of which resides within the Town's boundary. A small portion of the Town, primarily the southern part, is not in the study area. Within the last decade, the study area has experienced a significant amount of growth; the population has increased by 330 percent while the housing units increased from 2,000 to 9,000 (348%). The amount of growth within the study area is higher than the county, State, and National average. Table 3.1 lists the population and housing growth trends from 2000 to 2010 while Figure 3.2 depicts the location of the study area's master planned communities.

TABLE 3.1: POPULATION AND HOUSING UNIT GROWTH TRENDS

Geographic Area	Population		Population Growth Rate	Housing Units		Housing Units Growth Rate
	2000	2010		2000	2010	
Study Area	5,412	23,289	33.3%	2,009	9,001	34.8%
Pima County	843,746	980,263	1.6%	366,737	440,909	2.0%
Arizona	5,130,632	6,392,017	2.5%	2,189,189	2,844,526	3.0%

Source: 2000 U.S. Census Bureau, 2010 U.S. Census Bureau, Arizona Department of Commerce

FIGURE 3.2: EXISTING SUBDIVISIONS



As illustrated in Figure 3.3, the population in the study area is mainly located along the Sahuarita Rd corridor east of I-19, with the largest concentration within the Rancho Sahuarita master planned community and in the southern portion of the study area along La Cañada Drive

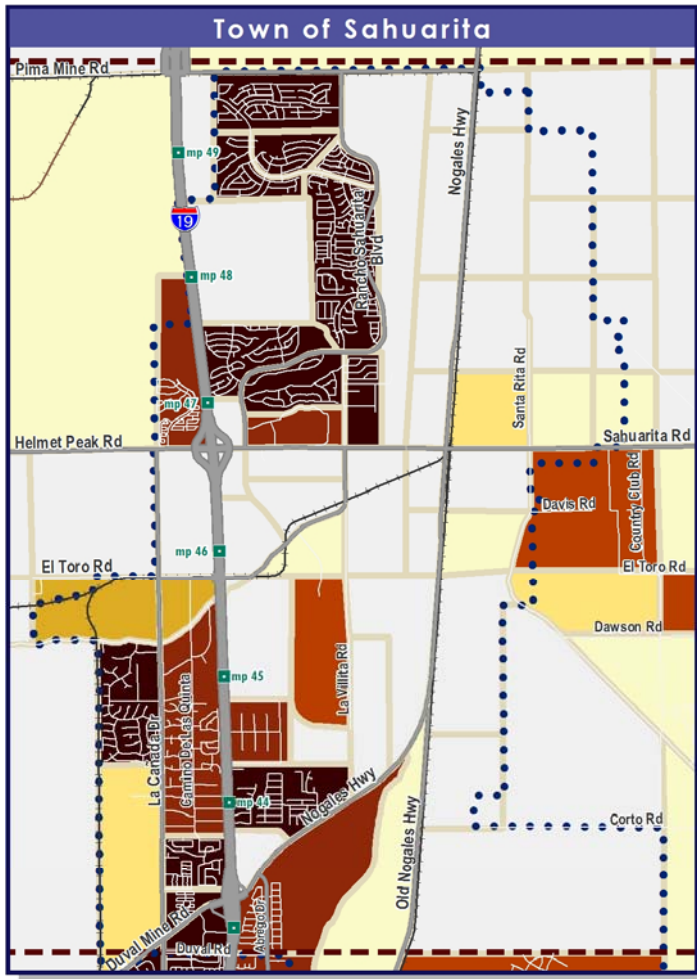
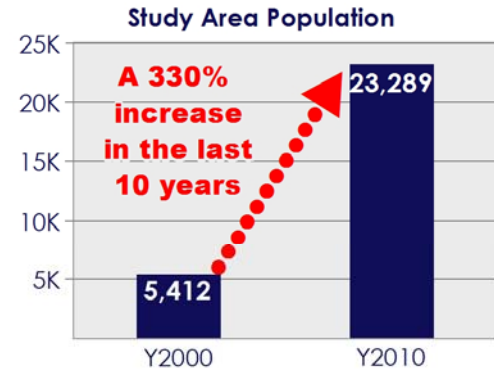
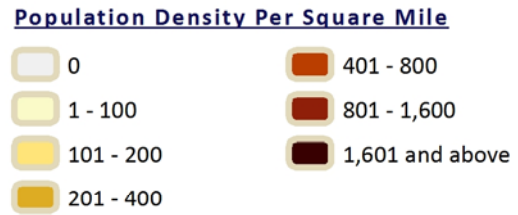


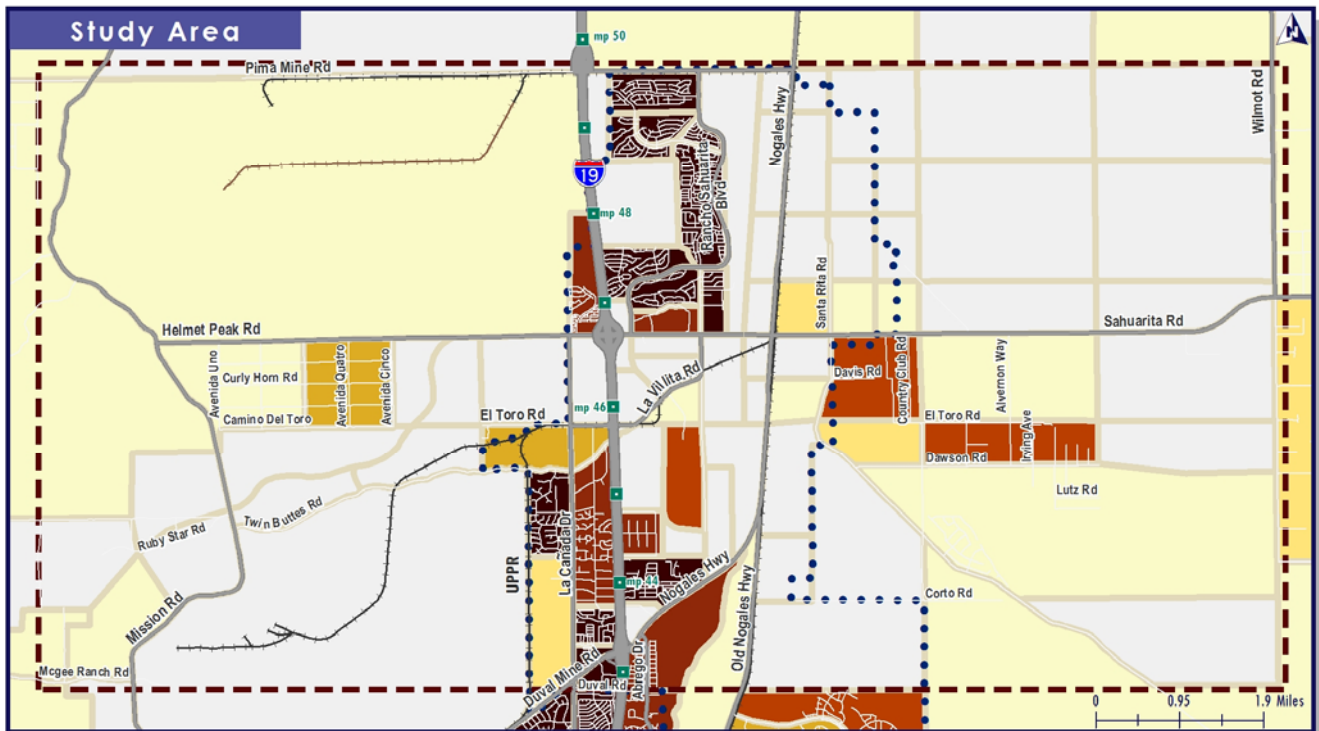
FIGURE 3.3: 2010 POPULATION DENSITY



REFERENCE

- Milepost
- Interstate
- Major Roads
- Frontage Road
- Other Roads
- Railroad
- Abandoned Railroad
- Town of Sahuarita
- Study Area

Sources: Census 2010, Town of Sahuarita, PAG, Pima County DOT, ALRIS, and ADOT



Employment Overview

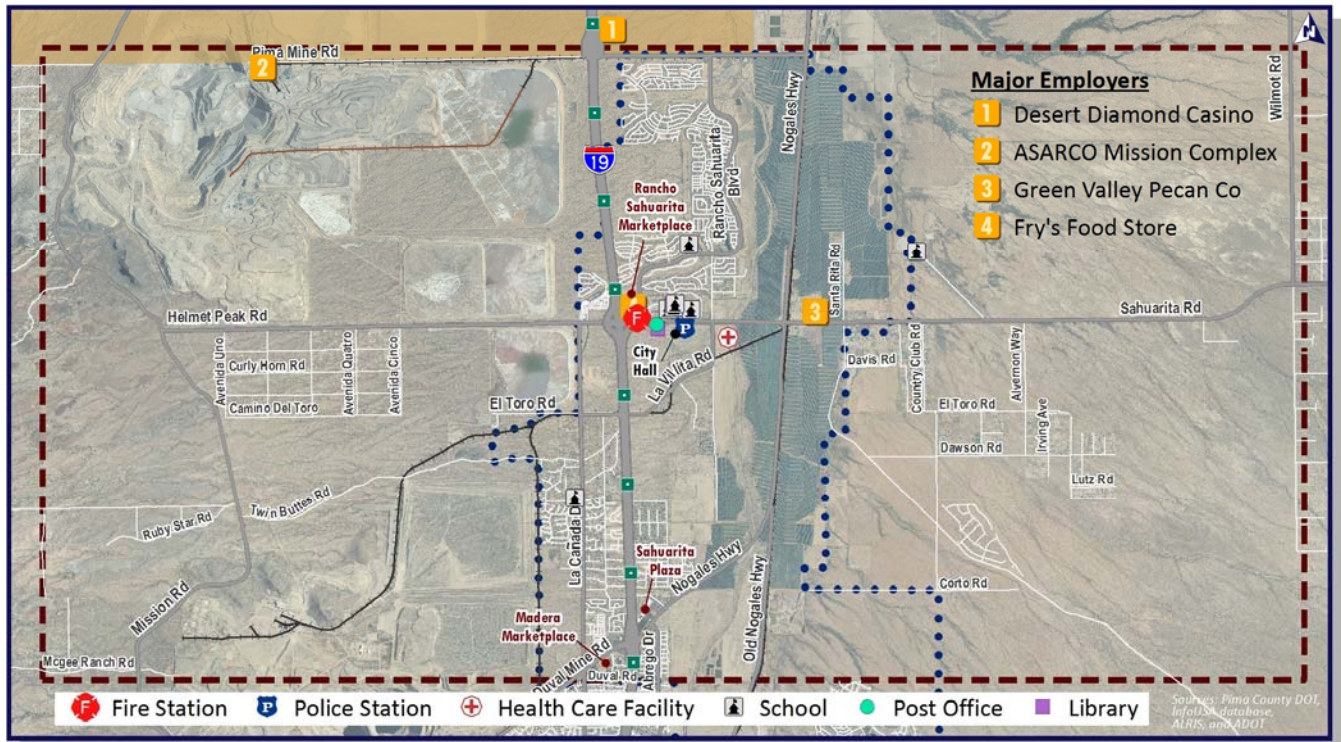
Mining, agricultural, and retail are the primary economic drivers of the study area. The largest employment center in the area, Desert Diamond Casino, is located north of the study area in the Tohono O’odham Nation. Many of the residents travel to the City of Tucson for employment, thus making the Town a bedroom community. Figure 3.4 presents a visual depiction of the location of the major activity centers in the study area. Many of the local amenities are located along Sahuarita Rd and Nogales Hwy east of I-19. In addition, there are nine schools within the study area; four elementary schools, one middle school, two high schools, and two charter schools.

TABLE 3.2: MAJOR EMPLOYERS

Major Employers	Employees
Desert Diamond Casino	750
ASARCO Mission Complex	600
Green Valley Pecan Company	287
Fry's Food Store	135
Safeway	125
Jim Click Hyundai	50

*Source: InfoUSA database

FIGURE 3.4: MAJOR ACTIVITY CENTERS

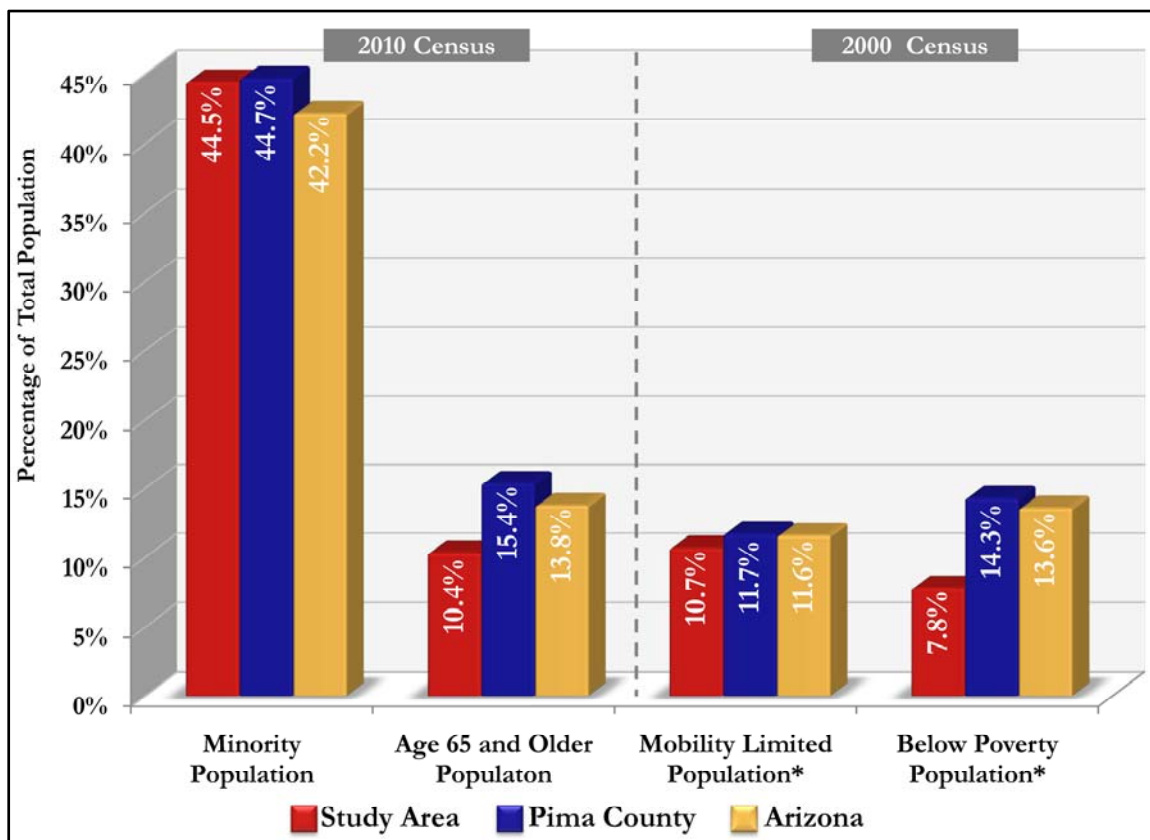


Environmental Justice Review (Title VI)

Title VI of the Civil Rights Act of 1964 and related statutes require individuals not be discriminated against based on race, color, national origin, age, sex, or disability. Executive Order 12898 on Environmental Justice dictates that any programs, policies, or activities to be implemented are not to have disproportionately high adverse human health and environmental effects on minority populations. Environmental justice principles and procedures are followed to assure that transportation improvements do not adversely impact different socioeconomic groups. To assure that these policies are adhered to, a variety of possible alternatives should be developed and considered in order to make sure all groups are fairly represented in the amount and type of transportation services provided.

Protected populations considered in this analysis include minority, elderly, low-income, and disabled populations. Figure 3.5 shows a graphical comparison of these protected populations in the study area, Pima County and State of Arizona. Updated 2010 Census data was unavailable for select protected population; therefore 2000 Census estimates were used to identify mobility limited and below poverty level populations.

FIGURE 3.5: TITLE VI POPULATION GROUPS COMPARISON



Source: 2010 U.S. Census, *2000 U.S. Census



Minority Population: Minority population consists of individuals who are members of the following population groups: Native American or Alaskan Native, Asian or Pacific Islander, Black, Hispanic, other race, or two or more races. According to the 2010 Census data:

- Minorities accounted for 44.5 percent of the study area population, with Hispanics as the largest minority group.
- Minority population in the study area is higher than the state's estimate (42.2%).

Figure 3.6 illustrates the concentration of minority populations.

Age 65 and Older Population: According to the 2010 Census data:

- 10.4 percent of the study area population are age 65 or older.
- The age 65 and older population in the study area is less than the State (13.8%) and county (15.4%) estimates.

Figure 3.7 displays the age 65 and older population concentrations.

Mobility Limited Population: Mobility-limited population is comprised of individuals who have a physical or mental disability that prohibits them from operating an automobile and may require access to public transportation. According to the 2000 Census:

- 10.7 percent of the study area population are mobility limited.
- The study area's estimate is less than both county (11.7%) and State (11.6%).

Figure 3.8 shows the mobility-limited population concentrations in the study area.

Below Poverty Population: Below poverty populations are individuals living in households that lie within a set of income thresholds, which vary by family size and composition, established by the U.S. Census Bureau. According to the 2000 Census:

- 7.8 percent of the study area population was below the poverty status
- The study area's population below poverty status was approximately half of the state (13.6%) and county (14.3%) estimates.

Figure 3.9 illustrates the below poverty population concentrations



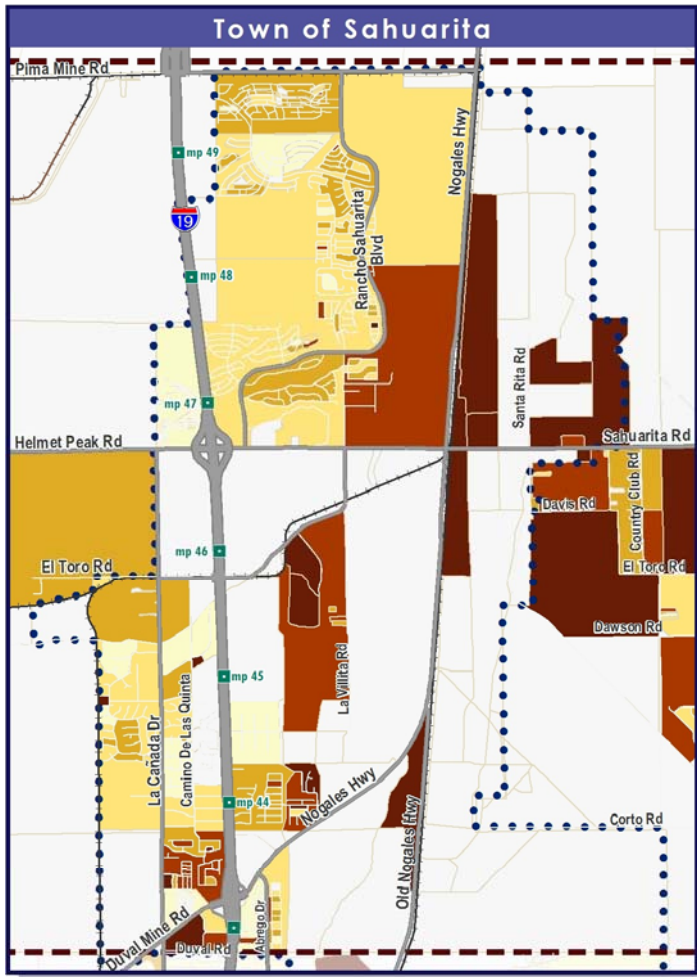


FIGURE 3.6: MINORITY POPULATION

Above Study Area Average		Below Study Area Average	
0.0%	44.6% - 60.5%	44.6% - 60.5%	
1.0% - 22.5%	60.6% - 75.5%	60.6% - 75.5%	
22.6% - 44.5%	75.6% - 100.0%	75.6% - 100.0%	

Percentage of Minority Population in:
 Study Area: 44.5%
 Pima County: 44.7%
 State of Arizona: 42.2%

Minority population consists of individuals who are members of the following population groups: Native American or Alaskan Native, Asian or Pacific Islander, Black, and Hispanic.

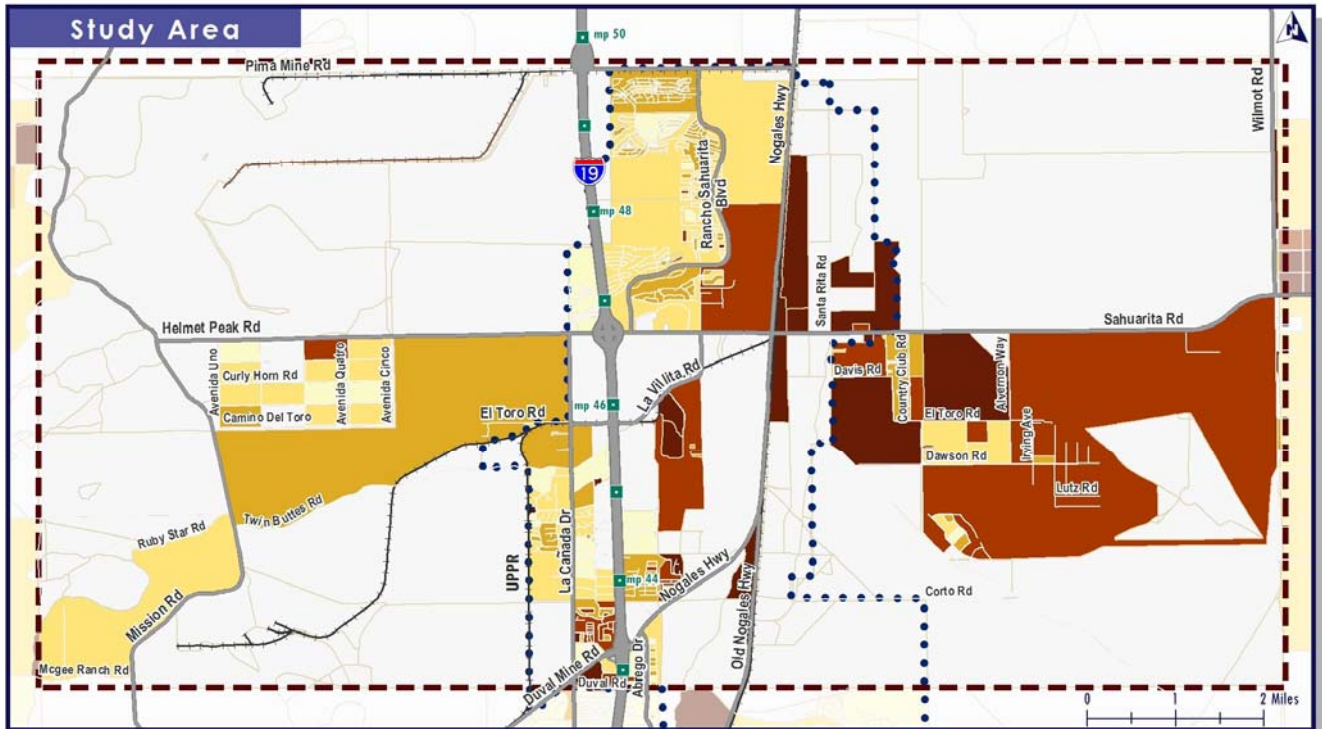
A high percentage of minority population does not necessarily mean that there is a large minority population in the area. The map shows what percentage of people living in the census block are minority.

For example if the census block has a:
 Total population = 1 and the minority population = 1 then the percentage of minority living in the census block = 100%

REFERENCE

- Milepost
- Interstate
- Major Roads
- Frontage Road
- Other Roads
- Railroad
- Abandoned Railroad
- Town of Sahuarita
- Study Area

Sources: Census 2010, Pima County DOT, ALRIS, and ADOT



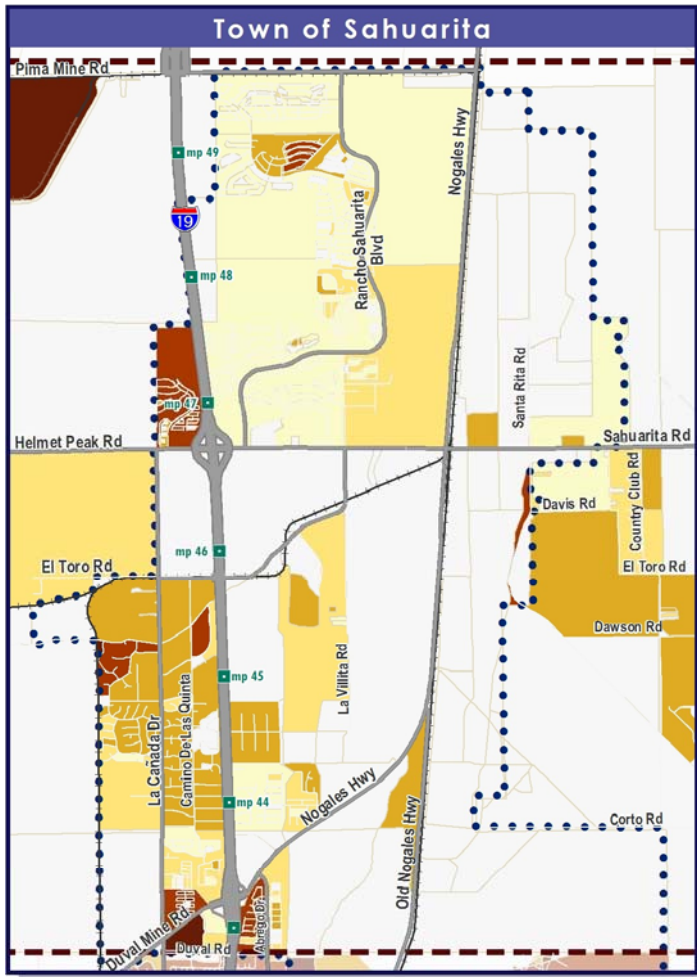


FIGURE 3.7: ELDERLY POPULATION

Above Study Area Average	Below Study Area Average
0.00%	10.5% - 40.4%
0.01% - 5.40%	40.5% - 80.4%
5.41% - 10.40%	80.5% - 100.0%

Percentage of Elderly Population in:
 Study Area: 10.4%
 Pima County: 15.4%
 State of Arizona: 13.8%

Elderly population consists of individuals who are age 65 years and older.

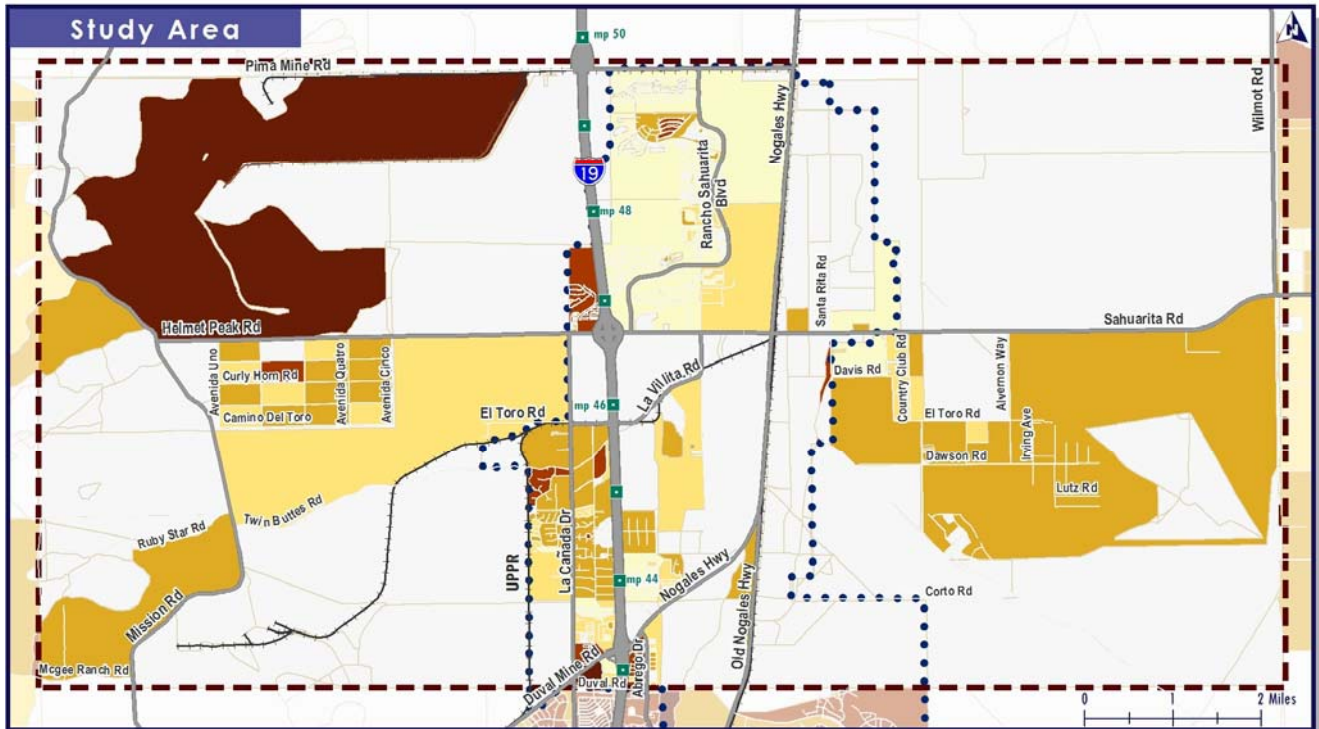
A high percentage of elderly population does not necessarily mean that there is a large elderly population in the area. The map shows what percentage of people living in the census block are elderly.

For example if the census block has a:
 Total population = 1 and the elderly population = 1 then the percentage of elderly living in the census block = 100%

REFERENCE

- Milepost
- Interstate
- Major Roads
- Frontage Road
- Other Roads
- Railroad
- Abandoned Railroad
- Town of Sahuarita
- Study Area

Sources: Census 2010, Pima County DOT, ALRIS, and ADOT



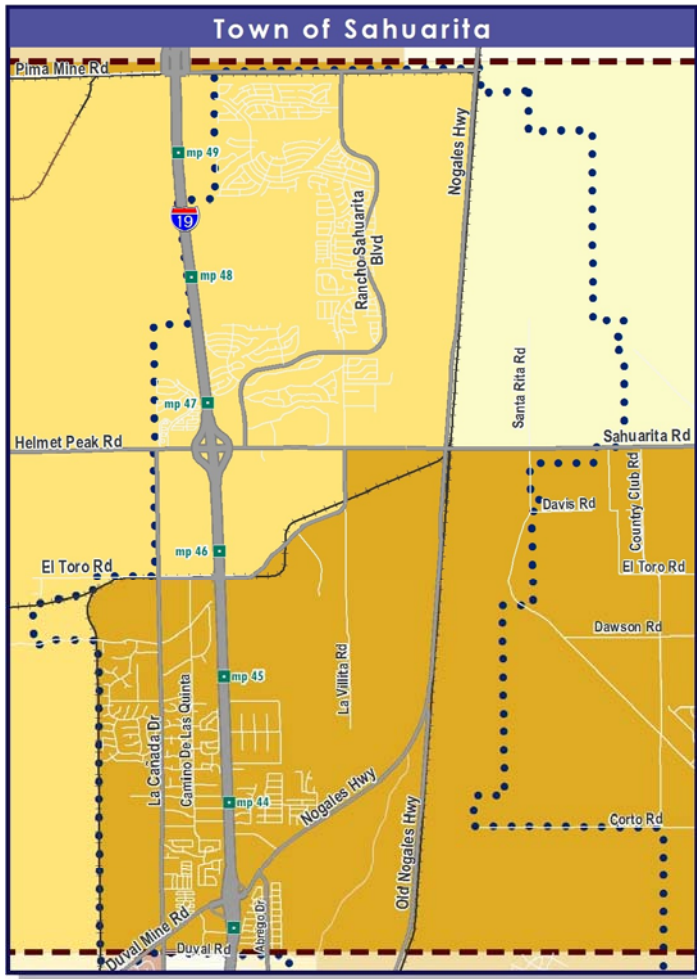


FIGURE 3.8: MOBILITY LIMITED POPULATION

Above Study Area Average	Below Study Area Average
0.0%	10.8% - 13.7%
1.0% - 7.7%	13.8% - 15.7%
7.8% - 10.7%	15.8% - 16.0%

Percentage of Mobility Limited Population in:
 Study Area: 10.7%
 Pima County: 11.7%
 State of Arizona: 11.6%

The mobility-limited population is made up of individuals who have a physical or mental disability that prohibits them from operating an automobile.

A high percentage of mobility limited population does not necessarily mean that there is a large mobility limited population in the area. The map shows what percentage of people living in the census block group are mobility limited.

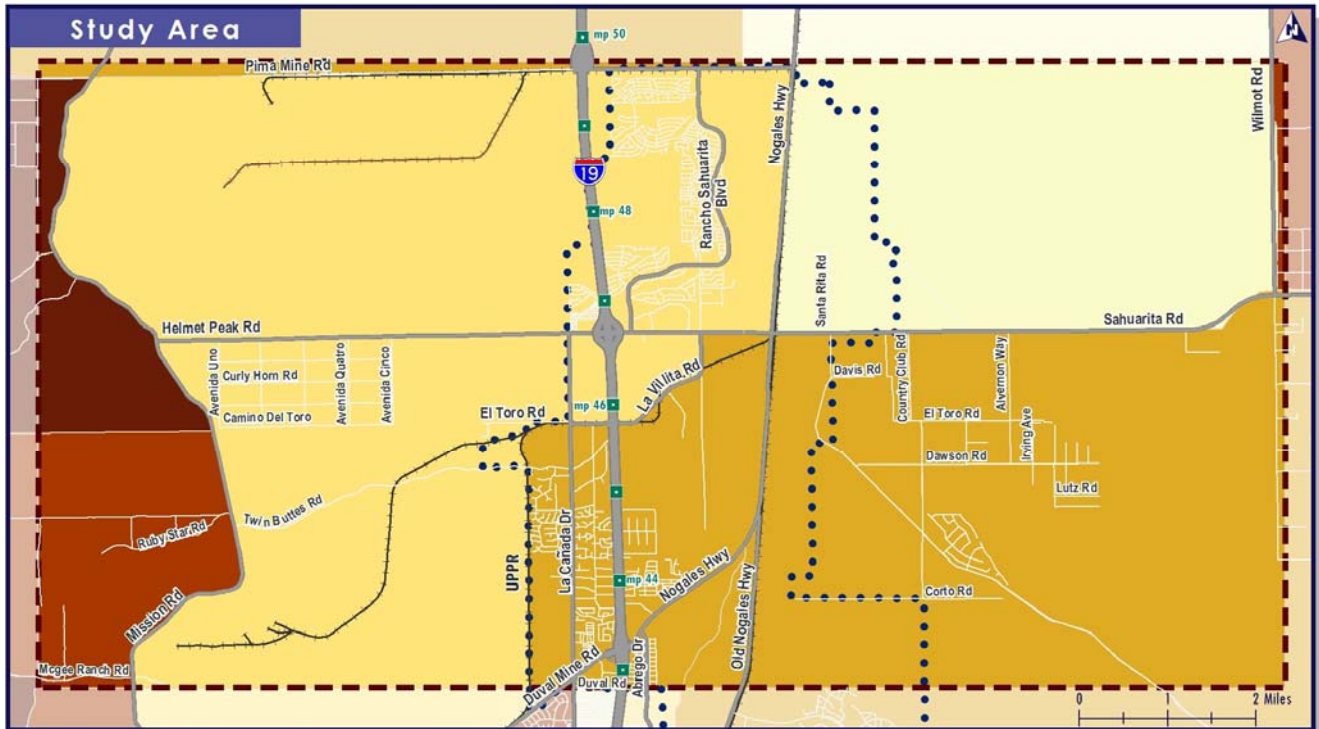
For example if the census block group has a:
 Total population = 1 and the mobility limited population = 1
 then the percentage of mobility limited population living in the census block group = 100%

Note: Several census block groups displayed extend beyond study area

REFERENCE

- Milepost
- Interstate
- Major Roads
- Frontage Road
- Other Roads
- Railroad
- Abandoned Railroad
- Town of Sahuarita
- Study Area

Sources: Census 2000 SF3, Pima County DOT, ALRIS, and ADOT



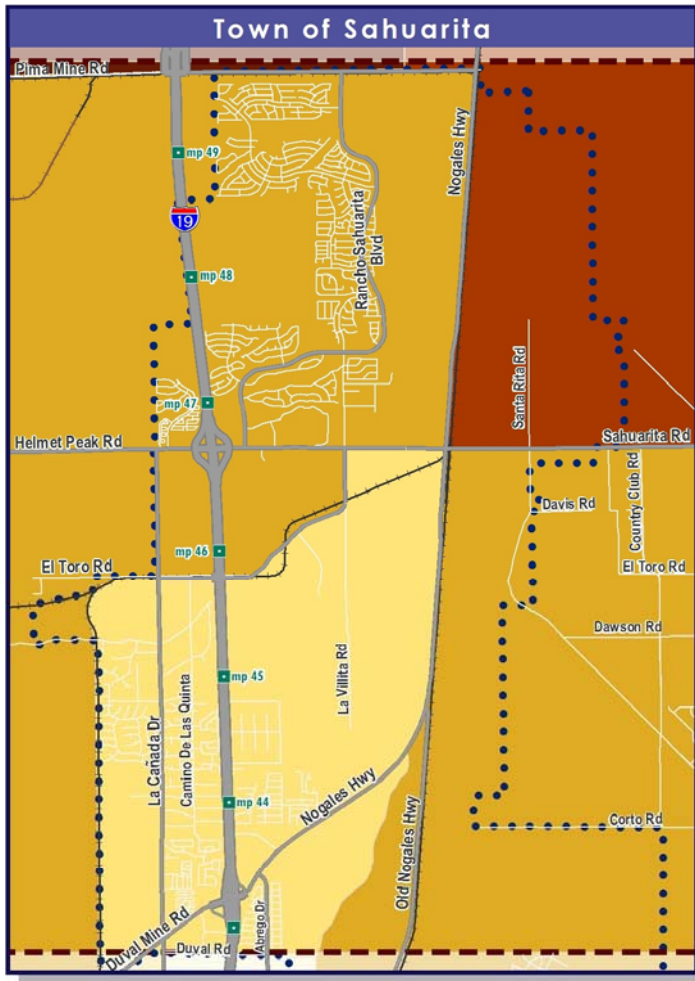


FIGURE 3.9: BELOW POVERTY POPULATION

Above Study Area Average	Below Study Area Average
0.0%	7.9% - 10.8%
1.0% - 4.8%	10.9% - 15.8%
4.9% - 7.8%	15.9% - 23.0%

Percentage of Below Poverty Population in:
 Study Area: 7.8%
 Pima County: 14.3%
 State of Arizona: 13.6%

The Census Bureau uses a set of income thresholds that vary by family size and composition to determine below poverty population.

A high percentage of below poverty population does not necessarily mean that there is a large poverty population in the area. The map shows what percentage of people living in the census block group are below poverty.

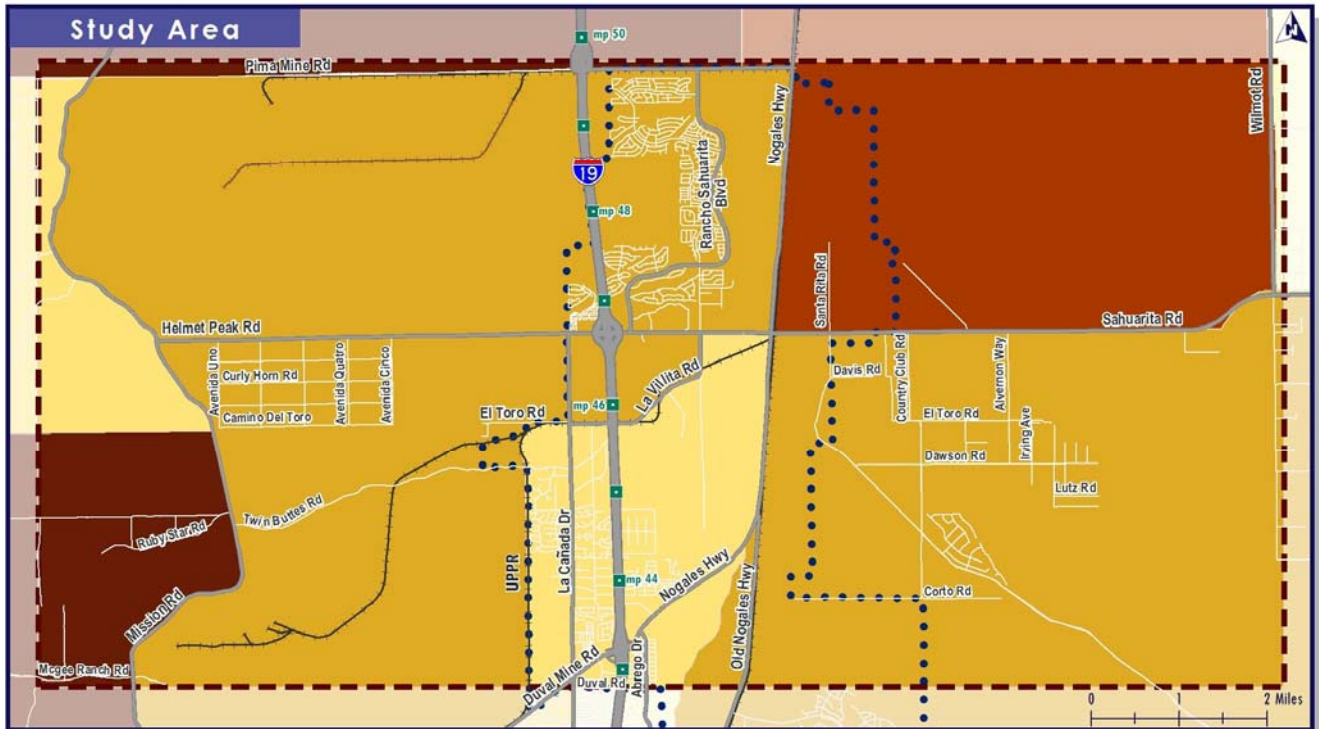
For example if the census block group has a:
 Total population = 1 and the poverty population = 1 then the percentage of people living below poverty in the census block group = 100%

Note: Several census block groups displayed extend beyond study area

REFERENCE

- Milepost
- Interstate
- Major Roads
- Frontage Road
- Other Roads
- Railroad
- Abandoned Railroad
- Town of Sahuarita
- Study Area

Sources: Census 2000 SF3, Pima County DOT, ALRIS, and ADOT



Environmental Overview

Inventory of the physical, natural, and cultural environment is an important component of the corridor planning process. When environmental conditions and historic and cultural concerns are reviewed in the early stages of the planning process, transportation solutions can be developed to minimize the negative impacts on the environment and cultural treasures. Figure 3.10 displays environmental and cultural elements of significance within the study area.

Natural Environment

Vegetation: Two types of vegetation exist within the study area; the most predominant vegetation type found is the Arizona Upland Sonoran Desertscrub.

Riparian Areas: Natural Resources Conservation Service (NRCS) defines riparian areas as vegetation, habitats, and ecosystems that occur along watercourse or water bodies. Overall 4.7 percent of the total study area is identified as riparian areas, with 3.4 % classified as important riparian areas.

Water Features: Major hydrological features in the area include the Santa Cruz River, and Box Canyon Wash. Additional minor hydrological features are located through the study area. In addition, the study area is classified under the Upper Santa Cruz & Avra Basin Sole Source Aquifer and under the Tucson Active Management Area.

Wetlands: Wetlands are defined, by the U.S. Army Corps of Engineers, as areas inundated or saturated frequently by surface water or ground water that can support an ecosystem. Within less than 1,500 feet of the Pima Mine Rd and Nogales Hwy intersection, two potential wetlands have been identified; however, one of the wetlands is outside the study area.

Geology: Alluvium is present in more than half of the study area, thus contributing to areas classified as Prime Farmland (if irrigated). These lands comprise approximately 22 percent of the study area and are located predominantly along the Santa Cruz River.

Environmental Concerns

Leaking Underground Storage Tanks: Environmental Protection Agency (EPA) defines underground storage tanks as any tank and any underground piping connected to the tank that stores petroleum or hazardous substances. The Arizona Department of Environmental Quality (ADEQ) has identified five leaking underground storage tanks in the study area.

Mines: The Sahuarita area has historically been one of Arizona's oldest mining districts, with 32 mines located within the study area. These mines consist of active and inactive mines, with copper as the largest commodity extracted.



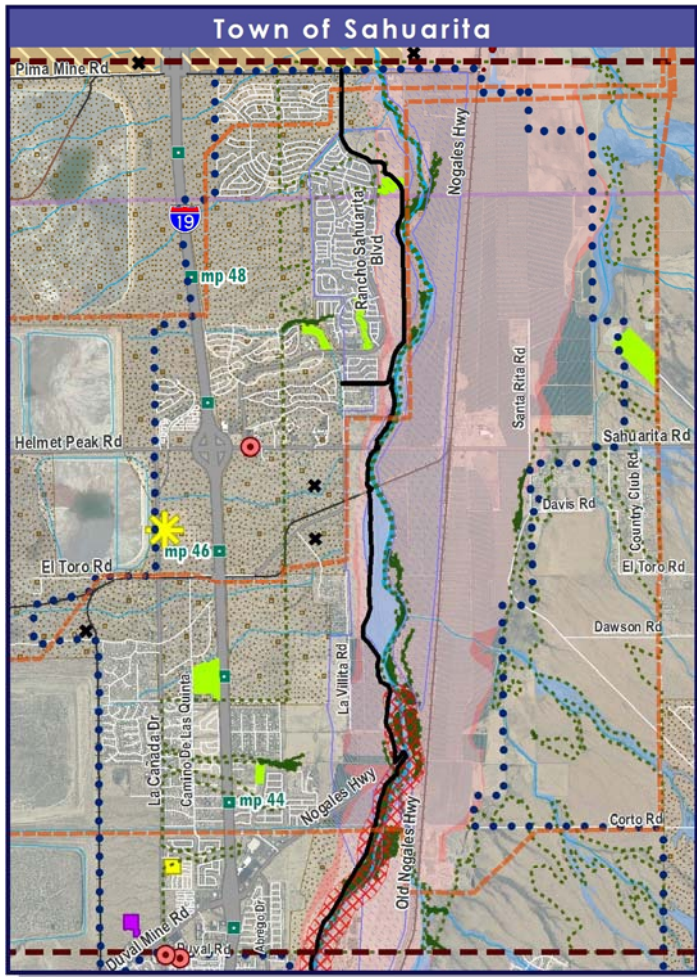


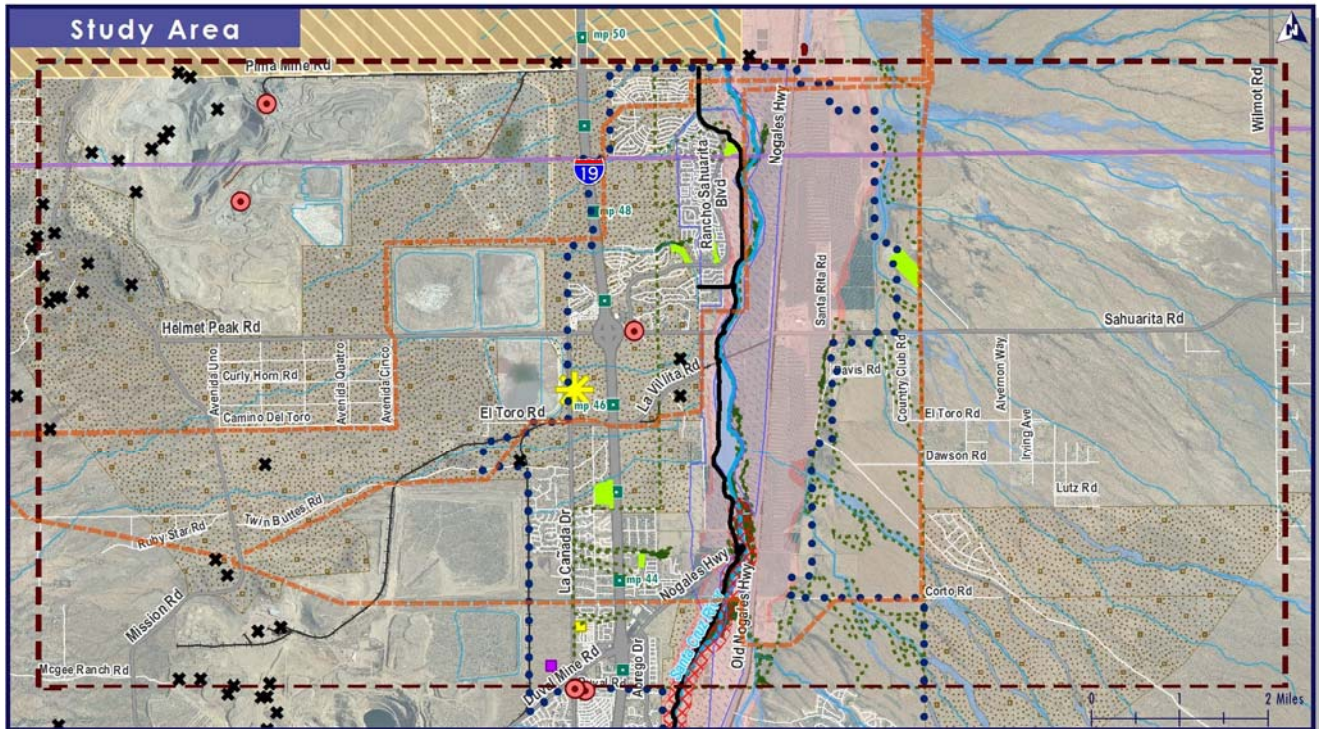
FIGURE 3.10: ENVIRONMENTAL OVERVIEW

- Leaking Underground Storage Tank
- Mine
- Active Municipal Solid Waste Landfill
- Juan Bautista De Anza National Historic Trail
- Major Transmission Line
- Santa Cruz River
- Major Rivers and Washes
- Parks
- Green Valley Mortuary and Cemetery
- Titan Missile Museum - National Historic Landmark
- Carbon Monoxide Maintenance Area
- Important Riparian Areas
- High Flood Hazard
- Moderate Flood Hazard
- Potential Wetland
- Habitat Block
- Wildlife Corridor
- High Level of Cultural Resource
- Agriculture In-Holdings
- Multiple Use Management Area
- Farmland of Unique Importance
- Prime farmland if irrigated & either protected from flooding or not frequently flooded during the growing season

REFERENCE

- Milepost
- Interstate
- Major Roads
- Frontage Road
- Other Roads
- Railroad
- Abandoned Railroad
- Tohono O'odham Nation
- Town of Sahuarita
- Study Area

Sources: Pima County DOT, ADEQ, ALRIS, and ADOT



Large Quantity Generators (LQG) of Waste: As defined by the EPA, large quantity generators (LQG) generate 1,000 kilograms per month or more of hazardous waste. Currently there is one LQG's located within the study area, the Kerly Mining and Chemical Company.

Active Municipal Solid Waste Landfill: The Sahuarita Landfill is located along La Cañada Dr, north of El Toro Rd. The landfill occupies approximately 64 acres within the study area and actively collects solid waste and recycles green waste, metal, batteries, oil, and tires.

Air Quality: Approximately 15 percent of the northern portion of the study area is located within a Carbon Monoxide (CO) Maintenance area of the Tucson Air Planning Area. Maintenance areas are geographic areas that previously had a history of nonattainment but currently meet air quality standards set by Clean Air Act of 1970.

Flooding Hazards

High Risk Flood Prone Areas: Flood zones are geographic areas that FEMA has defined according to varying levels of flood risk. The Nogales Hwy corridor, which runs parallel to Santa Cruz River, is within the FEMA defined “High Risk Flooding Areas”, which range from areas with a 1 percent annual chance of flooding to a 26 percent chance of flooding over the life of a 30-year mortgage. In addition, several areas are within the “Moderate Risk Flooding Areas”, which is the area between the high-risk flood area and the 0.2 percent change of flooding. Other areas are classified as “Moderate Risk”, where local, shallow flooding is a problem or the area is protected by a levee.

Recreation Areas

Recreation Areas: Several recreational opportunities are currently available at the local and regional level within the study area; local parks include North Santa Cruz Park, Anza Trail Park, Sahuarita Lake Park, Anamex Park, and Parque Arroyos Park. The Sahuarita District Park is owned and operated by Pima County and includes athletic fields, ball courts, and an aquatic facility.

Utilities

Utilities: Several transmission lines, ranging from 46 kV to 345 kV, owned and operated by Tucson Electric Power transverse through the central portion of the study area. Two 345 kV transmission lines border the master planned community of Rancho Sahuarita and cross I-19 prior to either terminating or exiting the western study boundary. The first 345 kV transmission line crosses I-19 south of milepost 48, while the second transmission line crosses south of milepost 46 (generally following El Toro Rd). There are three existing substations in the area; one in the vicinity of the Pima Mine Rd and Rancho Sahuarita Blvd intersection, one north of the Sahuarita Parks Rd, and the other north of Nogales Hwy and Old Nogales Hwy intersection. In addition, a natural gas line, owned and operated by Southwest Gas, borders the western study boundary.



Conservation Areas

Conservation Areas: **Sonoran Desert Conservation Plan**, initiated by the Pima County Supervisors in 1998, was developed to help protect the cultural and natural resources of the county. As part of the plan, a Conservation Lands System was developed for the purpose of identifying locations that have high value and importance in retaining and preserving the biology of the county. Conservation elements identified in the study area are:

- Important riparian areas identified by high water availability, vegetation density, and biological productivity. These locations not only provide high quality habitat but also provide connectivity and coverage for animals to move throughout the county. Important riparian areas within the study area account for 3.4 percent of the total area.
- Multiple use management areas are identified as locations that could potentially support three to four priority vulnerable species as identified by the Plan. Multiple use areas cover roughly 34 percent of the study area and are located throughout the study area.
- Agriculture holdings are identified as areas currently utilized for agricultural purposes and/or areas where agricultural uses have been abandoned. Primarily located along the Santa Cruz River, agriculture holdings account for four percent of the study area.

Wildlife: The Arizona Wildlife Linkages Workgroup (AWLW) is a collaborative effort between ADOT and nine public and nonprofit organizations to identify large blocks of protected habitat, potential wildlife movement corridors, and factors that may disrupt these linkage zones. The AWLW developed the Arizona Wildlife Linkages Assessment, which identified wildlife habitat blocks and linkage zones that allow land managers and transportation planners to integrate wildlife needs into developments and land use plans. Wildlife habitat blocks are defined as large, contiguous areas of natural woodland with little or no human disturbance and are essential for maintaining a diverse and healthy population of wildlife. Wildlife linkage zones are areas of wildlife movement between habitat blocks. Less than one percent of the study area is located within a habitat block; however, Pima Mine Rd borders the southern boundary of the habitat block that is located just north of the study area. The linkage zone also occupies less than one percent of the study area and follows the Santa Cruz River in the southern portion of the study area.

Endangered Species: The Arizona Game and Fish Department (AZGFD) identified several endangered species within the proximity of the planning area. Within the study area, the Pima Pineapple Cactus was identified as an endangered and threatened species. A full listing of endangered species within the study area is listed in Table 3.3.



TABLE 3.3: ARIZONA GAME AND FISH ENDANGERED AND THREATENED SPECIES

AZ Game & Fish Identified Species and Habitats within the Study Area	
California Leaf-nosed Bat (SC) (U) (S)	Sonoran Desert Tortoise(SC)
Cave Myotis(S)	Tumamoc Globeberry (U) (S)
Pima Pineapple Cactus (E)	Western Narrow-mouth Toad (U) (S)
San Xavier Talussnail (SC)	

E = Endangered under the Endangered Species Act

T= Threatened under the Endangered Species Act

PS = Partial Status under the Endangered Species Act

S = BLM Sensitive Species

C = Candidate under the Endangered Species Act

U = USFS Sensitive Species

SC= Species of Concern to the US Fish and Wildlife Service

Historic and Cultural Resource

Cultural Resource: Cultural resources are properties that reflect the heritage of local communities, states, and nations. A search of AZSITE cultural resources database identified 31 previously recorded cultural resource sites and 77 prior cultural resources projects in a search area that included one-half mile along I-19 generally between Pima Mine and Duval Mine roads, and about one-mile around the I-19 intersection with El Toro Rd.

Other Cultural Items The Titan Missile Museum, located north of Duval Mine Rd in the southern portion of the study area, is part of the National Register of Historic Places. In addition, the Juan Baptista De Anza Trail, which follows the Santa Cruz River through the study area, is listed as a national historic trail, which consists of a continuous autoroute and multi-use trail that extends from the U.S.-Mexico border in Nogales to San Francisco, California. Within the study area, the autoroute portion of the trail travels along Mission Rd then connects to I-19 at Continental Rd.

Several roads outside the incorporated portion of the Town have been identified by Pima County as scenic routes, including Mission Rd, Helmet Peak Rd, Sahuarita Rd, and Santa Rita Rd.



Transportation Conditions

This section inventories major elements of the existing transportation system and documents the status/condition of each element. Major elements inventoried include bridges, pavement condition, crashes, traffic conditions, roadway performance, and other modes of transportation in the study area.

Major Roadways

The study area is comprised of a network of major arterials, collectors, and local roadways. The following is a summary of characteristics of the major roadways that transverse the study area:

- I-19 is ADOT owned north-south highway that serves as the regional connector between the Tucson metropolitan area in the north and the U.S.-Mexico border in Nogales to the south. In addition, it also serves as commuter freeway from Sahuarita area.
- Nogales Hwy, a north-south collector, serves local and regional traffic with connection to I-19 in the southern portion of the study area and to I-10 in Tucson.
- Sahuarita Rd is an east-west arterial that provides local access to businesses, residences, and schools as well as regional access to I-19, SR 83 and I-10 via Wilmot Rd, Houghton Rd, or Wentworth Rd.

Roadway Functional Classification

Functional Classification is the grouping of streets and highways by the character of service they intend to provide. Defining a street's functional classification, serves as a basis for establishing speed limits, design standards, and access controls. Approved Federal Highway Administration (FHWA) functional classifications for the study area are presented in Figure 3.11. Majority of the roadway within the study area are classified as collectors, with the exception of I-19 and Sahuarita Rd which are classified as an interstate and principal arterial respectively. Also illustrated in the figure are several roads (depicted as dashed lines) that do not have a FHWA functional classification.

Number of Lanes and Posted Speed Limits

A visual review was conducted to inventory the number of lanes and posted speed limits for major roadways in the study area. In addition, traffic control type (signals, roundabouts, stop signs, etc.) at major intersections was also inventoried. Figure 3.12 displays the number of lanes for each roadway while Figure 3.13 displays posted speed limits and traffic signal locations.



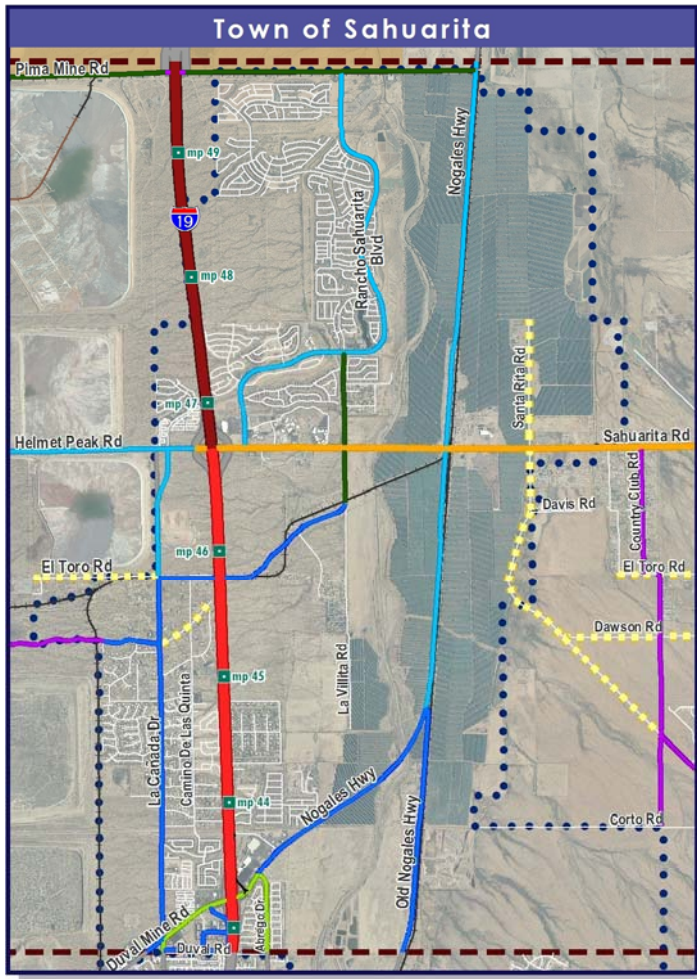


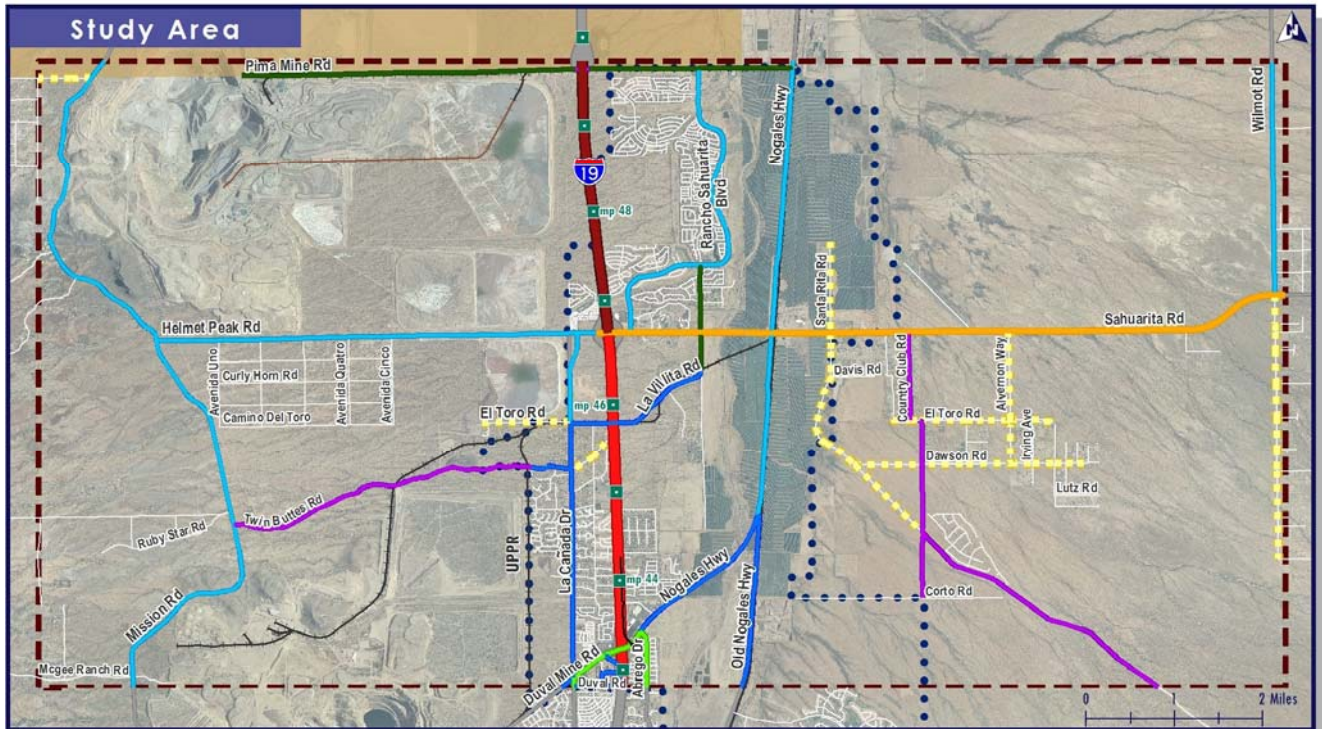
FIGURE 3.11: EXISTING FEDERAL FUNCTIONAL CLASSIFICATION

Rural	Urban
Principal Arterial - Interstate	Principal Arterial - Interstate
Principal Arterial - Other	Minor Arterial
Minor Arterial	Collector
Major Collector	Local
Minor Collector	
Not Federally Classified	

REFERENCE

Milepost	Railroad
Interstate	Abandoned Railroad
Major Roads	Tohono O'odham Nation
Frontage Road	Town of Sahuarita
Other Roads	Study Area

Sources: HPMS, Pima County DOT, ALRIS, and ADOT



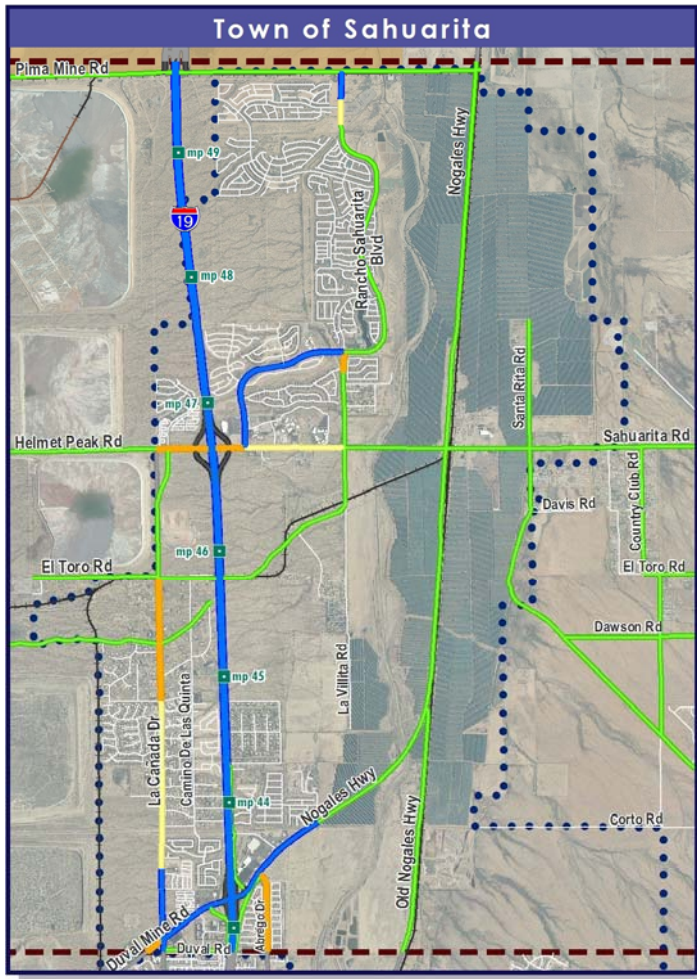


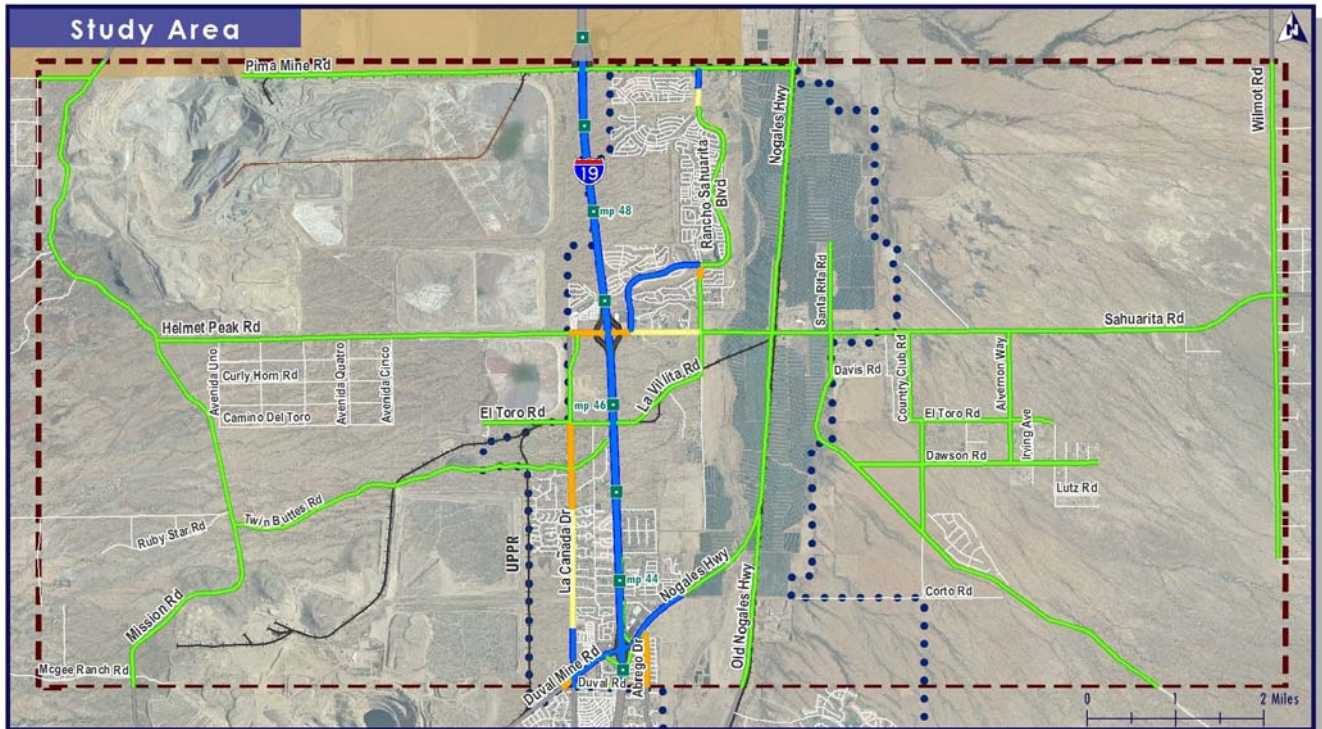
FIGURE 3.12: EXISTING NUMBER OF LANES

- 4-Lanes (Divided)
- 3-Lanes
- 2-Lanes (Divided)
- 2-Lanes
- 1-Lane

REFERENCE

- | | |
|---------------|-----------------------|
| Milepost | Railroad |
| Interstate | Abandoned Railroad |
| Major Roads | Tohono O'odham Nation |
| Frontage Road | Town of Sahuarita |
| Other Roads | Study Area |

Sources: Town of Sahuarita, Pima County DOT, ALRIS, and ADOT



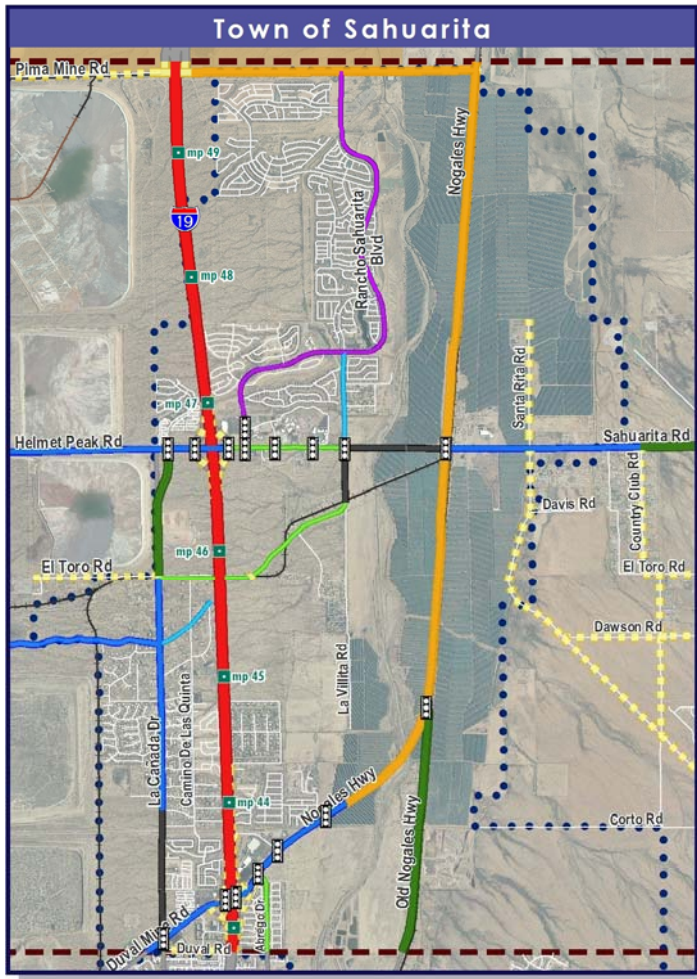


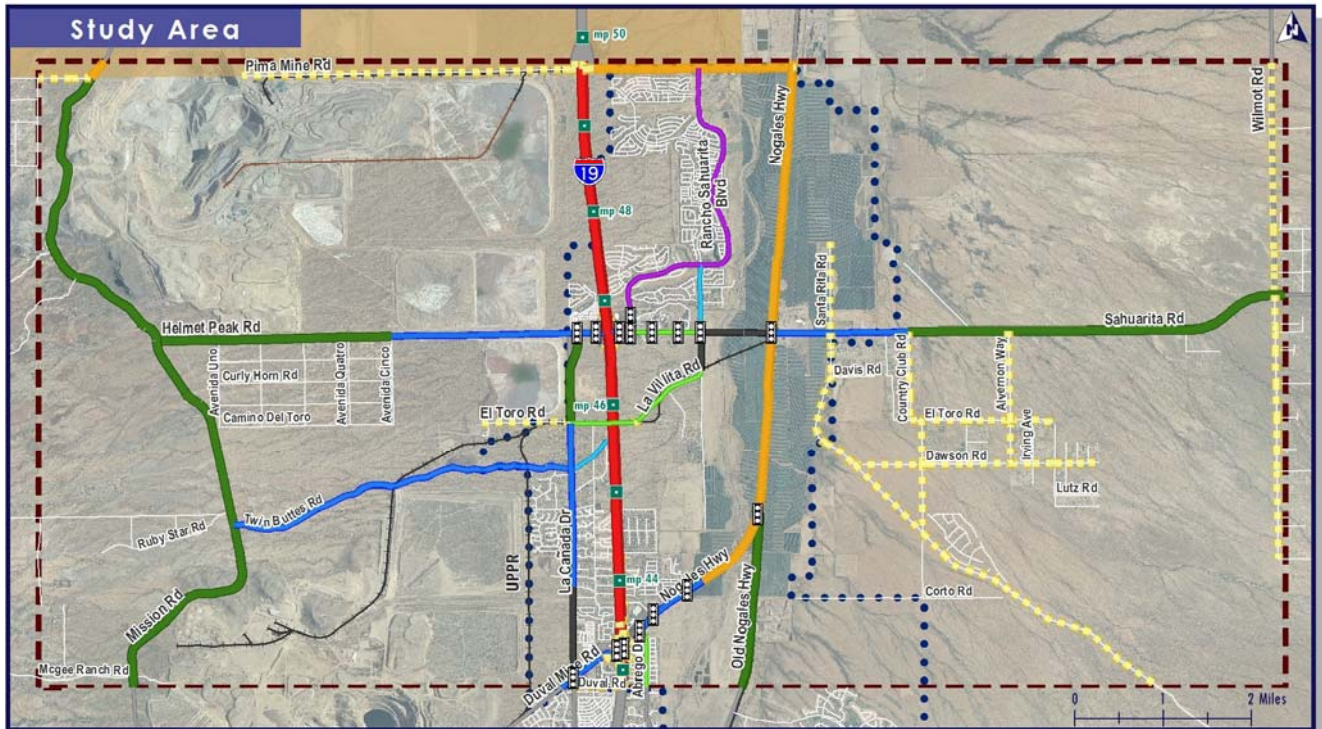
FIGURE 3.13: EXISTING POSTED SPEED LIMITS

- █ 75 mph
- █ 55 mph
- █ 50 mph
- █ 45 mph
- █ 40 mph
- █ 35 mph
- █ 30 mph
- Unknown
- Traffic Signal

REFERENCE

- Milepost
- Interstate
- Major Roads
- Frontage Road
- Other Roads
- Railroad
- Abandoned Railroad
- Tohono O'odham Nation
- Town of Sahuarita
- Study Area

Sources: Town of Sahuarita, Pima County DOT, ALRIS, and ADOT



Crash Data Analysis

An assessment of the crash analysis portion from *2010 Town of Sahuarita Area Transportation Study* showed that a total of 689 crashes occurred in the area between the years 2003 to 2007, of which eight were fatalities. Other key observations include:

- Number of crashes per year increased; the highest increase was from 2005 to 2006 from 136 to 182. This could be reflective of the population growth in the area.
- Approximately 29 percent of the crashes were injury related.
- From 2003 to 2007, ten intersections exceed more than five crashes; Sahuarita Rd and Nogales Hwy was the highest recorded crash intersection at 19 crashes. Majority of the crash related intersections were concentrated along Sahuarita Rd between I-19 to Santa Rita Rd.
- Fifteen roadway segments that exceed five crashes were reviewed; Nogales Hwy between Sahuarita Rd and Old Nogales Hwy recorded the highest crashes at 21. Overall, majority of the crashes were classified as rear-end collisions.
- Three high crash corridors were observed: I-19, Nogales Hwy, and Sahuarita Rd (I-19 to Country Club Rd).

Existing Traffic Conditions

Existing daily traffic count data was obtained from the Pima DOT, PAG, and ADOT. Figure 3.14 displays the existing daily traffic volumes. Key observations noted in the figure include:

- I-19 has the highest amount of traffic through the study area
- Nogales Hwy, though the study area, is highly traveled.
- Sahuarita Rd carries a significant amount of local traffic.

Level of Service

Traffic congestion levels of major roadways within the study area were estimated using existing traffic count data. The degree of traffic congestion is commonly expressed in terms of Level of Service (LOS). LOS is a measurement of traffic congestion conditions defined by the Transportation Research Board's (TRB) *Highway Capacity Manual* (HCM). For a planning level analysis, the roadway LOS is determined based on the ratio of the traffic volume on the road to the capacity of the road. Capacity of the road is a function of the number of lanes, functional classification, speed, and roadway geometrics and provides thresholds for the maximum number of cars allowed to travel on a lane for the peak or daily conditions. Each level of service is given a letter grade based on its level of congestion, ranging from "A" through "F", with LOS A representing free flowing traffic conditions where vehicles experience minimal delays, and LOS F represents failure conditions where vehicles experience long delays.



Road segment LOS is characterized by the HCM as follows:

LOS A: Best, free flow operations (on uninterrupted flow facilities) and very low delay (on interrupted flow facilities). Freedom to select desired speeds and to maneuver within traffic is extremely high.

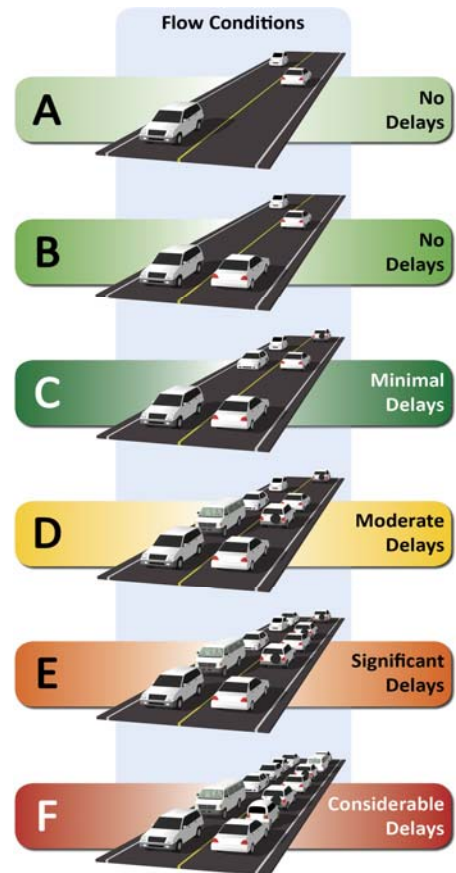
LOS B: Flow is stable, but presence of other users is noticeable. Freedom to select desired speeds is relatively unaffected, but there is a slight decline in the freedom to maneuver within traffic.

LOS C: Flow is stable, but the operation of users is becoming affected by the presence of other users. Maneuvering within traffic requires substantial vigilance on the part of the user.

LOS D: High density but stable flow. Speed and freedom to maneuver are severely restricted. The driver is experiencing a generally poor level of comfort and convenience.

LOS E: Flow is at or near capacity. All speeds are reduced to a low, but relatively uniform value. Freedom to maneuver within traffic is extremely difficult. Comfort and convenience levels are extremely poor.

LOS F: Worse, facility has failed, or a breakdown has occurred.



In general for rural areas, LOS A and B represent no or minimal congestion, LOS C represents moderate congestion, and LOS D, E, and F represent significant and considerable congestion.

Current Roadway Level of Service

Figure 3.15 displays the existing LOS for the study roadways. Currently, all roads located within the study area operate at a LOS A and B, except for the following:

LOS D

- Nogales Hwy: Sahuarita Rd to Pima Mine Rd

LOS C

- Nogales Hwy: Calle Valle Verde Rd to Old Nogales Hwy
- Nogales Hwy: Old Nogales Hwy to Sahuarita Rd



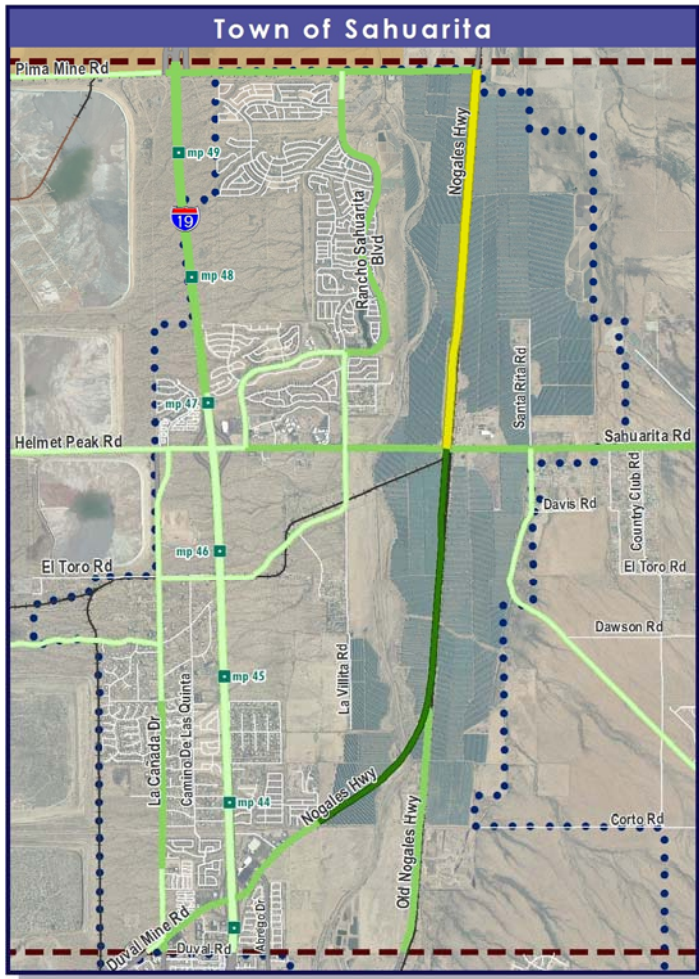


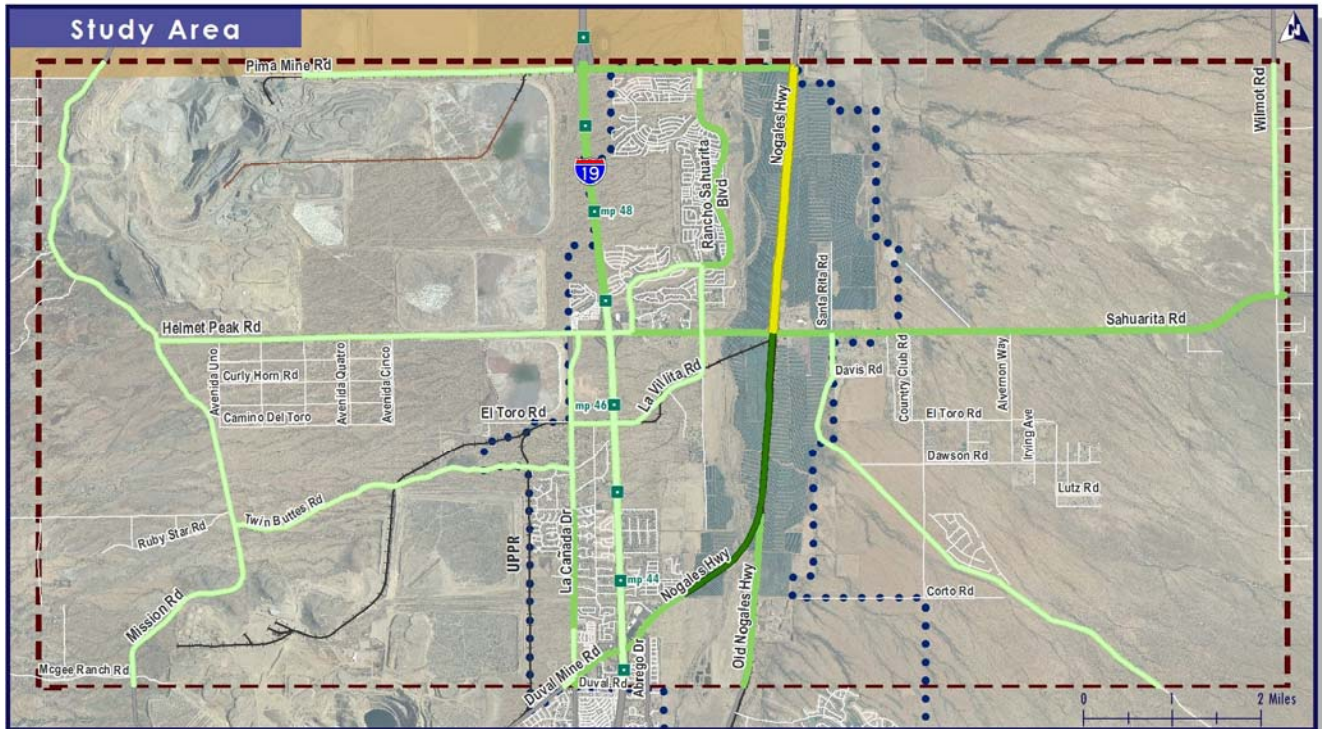
FIGURE 3.15: EXISTING LEVEL OF SERVICE

- LOS A
- LOS B
- LOS C
- LOS D
- LOS E
- LOS F

REFERENCE

- Milepost
- Interstate
- Major Roads
- Frontage Road
- Other Roads
- Railroad
- Abandoned Railroad
- Tohono O'odham Nation
- Town of Sahuarita
- Study Area

Sources: Town of Sahuarita, Pima County DOT, ALRIS, and ADOT



Other Modes of Transportation

Railroad

Approximately 30 miles of Union Pacific Railroad (UPRR) tracks transverse the study area, which includes railroad spurs used by the mining industry as shown in Figure 3.16.

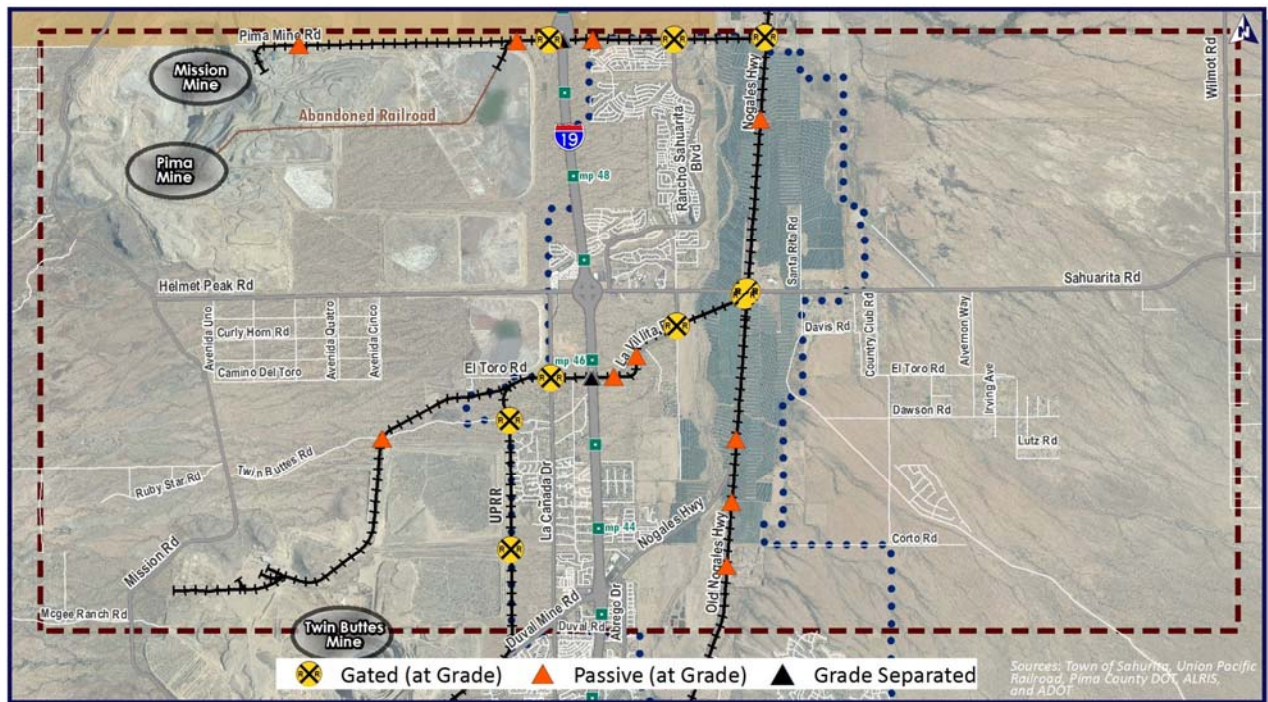
- Approximately four miles of the UPRR tracks are listed as abandoned.
- There are 11 passive at-grade crossing, seven gated at-grade crossings, and two grade-separated crossings over I-19 at El Toro Rd and again at Pima Mine Rd.
- According to the *2010 Town of Sahuarita Area Transportation Study*, approximately three to seven trains per day travel through the study area, with the number of cars ranging from 150 to 800.
- One train per day, 25 to 50 cars, is used for mining operations along the railroad spur lines.

Freight

As the first segment of the Arizona portion of the CANAMEX trade corridor, a high capacity corridor that facilitates the flow of import-export between Mexico, U.S., and Canada, I-19 links the three port of entries in Nogales with I-10 in the Tucson metro area.

- As of 2009, 9 percent of the traffic along I-19 from Nogales to Tucson was classified as heavy truck. Most of the trucks travel to the Phoenix market.
- As noted in the *2010 Town of Sahuarita Area Transportation Study*, Sahuarita Rd is used as an alternative bypass for trucks between I-19 and I-10 to either avoid congestion at the I-10 and I-19 junction or to evade U.S. Customs and Border Protection checkpoint on SR 83.

FIGURE 3.16: EXISTING RAILROAD CROSSING



Transit Service

The following is a summary of the existing transit providers in the study area:

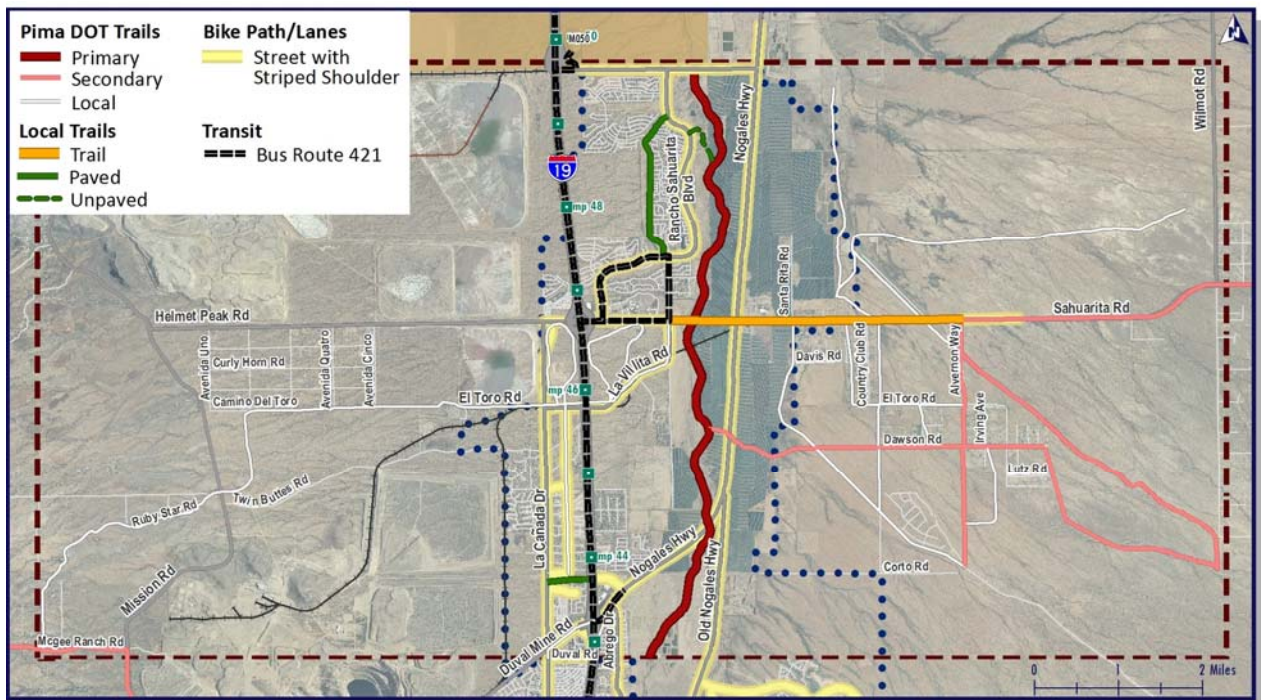
- Route 421, the Green Valley/Sahuarita/Tucson Connector, provides service for Green Valley, Sahuarita, and Tucson with stops in the study area at Sahuarita Town Hall, Fry’s, Desert Gem, Wal-Mart, and Desert Diamond Casino. In addition, a park and ride lot is located in the Sahuarita Town Hall complex.
- Sun Shuttle provides curb-to-curb dial-a-ride service in the study area. Reservations must be at least one to seven days prior to the trip and is on a first come, first serve basis.

Non-Motorized Modes of Transportation

Alternative modes of transportation are an important aspect of the multimodal transportation network as they provide mobility for those not able to operate or without access to a vehicle. Figure 3.17 illustrates the existing pedestrian, bike, and trails facilities in study area.

- Existing sidewalk facilities are located in the master planned community of Rancho Sahuarita and along portions of La Cañada Dr, Sahuarita Rd, and Duval Mine Rd.
- There are no designated bike lanes; however several streets include striped shoulders for bicycle use.
- Trails within the study area are classified as primary, secondary, and local by Pima County. San Juan Bautista de Anaza Historic Trail, which follows along the San Cruz River, is identified as a primary trail and could serve as the potential backbone for the Town’s trail system.

FIGURE 3.17 SIDEWALKS AND TRAILS



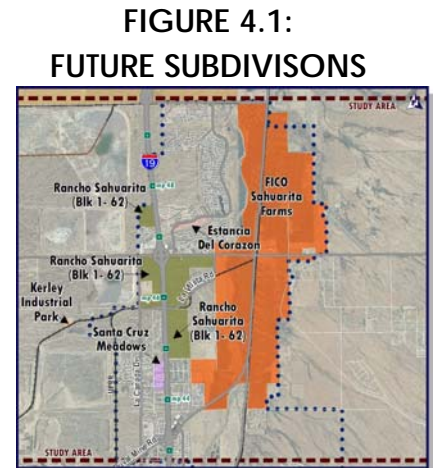
4.0 FUTURE CONDITIONS

Future Socioeconomic Conditions

Forecasting future socioeconomic conditions allows us to anticipate changes in future travel demand and travel patterns and to envision potential solutions. Development of rational projections for population, housing units, and employment is vital to the process of forecasting realistic traffic volumes.

Population, Housing Unit, and Employment Forecasts

The population and housing unit projections developed for the *Sahuarita Area Transportation Study* were used as a base. The recently revised land use plan for the Farmer Investment Company (FICO) Sahuarita Farms master planned development was included in the projections. The entire FICO Sahuarita Farms consists of two areas with the larger portion centrally located in the study area, as shown in orange in Figure 4.1, while the smaller portion is located south of the study area. By 2040, the study area is projected to have a population of 95,789 with nearly half of the population residing within the current town limits. In addition, it is projected that the study area will have 38,739 dwelling units by 2040.



Initially a residential development, FICO Sahuarita Farms is now an employment center; potentially becoming an economic driver of the local economy. By 2040, the study area is estimated to have 27,526 employees. Table 4.1 shows a tabular summary of the projected population, housing units, and total number of employees for the various geographies.

TABLE 4.1: PROJECTED POPULATION, HOUSING UNITS, AND EMPLOYMENT

		2010	2040
Study Area	Population	23,289	95,798
	Total Housing Units	9,001	38,739
	Total Employment	4,083	27,526
Town of Sahuarita in Study Area	Population	21,108	47,625
	Total Housing Units	8,180	19,657
	Total Employment	3,315	18,827
PAG Region	Population	969,571	1,870,790
	Total Housing Units	435,933	753,923
	Total Employment	424,007	730,732

Socioeconomic Data for the Travel Demand Model

The PAG Regional Travel Demand Model was utilized to generate the future 2040 travel demand estimates in the study area for all future alternatives. The PAG Regional TAZ structure modified during the development of the *Sahuarita Area Transportation Study* was utilized and revised to reflect the new FICO Sahuarita Farms land use plan. Figures 4.2 and 4.3 display the population and employment densities by TAZ for the horizon year 2040 respectively.



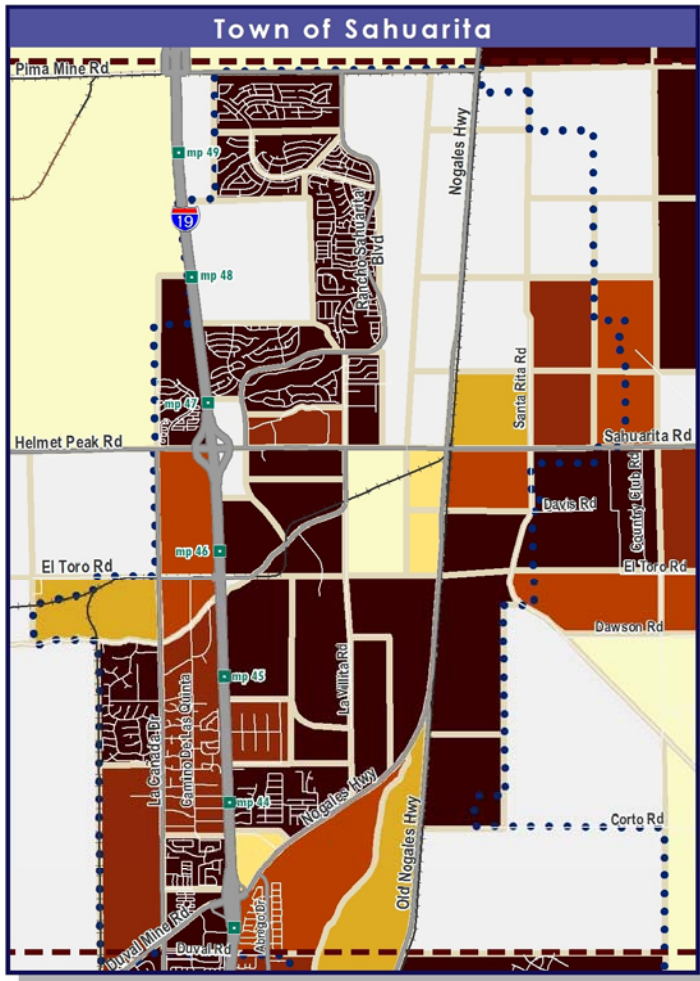
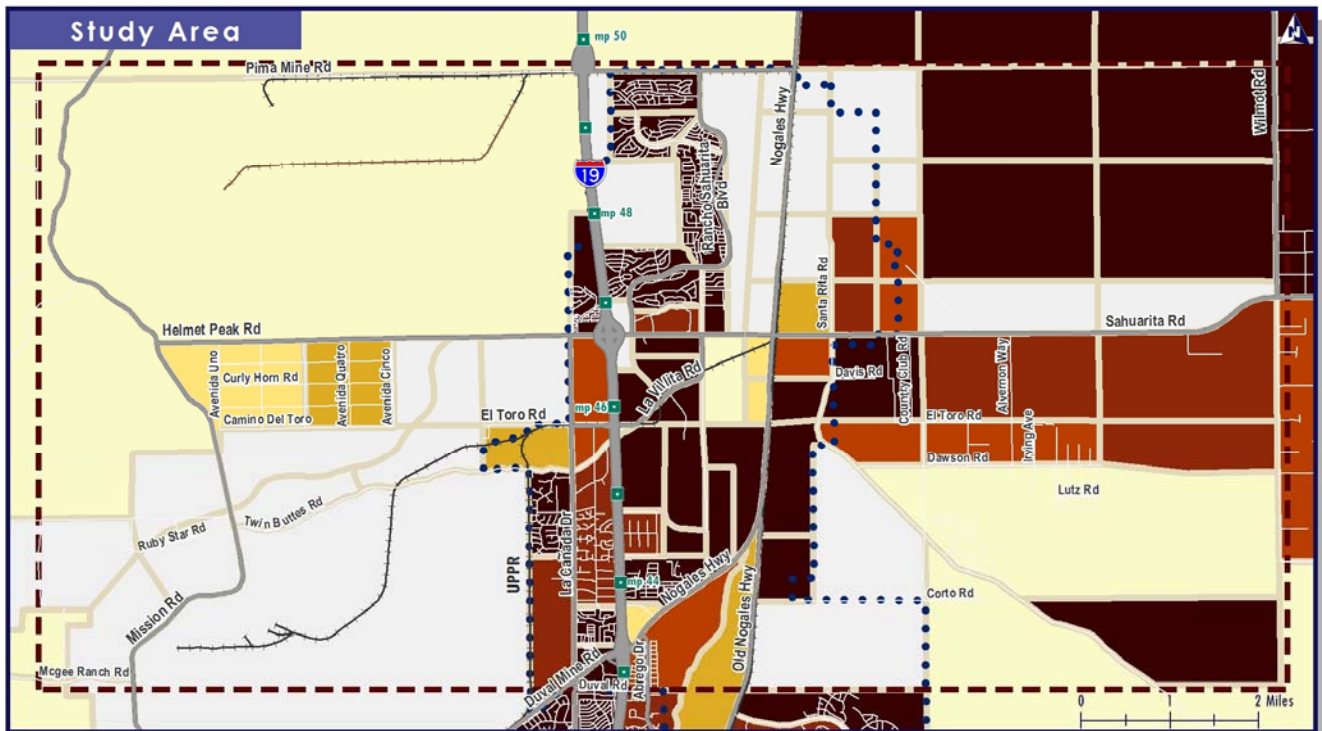


FIGURE 4.2: 2040 POPULATION DENSITY



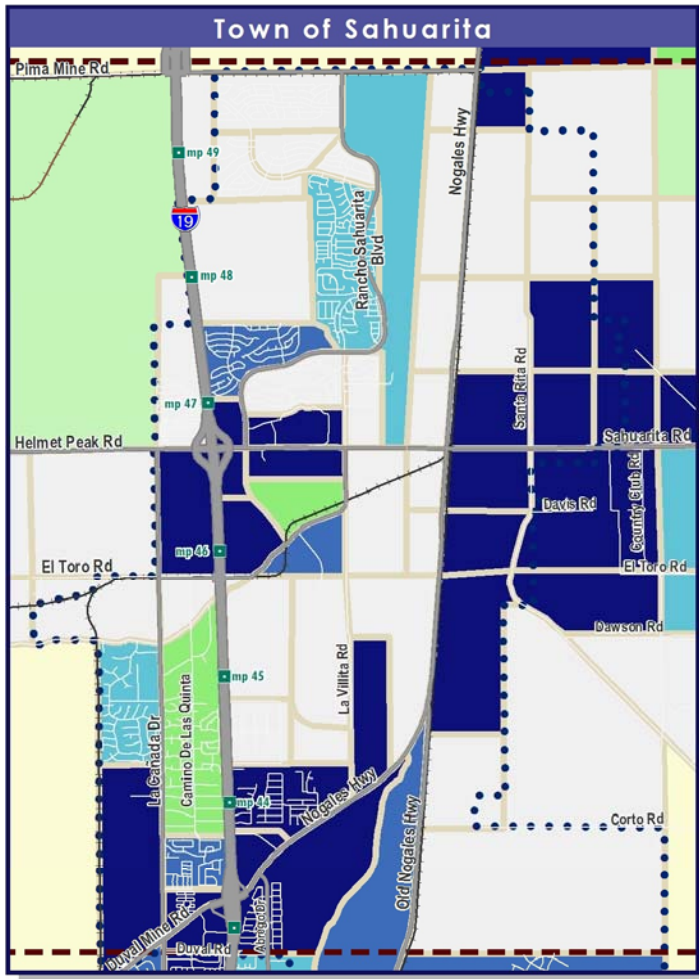
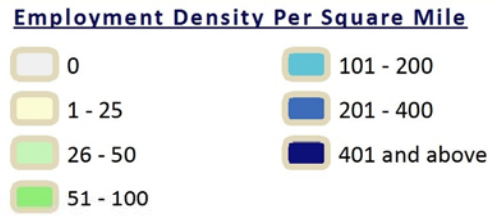
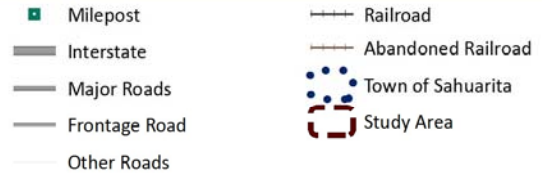


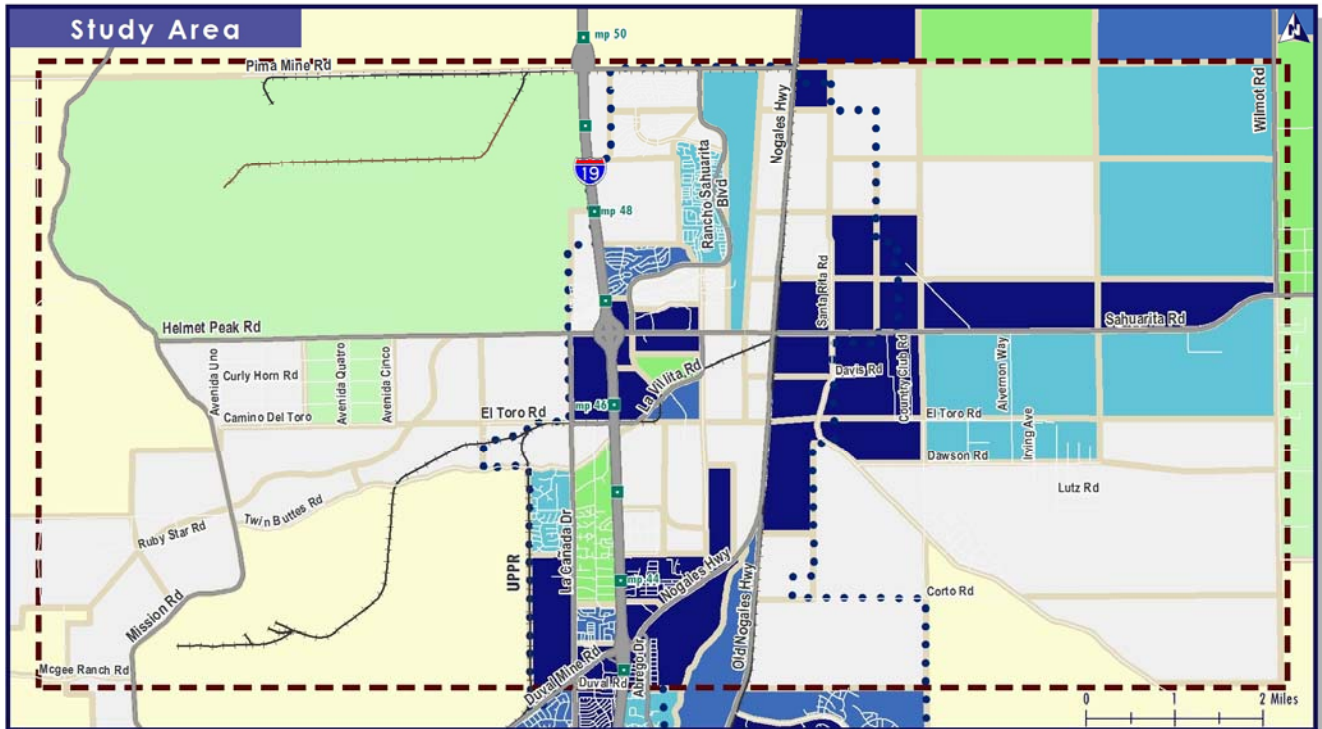
FIGURE 4.3: 2040 EMPLOYMENT DENSITY



REFERENCE



Sources: Town of Sahuarita, PAG, Pima County DOT, ALRIS, and ADOT



Future Transportation Conditions

The primary purpose of forecasting future traffic volumes is to estimate the additional travel demand added to existing roadways and to forecast congestion levels due to projected population and employment growth. In addition, this analysis provides valuable insight into potential transportation solutions. As previously discussed, a modified PAG Regional Travel Demand Model was used to forecast traffic volumes for the 2040 horizon year, using the socioeconomic data developed in the preceding sections. Similar to existing traffic analysis, the degree of traffic congestion is expressed in terms of LOS.

Projected 2040 Traffic Conditions

To ensure consistency, the 2040 roadway network used to develop the transportation plan in the *Sahuarita Area Transportation Study* was used as the base. With the new roadways providing additional capacity and connectivity, especially east of Nogales Hwy, the transportation system for the study area was evaluated without the planned new east-west corridor establishing the No Build alternative. Figure 4.4 presents the functional classification and number of lanes for the No Build alternative. Additional modifications included:

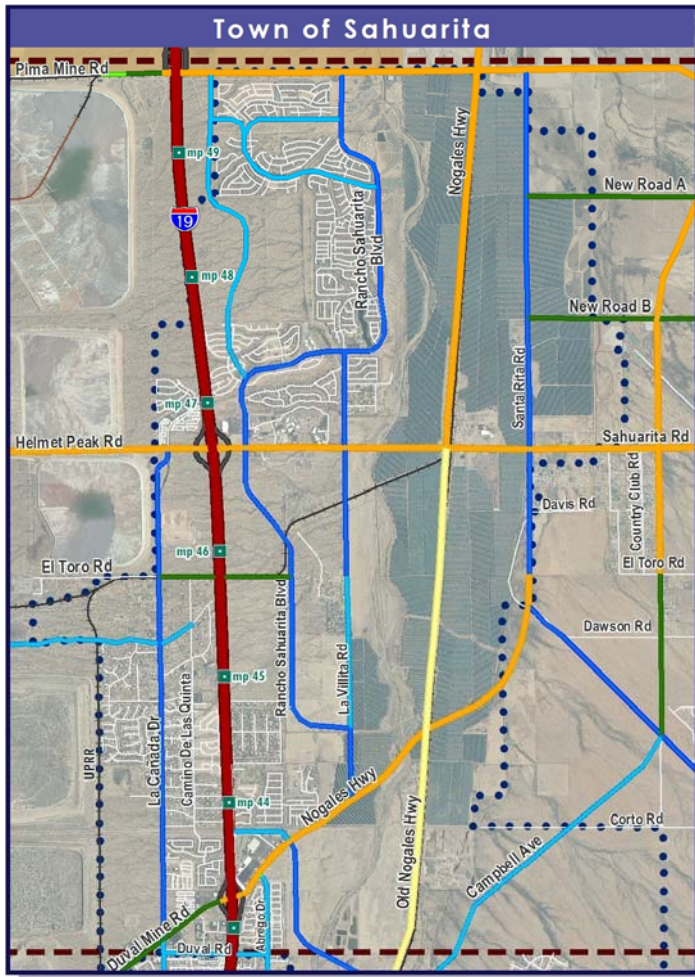
- Minor adjustments in the FICO Sahuarita Farms development to reflect the proposed major transportation facilities.
- Rancho Sahuarita Blvd south of Sahuarita Rd will serve as the ending terminus for the existing El Toro Rd east of I-19

Roadway LOS

Figure 4.5 displays the projected No Build traffic volumes and LOS. The resulting traffic volumes and LOS represent average daily traffic conditions. The study area roadways operate at LOS A or B, low levels of congestion, except for the following:

- LOS F** (High Congestion)
- I-19: through study area, except at Duval Mine Rd/Nogales Hwy interchange
 - Pima Mine Rd: I-19 to east out of study limits
 - Sahuarita Rd: I-19 to east out of study limits
 - Duval Mine Rd: La Cañada Dr to I-19
 - Campbell Ave: Santa Rita Rd south out of study limits
 - La Cañada Dr: Helmet Peak Rd to south of El Toro Rd
 - Avenida Mitla: Pima Mine Rd to south of Camino Rancheria
 - Camino Rancheria: Avenida Mitla to south of Calle Vista Larga
 - Rancho Sahuarita Blvd: two segments between Pima Mine Rd and Sahuarita Rd (south)
 - La Villita Rd: two segments between Stagecoach Dr and Nogales Hwy.
 - Santa Rita Rd: two segments between New Road B and Swan Rd
 - Swan Rd: New Road A to north out of study limits
 - Wilmot Rd : New Road A to north out of study limits

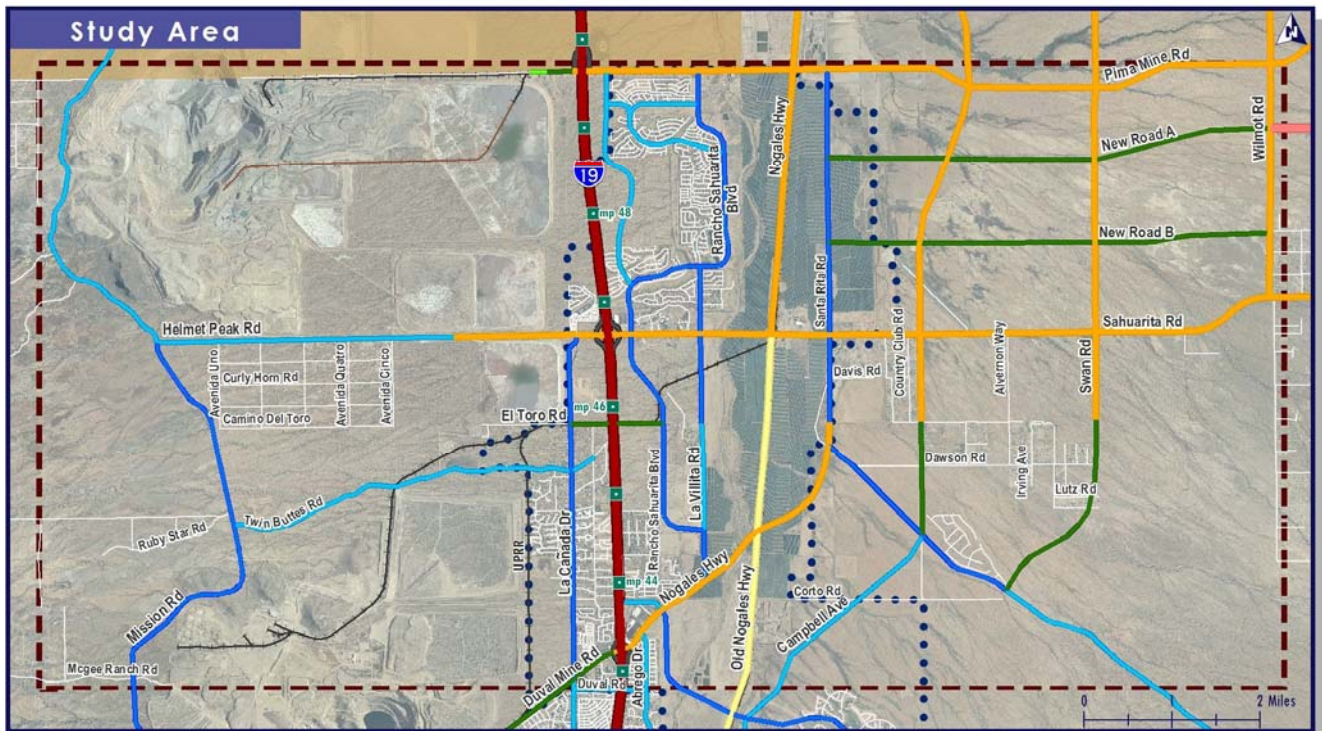




REFERENCE

- Milepost
- Other Roads
- Railroad
- Abandoned Railroad
- Tohono O'odham Nation
- Town of Sahuarita
- Study Area

Sources: Town of Sahuarita, PAG, Pima County DOT, ALRIS, and ADOT



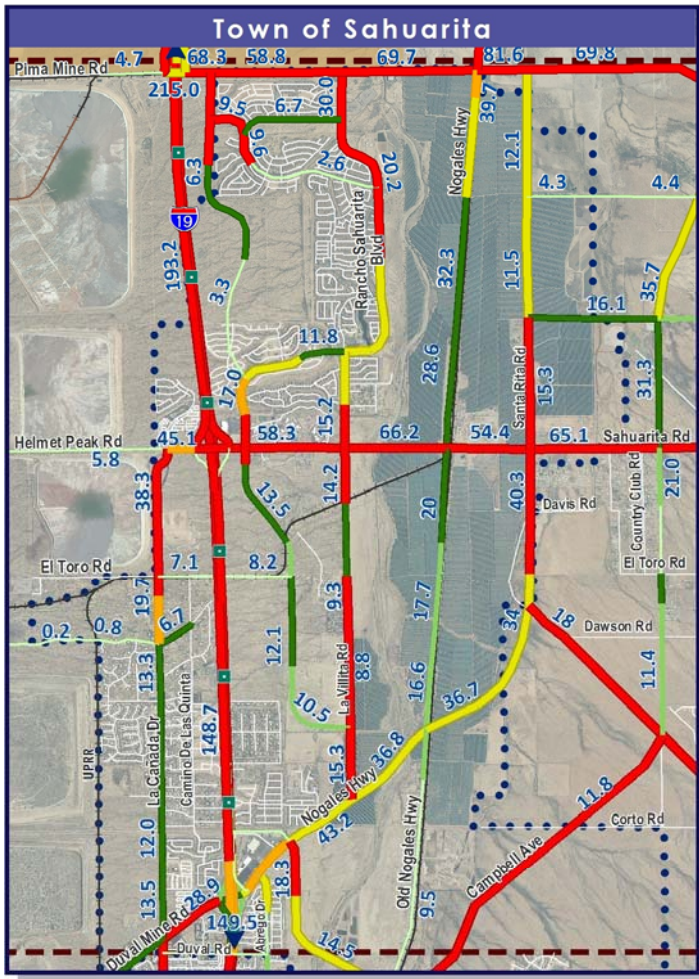
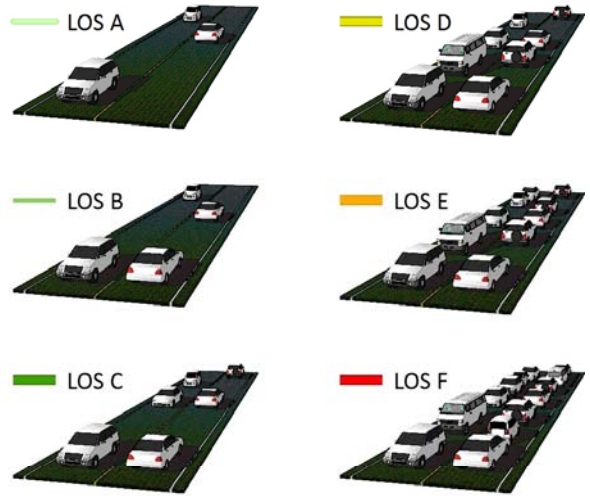


FIGURE 4.5: NO BUILD LEVEL OF SERVICE AND DAILY TRAFFIC VOLUMES

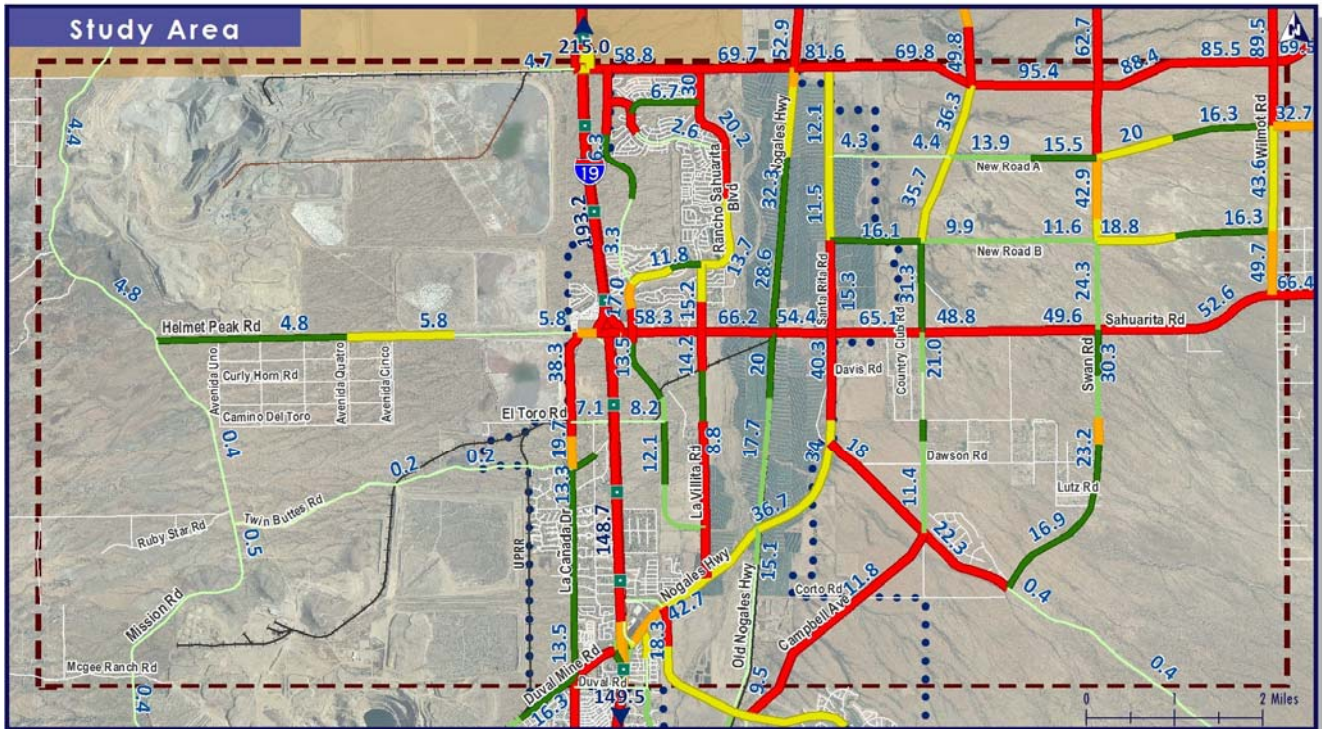


00 Daily Volume (display in Thousands)

REFERENCE

- Milepost
- Other Roads
- Railroad
- Abandoned Railroad
- Tohono O'odham Nation
- Town of Sahuarita
- Study Area

Sources: Town of Sahuarita, PAG, Pima County DOT, ALRIS, and ADOT



- LOS E**
(High Congestion)
- Helmet Peak Rd: La Cañada Dr to I-19
 - Nogales Hwy: I-19 to Quail Creek Blvd Extension
 - La Cañada Dr: south of El Toro Rd to Twin Buttes Rd
 - I-19: Between interchange ramps at Duval Mine Rd
 - Rancho Sahuarita Blvd: Avenida Mitla to north of Sahuarita Rd
 - Nogales Hwy: Pima Mine Rd to 0.2 miles south
 - Swan Rd: two segments between New Road A to Dawson Rd
 - Wilmot Rd: New Road B to Sahuarita Rd

- LOS D**
(Moderate Congestion)
- Pima Mine Rd: between I-19 ramps
 - New Road A: Swan Rd to 0.9 miles west of Wilmot Rd
 - New Road B: Swan Rd to 0.9 miles west of Wilmot Rd
 - Helmet Peak Rd: Avenida Quatro to 0.7 miles east of Avenida Cinco
 - Nogales Hwy: two segments between I-19 to Old Nogales Hwy
 - Duval Mine Rd extension: Old Nogales Hwy to 1 mile south of Sahuarita Rd
 - Quail Run Blvd extension: Nogales Hwy south out of study limits
 - Abrego Dr: Nogales Hwy to Placita Del Petalo
 - Rancho Sahuarita Blvd: Avenida Mitla to east of Paseo Campo Verde
 - Rancho Sahuarita Blvd: La Villita Rd to Camino Rancho Caliente
 - Nogales Hwy: south of Pima Mine Rd to New Road A alignment
 - Santa Rita Rd: Pima Mine Rd to New Road B
 - Country Club Rd: Pima Mine Rd to New Road B
 - Wilmot Rd: New Road A to New Road B

- LOS C**
(Moderate Congestion)
- Calle Vista Larga: Camino Rancheria to Rancho Sahuarita Blvd
 - New Road A: two segments between Country Club and Wilmot Rd
 - New Road B: two segments between Santa Rita Rd to Wilmot Rd
 - Rancho Sahuarita Blvd: east of Paseo Campo Verde to La Villita Rd
 - Helmet Peak Rd: Mission Rd to Avenida Quatro
 - Twin Buttes Rd: La Cañada Dr to Camino De Las Quinta
 - Duval Mine Rd: Between I-19 interchange ramps
 - La Cañada Dr: Twin Buttes Rd to Duval Mine Rd
 - Avenida Mitla: 0.4 miles south of Calle Vista Larga to 0.55 miles north of Calle Calca
 - Rancho Sahuarita Blvd: two segments between Sahuarita Rd and La Villita Rd
 - La Villita Rd: UPRR tracks to 1.2 miles north of Rancho Sahuarita Blvd
 - Nogales Hwy: 1 mile south of Pima Mine Rd to 0.7 mile south of Sahuarita Rd
 - Country Club Rd: two segments between New Road B to Dawson Rd
 - Swan Rd: two segments between Sahuarita Rd and Santa Rita Rd



Project Need

Based on an inventory and analysis of existing conditions, future deficiencies and issues were identified with the study area's transportation system establishing the project need. The project need forms the basis for the next phase of the study, which is the development of alternative corridor alignments. Key items in establish the project need are listed below.

- Growth Issues*
- The study area is projected to have approximately 95,798 residents by 2040.
 - A low projected employment forecast of 27,526 employees, cannot sustain the area's population growth; therefore, residents will travel to neighboring cities (such as Tucson) for work or other amenities.
 - Majority of the residential growth in the study area is expected to occur south of Sahuarita Rd and east of the I-19. It should be noted that high intensity residential development is located in the vicinity of the northeast corner of the study area which could strain the surrounding transportation system and impact the study area roadways.
 - Employment growth is expected to occur in areas where regional access is available such as I-19 and Duval Mine Rd/Nogales Hwy, I-19 and Sahuarita Rd, and Nogales Hwy (east of) and Sahuarita Rd.
 - Potential plans to create an industrial/research/aerospace park around the Tucson International Airport and Raytheon in South Tucson would impact the roadways connecting the Town to the Tucson metropolitan area.

- Mobility Issues*
- In the existing conditions, Nogales Hwy for majority of its length operates at level of service C and D which corresponds to moderate congestion levels.
 - East-west roadways are sparse in the study area; in addition to Pima Mine Rd and Sahuarita Rd, New Road A and B are expected to be complete by 2040. These new roadway facilities are located between Santa Rita Rd and Wilmot Rd in the northeast portion of the study area with regional access provided through Wilmot Rd, Pima Mine Rd, and Sahuarita Rd.
 - Even with the additional capacity, there is still a need for an additional east-west facility since the study area transportation system is unable to effectively accommodate local and regional traffic flow as Pima Mine Rd and Sahuarita Rd are highly congested. They are the only east-west facilities providing a direct connection to and from I-19 in the study area as local access to businesses and homes in the area.
 - Also affected are the roadways in the surrounding vicinity as traffic tries to find less congested routes to travel through the study area.

- Regional Issues*
- Alternate truck route to avoid the future I-10/I-19 interchange congestion for eastbound freight.

- Environmental and Cultural Issues*
- Very sensitive environmental and cultural zones are present within the study area.
 - The Santa Cruz River transverse through the center of the study area, in addition moderate to high-risk flood zones are located in the vicinity of the river.
 - At least three major transmission lines travel through the study area.
 - UPRR tracks parallel two major roadways, Nogales Hwy and Pima Mine Rd. To access the mines, the tracks cross I-19 near Pima Mine Rd and El Toro Rd.



5.0 DEVELOPMENT AND EVALUATION OF POTENTIAL ALTERNATIVE CORRIDORS

In the previous section the need for an alternative corridor was determined, the next step is to identify and evaluate conceptual corridor alternatives that would meet the project objectives. Four corridor alternatives were evaluated, using the PAG travel demand model, for their effectiveness in the study area. *It should be noted that roadway alignments used in this section **do not** represent the final alignment but rather the approximate location of the facility for the purpose of travel demand modeling.*

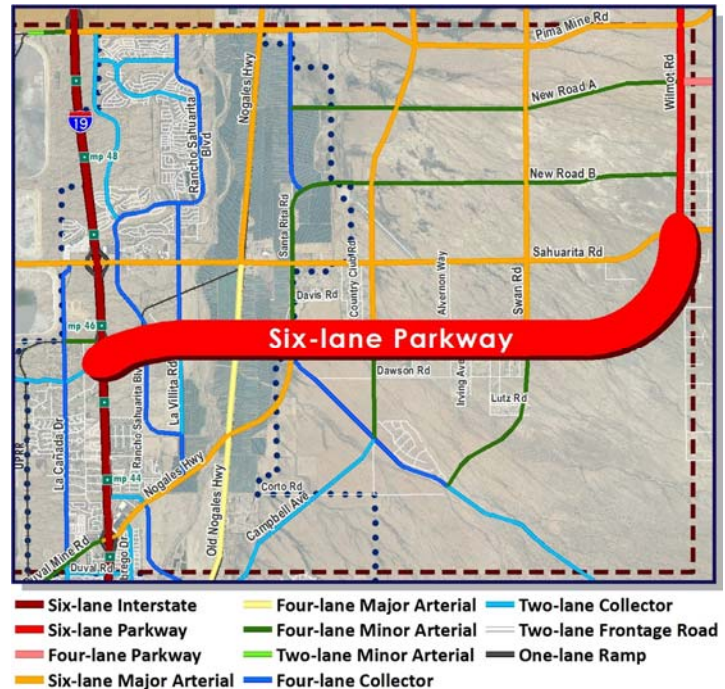
Alternative 1: El Toro Road

Using the No Build roadway network as the base, El Toro Rd is included as a six-lane parkway, extending from I-19 to Sahuarita Rd where it will connect with Wilmot Rd near the eastern study limits as depicted in Figure 5.1. In addition, an interchange will provide service from I-19 to El Toro Rd.

Roadway LOS

Figure 5.2 displays the projected Alternative 1 traffic volumes and LOS with the projected 2040 socioeconomic conditions. The resulting traffic volumes and LOS represent average daily traffic conditions. The study area roadways operate at LOS A or B, low levels of congestion, except for the following:

FIGURE 5.1: ALTERNATIVE 1 ROADWAY NETWORK



- LOS F** ■ I-19: through entire study area
 (High Congestion) ■ Pima Mine Rd: I-19 to east out of study limits
 ■ El Toro Rd: La Cañada Dr to I-19
 ■ Campbell Ave: Santa Rita Rd south out of study limits
 ■ La Cañada Dr: Helmet Peak Rd to south of El Toro Rd
 ■ Avenida Mitla: Pima Mine Rd to Camino Rancheria
 ■ Camino Rancheria: Avenida Mitla to south of Calle Vista Larga
 ■ Rancho Sahuarita Blvd: two segments between Pima Mine Rd and Sahuarita Rd
 ■ Santa Rita Rd: El Toro Rd to Swan Rd
 ■ Swan Rd: north of New Road B to north out of study limits
 ■ Wilmot Rd : New Road A to north out of study limits
-
- LOS E** ■ Avenida Mitla: Camino Rancho Calienta south 0.4 miles
 (High Congestion) ■ Rancho Sahuarita Blvd: Avenida Mitla to north of Sahuarita Rd
 ■ Quail Run Blvd extension: Nogales Hwy south 0.45 miles



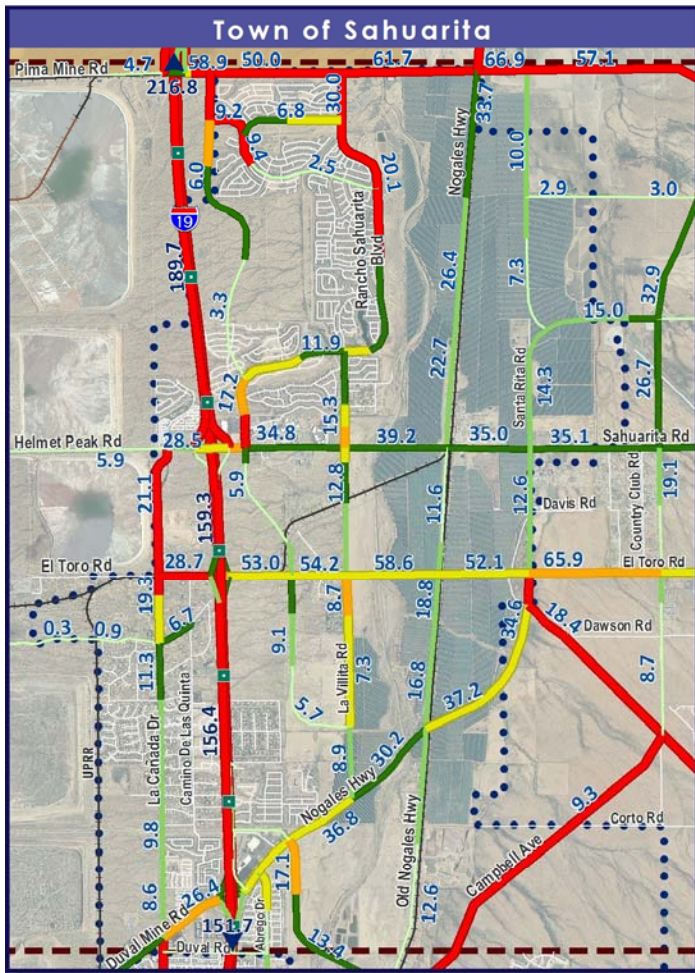
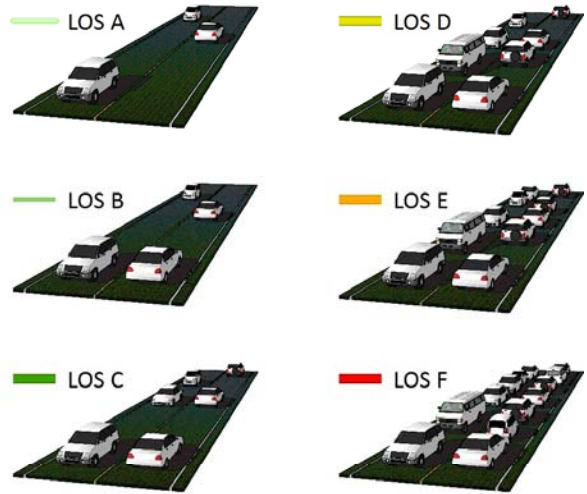


FIGURE 5.2: ALTERNATIVE 1 LEVEL OF SERVICE AND DAILY TRAFFIC VOLUMES

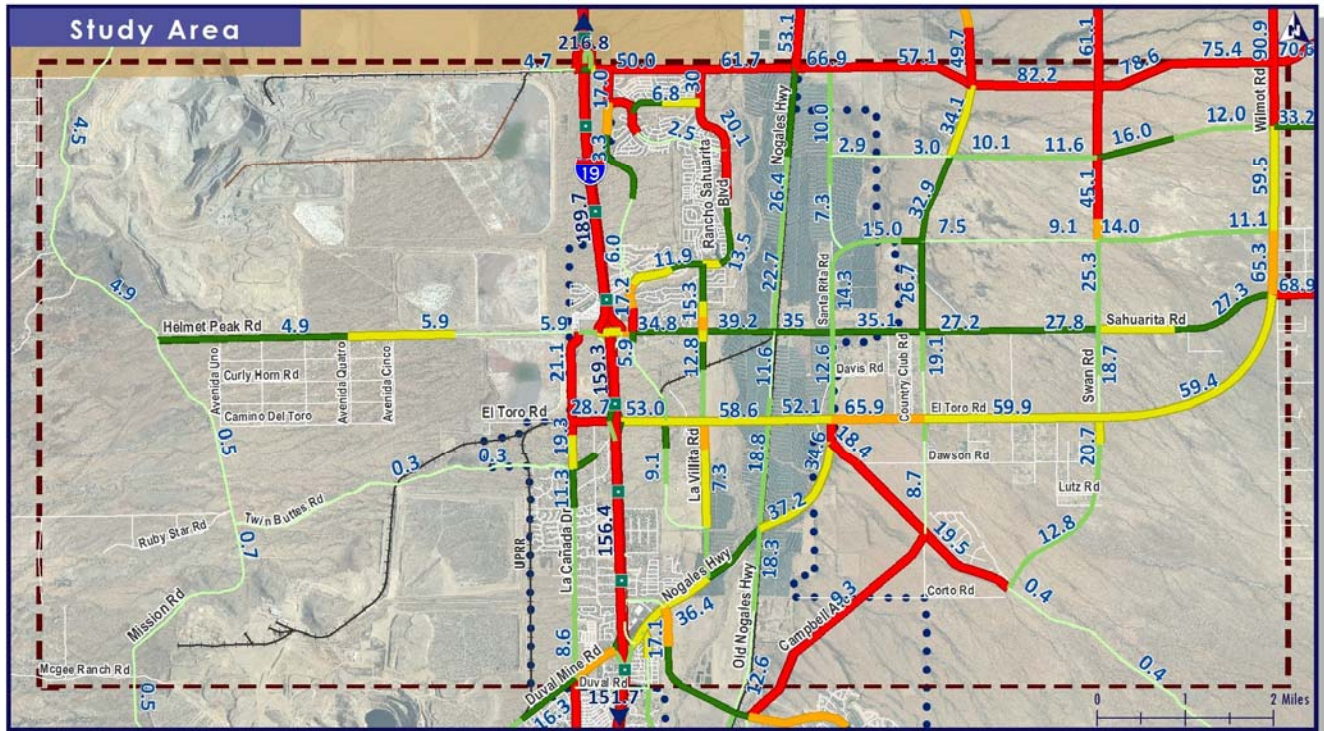


00 Daily Volume (display in Thousands)

REFERENCE

- Milepost
- Other Roads
- Railroad
- Abandoned Railroad
- Tohono O'odham Nation
- Town of Sahuarita
- Study Area

Sources: Town of Sahuarita, PAG, Pima County DOT, ALRIS, and ADOT



- La Villita Rd: two segments between Sahuarita Rd (north) and El Toro Rd (south)
- Swan Rd: New Road B north
- Wilmot Rd: New Road B to Sahuarita Rd

LOS D
(Moderate Congestion)

- Calle Vista Larga: Camino Paso Corto to Rancho Sahuarita Blvd
- Rancho Sahuarita Blvd: two segments between Camino Agua Azul and Avenida Mitla
- Helmet Peak Rd: Avenida Quatro to 0.7 miles east of Avenida Cinco
- Sahuarita Rd: between I-19 interchange ramps
- Sahuarita Rd: Swan Rd to west of Comsoft Dr
- El Toro Rd: two segments between I-19 and Wilmot Rd
- Nogales Hwy: I-19 to La Villita Rd
- Duval Mine Rd extension: Old Nogales Hwy to Santa Rita Rd
- La Cañada Dr: south of El Toro Rd to Twin Buttes Rd
- Abrego Dr: Nogales Hwy to Placita Del Petalo
- La Villita Rd: three segments between Stagecoach Dr and Rancho Sahuarita Blvd
- Country Club Rd: Pima Mine Rd to New Road A
- Wilmot Rd: New Road A to New Road B

LOS C
(Moderate Congestion)

- Pima Mine Rd: between I-19 interchange ramps
- Calle Vista Larga: Camino Rancheria to Camino Paso Corto
- Nogales Hwy: Pima Mine Rd to 0.2 miles south
- New Road A: Swan Rd to 0.9 miles west of Wilmot Rd
- New Road B: Santa Rita Rd to Country Club Rd west 0.2 miles
- Helmet Peak Rd: Mission Rd to Avenida Quatro
- Sahuarita Rd: two segments between I-19 and Wilmot Rd
- Twin Buttes Rd: La Cañada Dr to Camino De Las Quinta
- Duval Mine Rd: between I-19 interchange ramps
- Nogales Hwy: La Villita Rd to Old Nogales Hwy
- La Cañada Dr: Twin Buttes Rd to Camino Antigua
- Rancho Sahuarita Blvd: four segments between Camino Rancho Caliente and El Toro Rd (south)
- La Villita Rd: 0.1 miles south of Sahuarita Rd to Union Pacific Railroad tracks
- Nogales Hwy: Pima Mine Rd to New Road A alignment
- Country Club Rd: New Road A to Sahuarita Rd



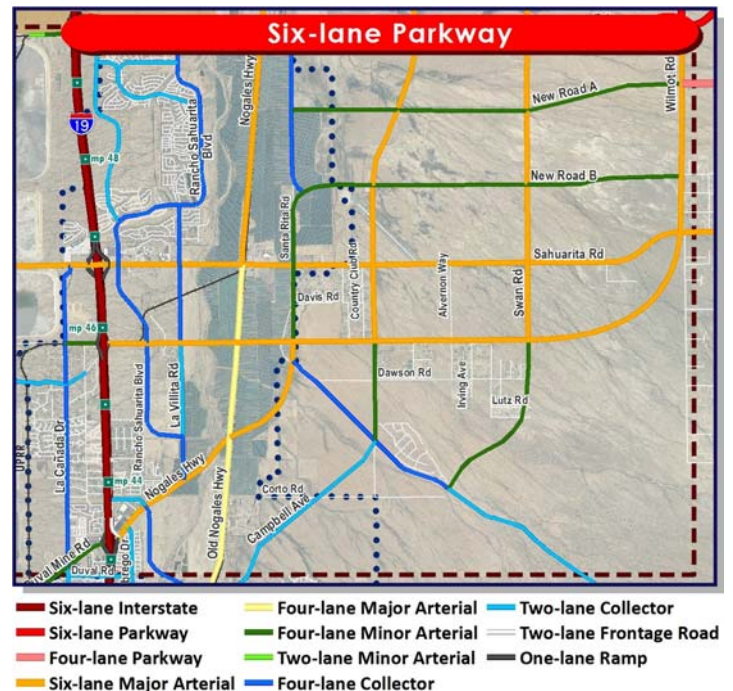
Alternative 2: Pima Mine Road

Pima Mine Rd is now a six-lane Parkway from I-19 to Wilmot Rd while El Toro Rd is now a six-lane arterial that will provide an additional connection to I-19 and additional east-west capacity within the study area as shown in Figure 5.3

Roadway LOS

Figure 5.4 displays the projected Alternative 2 traffic volumes and LOS with the projected 2040 socioeconomic conditions. The resulting traffic volumes and LOS represent average daily traffic conditions. The study area roadways operate at LOS A or B, low levels of congestion, except for the following:

FIGURE 5.3: ALTERNATIVE 2 ROADWAY NETWORK



- LOS F** (High Congestion)
- I-19: through entire study area with exception between interchange ramps at Duval Mine Rd/Nogales Hwy
 - Pima Mine Rd: two segments between Nogales Hwy and eastern study limits
 - El Toro Rd: La Cañada Dr to Sahuarita Rd
 - La Cañada Dr: Helmet Peak Rd to south of El Toro Rd
 - Avenida Mitla: Pima Mine Rd to south of Camino Rancheria
 - Camino Rancheria: Calle Vista Larga to Via Del Moro
 - Rancho Sahuarita Blvd: two segments between Pima Mine Rd and Sahuarita Rd
 - Santa Rita Rd: El Toro Rd to Swan Rd
 - Swan Rd: north of New Road B to north out of study limits
 - Wilmot Rd: Sahuarita Rd to north out of study limits
-
- LOS E** (High Congestion)
- Pima Mine Rd: Rancho Sahuarita Blvd to Nogales Hwy
 - Camino Rancheria: Avenida Mitla to Calle Vista Larga
 - Sahuarita Rd: I-19 to Rancho Sahuarita Blvd
 - Duval Mine Rd: La Cañada Dr to I-19
 - Duval Mine Rd extension: Nogales Hwy to 0.45 miles east
 - Campbell Ave: Santa Rita Rd to south out of study limits
 - Quail Run Blvd extension: Nogales Hwy to south 0.45 miles
 - Rancho Sahuarita Blvd: Avenida Mitla to north of Sahuarita Rd
 - La Villita Rd: two segments between Sahuarita Rd (north) and El Toro Rd (south)
 - Swan Rd: New Road B to north 0.24 miles



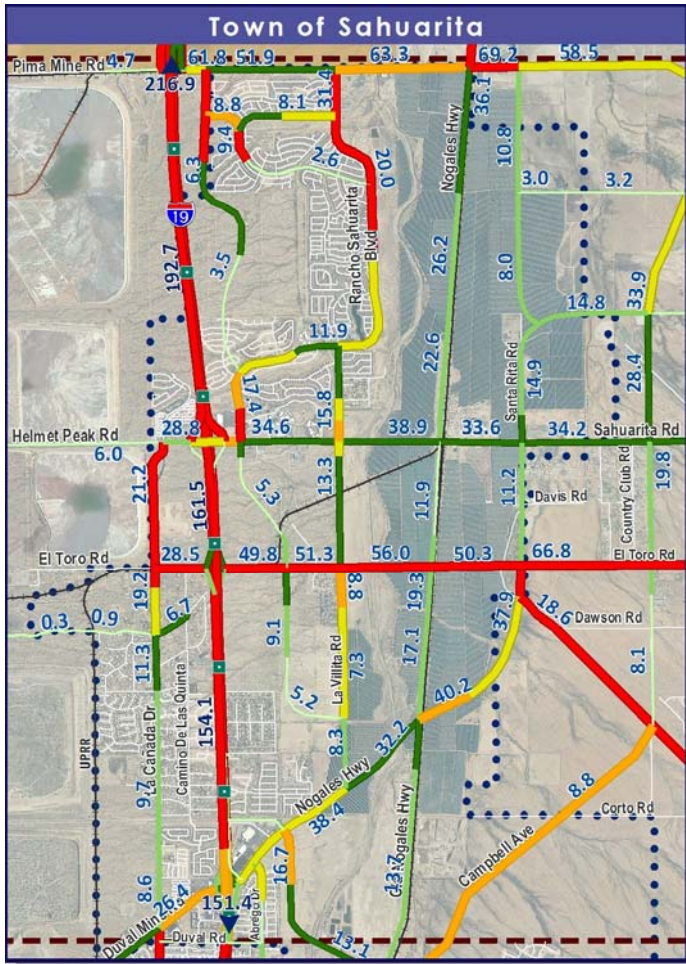
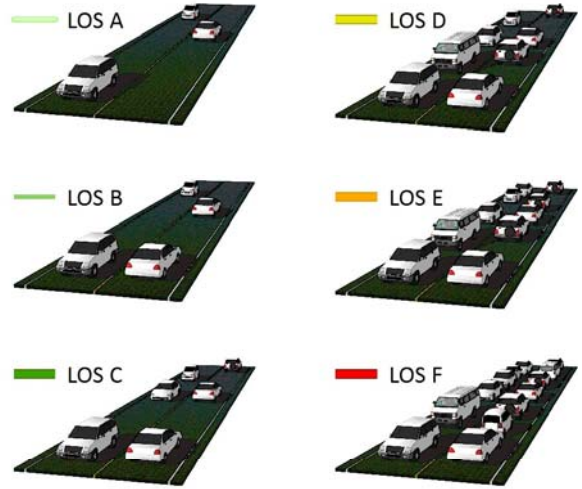


FIGURE 5.4: ALTERNATIVE 2 LEVEL OF SERVICE AND DAILY TRAFFIC VOLUMES

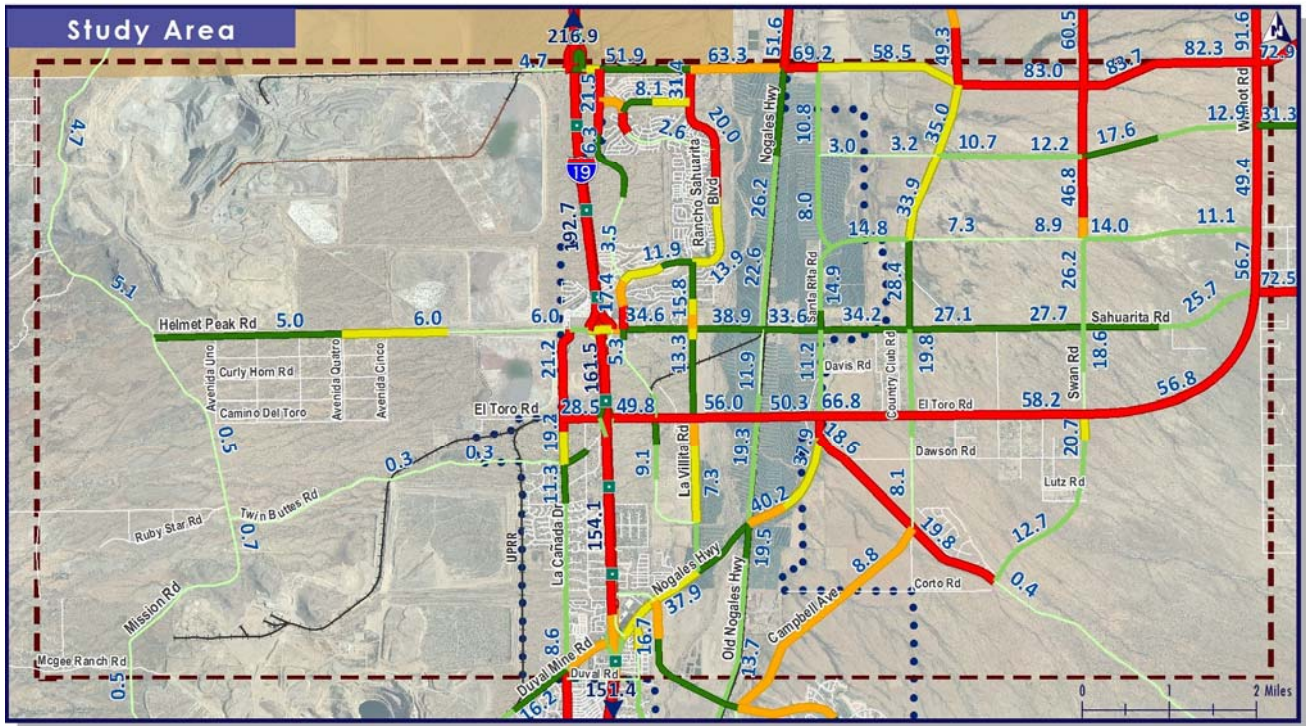


00 Daily Volume (display in Thousands)

REFERENCE

- Milepost
- Other Roads
- Railroad
- Abandoned Railroad
- Tohono O'odham Nation
- Town of Sahuarita
- Study Area

Sources: Town of Sahuarita, PAG, Pima County DOT, ALRIS, and ADOT



- LOS D**
(Moderate Congestion)
- Pima Mine Rd: two segments between I-19 and Country Club Rd
 - Calle Vista Larga: Camino Paso Corto to Rancho Sahuarita Blvd
 - Helmet Peak Rd: Avenida Quatro to 0.7 miles east of Avenida Cinco
 - Sahuarita Rd: between I-19 interchange ramps
 - Nogales Hwy: I-19 to La Villita Rd
 - Duval Mine Rd extension: 0.45 east of Nogales Hwy to Santa Rita Rd
 - La Cañada Dr: south of El Toro Rd to Twin Buttes Rd
 - Abrego Dr: Nogales Hwy to Placita Del Petalo
 - Rancho Sahuarita Blvd: two segments between Camino Rancho Caliente and Avenida Mitla
 - La Villita Rd: three segments between Stagecoach Dr and Rancho Sahuarita Blvd (south)
 - Country Club Rd: Pima Mine Rd to New Road B
 - Swan Rd: El Toro Rd to south 0.3 miles

-
- LOS C**
(Moderate Congestion)
- Pima Mine Rd: Avenida Mitla to Rancho Sahuarita Blvd
 - Calle Vista Larga: Camino Rancheria to Camino Paso Corto
 - New Road A: Swan Rd to 0.9 miles west of Wilmot Rd
 - Helmet Peak Rd: Mission Rd to Avenida Quatro
 - Sahuarita Rd: Rancho Sahuarita Blvd to 0.87 miles east of Swan Rd
 - Twin Buttes Rd: La Cañada Dr to Camino De Las Quinta
 - Nogales Hwy: La Villita Rd to Old Nogales Hwy
 - La Cañada Dr: Twin Buttes Rd to Camino Antigua
 - Avenida Mitla: 0.4 miles south of Camino Rancheria to 1 mile north of Ranch Sahuarita Blvd
 - Rancho Sahuarita Blvd: three segments between La Villita Rd and El Toro Rd (south)
 - La Villita Rd: 0.1 miles south of Sahuarita Rd to El Toro Rd
 - Nogales Hwy: Pima Mine Rd to New Road A alignment
 - Old Nogales Hwy: Nogales Hwy to 0.4 miles south
 - Country Club Rd: New Road B to Sahuarita Rd
-



Alternative 3: Modified El Toro Road

The six-lane parkway in Alternative 1 is now shifted south of its ending terminus at I-19 and connects with Duval Mine Rd extension east of Nogales Hwy prior to realigning with the El Toro corridor after Santa Rita Rd as displayed in Figure 5.5. The parkway will have an interchange with I-19 at new location. El Toro Rd is a four-lane arterial from La Cañada Dr to Santa Rita Rd, with no connection to I-19.

FIGURE 5.5: ALTERNATIVE 3 ROADWAY NETWORK



Roadway LOS

Figure 5.6 displays the projected Alternative 3 traffic volumes and LOS with the projected 2040 socioeconomic conditions. The resulting traffic volumes and LOS represent average daily traffic conditions. The study area roadways operate at LOS A or B, low levels of congestion, except for the following:

- LOS F**
 - I-19: through entire study area
- (High Congestion)*
 - Pima Mine Rd: I-19 to east out of the study limits
 - Sahuarita Rd: I-19 to Rancho Sahuarita Blvd
 - La Cañada Dr: Helmet Peak Rd to south of El Toro Rd
 - Avenida Mitla: Pima Mine Rd to Camino Rancheria
 - Camino Rancheria: Avenida Mitla to Via Del Moro
 - Rancho Sahuarita Blvd: two segments between Pima Mine Rd and Sahuarita Rd (south)
 - La Villita Rd: north of New parkway to south of Ranch Sahuarita Blvd
 - Santa Rita Rd: El Toro Rd to Swan Rd
 - Campbell Ave: Santa Rita Rd to south out of study limits
 - Swan Rd: north of New Road B to north out of study limits
 - Wilmot Rd: New Road A to north out of study limits
- LOS E**
 - Sahuarita Rd: between I-19 interchange ramps
- (High Congestion)*
 - El Toro Rd: Rancho Sahuarita Rd to Santa Rita Rd
 - Avenida Mitla: Camino Rancheria to 0.4 miles south
 - Rancho Sahuarita Blvd: Avenida Mitla to north of Sahuarita Rd
 - Quail Run Blvd extension: Nogales Hwy to south 0.45 miles
 - La Villita Rd: three segments between Sahuarita Rd (north) and Nogales Hwy



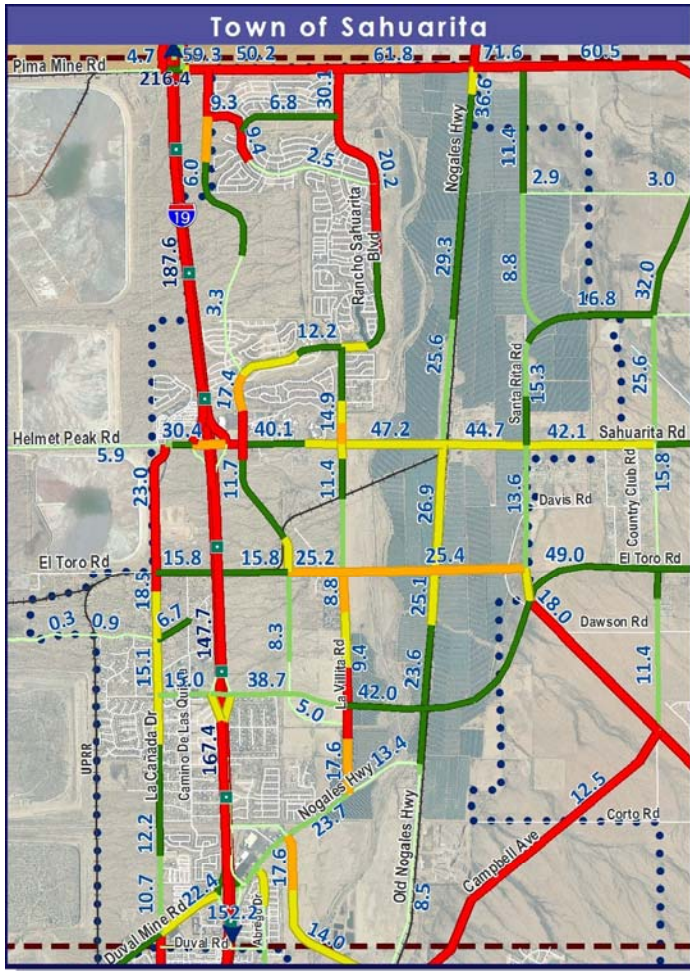
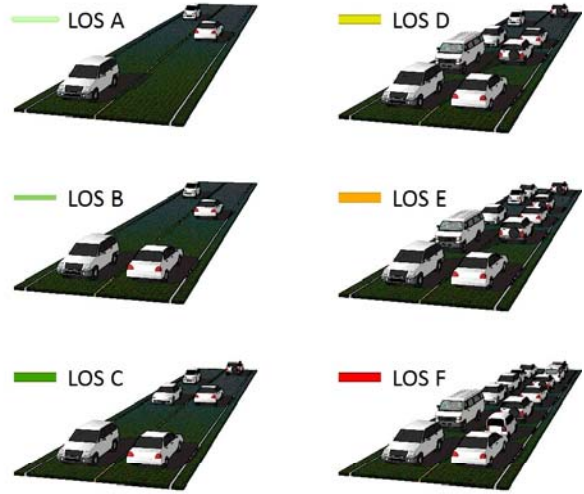


FIGURE 5.6: ALTERNATIVE 3 LEVEL OF SERVICE AND DAILY TRAFFIC VOLUMES

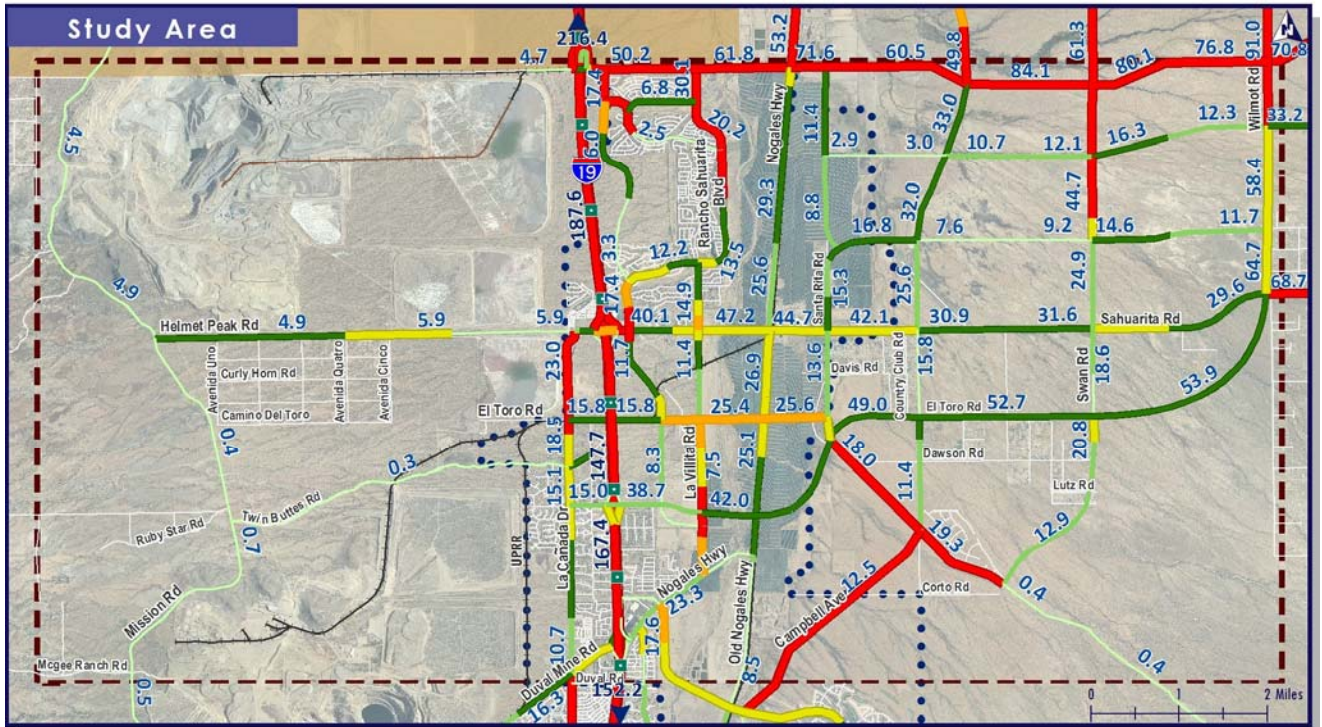


00 Daily Volume (display in Thousands)

REFERENCE

- Milepost
- Other Roads
- Railroad
- Abandoned Railroad
- Tohono O'odham Nation
- Town of Sahuarita
- Study Area

Sources: Town of Sahuarita, PAG, Pima County DOT, ALRIS, and ADOT



LOS D

*(Moderate
Congestion)*

- Helmet Peak Rd: Avenida Quatro to 0.7 miles east of Avenida Cinco
- Sahuarita Rd: two segments between Rancho Sahuarita Blvd and Wilmot Rd
- Duval Mine Rd: La Cañada Dr to I-19
- La Cañada Dr: south of El Toro Rd to Via De Chapala
- Abrego Dr: Nogales Hwy to Placita Del Petalo
- Quail Run Blvd extension: south of Nogales Hwy to out of the study limits
- Rancho Sahuarita Blvd: two segments between Camino Agua Azul and El Toro Rd
- La Villita Rd: three segments between Stagecoach Dr and new parkway
- Nogales Hwy: Sahuarita Rd to south of El Toro Rd
- Santa Rita Rd: El Toro Rd (west) to El Toro Rd (east)
- Swan Rd: New Road B to north 0.24 miles, and El Toro Rd to south 0.3 miles
- Wilmot Rd: Sahuarita Rd to New Road A

LOS C

*(Moderate
Congestion)*

- Calle Vista Larga: Camino Rancheria to Rancho Sahuarita Blvd
 - New Road A: Swan Rd to 0.9 miles west of Wilmot Rd
 - New Road B: two segments between Santa Rita Rd and Wilmot Rd
 - Helmet Peak Rd: Mission Rd to Avenida Quatro, and La Cañada Dr to I-19
 - Sahuarita Rd: three segments between Rancho Sahuarita Blvd and Wilmot Rd
 - El Toro Rd: La Cañada Dr to Rancho Sahuarita Blvd
 - El Toro Rd: Santa Rita Rd to Sahuarita Rd
 - Twin Buttes Rd: La Cañada Dr to Camino De Las Quinta
 - La Cañada Dr: Via De Chapala to Placita Tecolote Mesa
 - Avenida Mitla: south of Camino Rancheria to north of Ranch Sahuarita Blvd
 - Rancho Sahuarita Blvd: three segments between Camino Rancho Caliente and El Toro Rd
 - La Villita Rd: two segments between Rancho Sahuarita Blvd and Union Pacific Railroad Tracks
 - Nogales Hwy: two segments between Pima Mine Rd and Old Nogales Hwy
 - Santa Rita Rd: two segments between and Sahuarita Rd
 - Country Club Rd: two segments between New Road A and El Toro Rd (south)
-



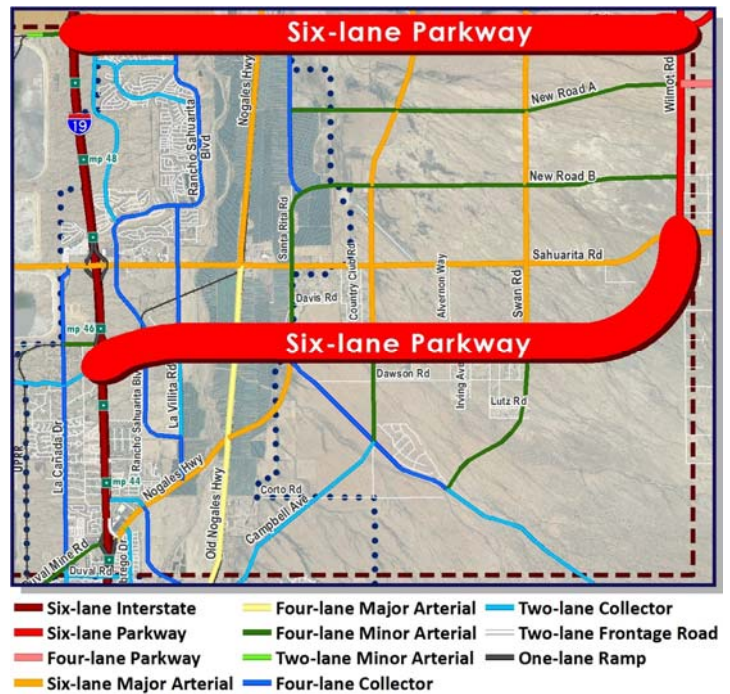
Alternative 4: El Toro Road and Pima Mine Road

Two previous parkway concepts are combined, El Toro Rd and Pima Mine Rd are now both six-lane parkways as shown in Figure 5.7. Both corridors will have a direct connection to I-19 as well as providing additional capacity to study area transportation system.

Roadway LOS

Figure 5.8 displays the projected Alternative 4 traffic volumes and LOS with the projected 2040 socioeconomic conditions. The resulting traffic volumes and LOS represent average daily traffic conditions. The study area roadways operate at LOS A or B, low levels of congestion, except for the following:

FIGURE 5.7: ALTERNATIVE 4 ROADWAY NETWORK



- LOS F** (High Congestion)
- I-19: through entire study area
 - Pima Mine Rd: Country Club to east out of the study limits
 - Sahuarita Rd: I-19 to Rancho Sahuarita Blvd
 - El Toro Rd: La Cañada Dr to I-19
 - La Cañada Dr: Helmet Peak Rd to south of El Toro Rd
 - Avenida Mitla: Pima Mine Rd to south of Camino Rancheria
 - Camino Rancheria: Calle Vista Larga to Via Del Moro
 - Rancho Sahuarita Blvd: two segments between Pima Mine Rd and Sahuarita Rd
 - Santa Rita Rd: El Toro Rd to Swan Rd
 - Campbell Ave: Santa Rita Rd to south out of study limits
 - Swan Rd: north of New Road B to north out of study limits
 - Wilmot Rd: New Road A to north out of study limits

- LOS E** (High Congestion)
- Pima Mine Rd: Nogales Hwy to Santa Rita Rd
 - Camino Rancheria: Avenida Mitla to Calle Vista Larga
 - El Toro Rd: Santa Rita Rd to Country Club Rd
 - Duval Mine Rd: La Cañada Dr to I-19
 - Rancho Sahuarita Blvd: Avenida Mitla to north of Sahuarita Rd
 - Quail Run Blvd extension: Nogales Hwy to south 0.45 miles
 - La Villita Rd: two segments between Sahuarita Rd (north) and El Toro Rd (south)



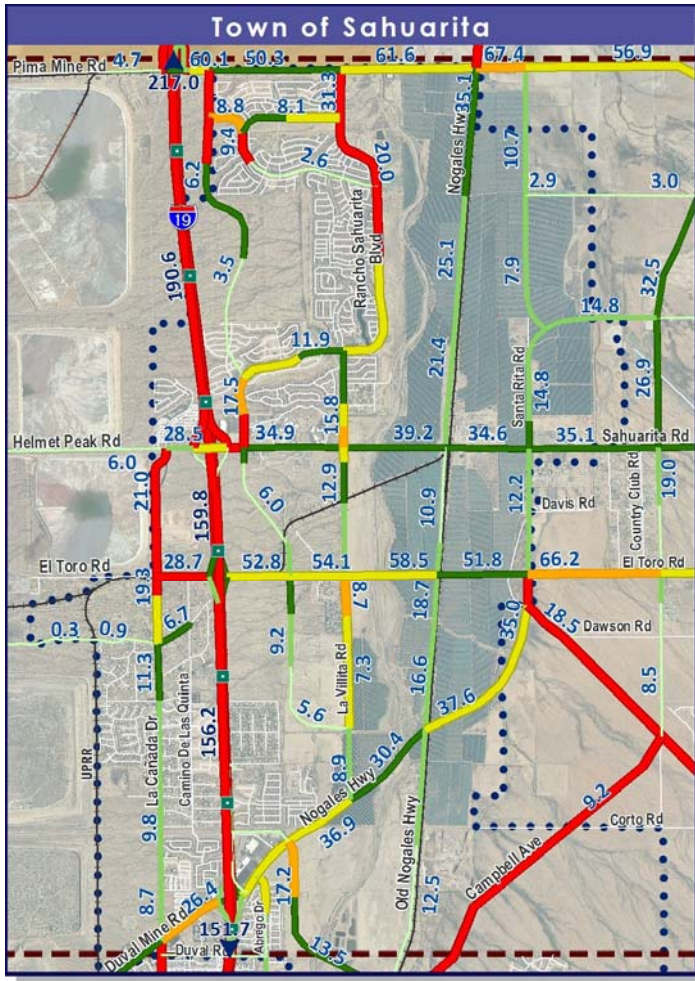
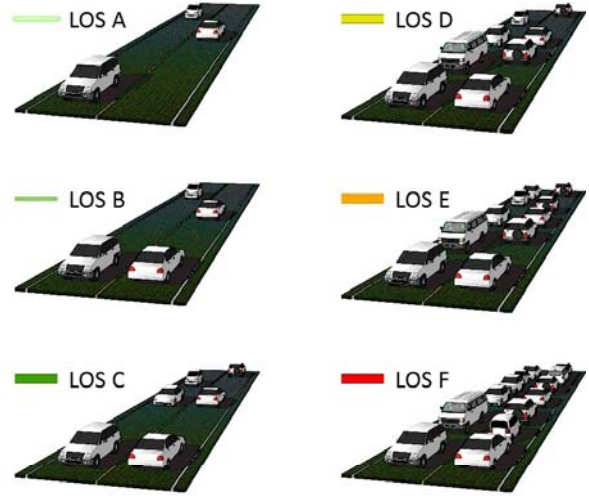


FIGURE 5.8: 2040 ALTERNATIVE 4 LOS AND DAILY TRAFFIC VOLUMES

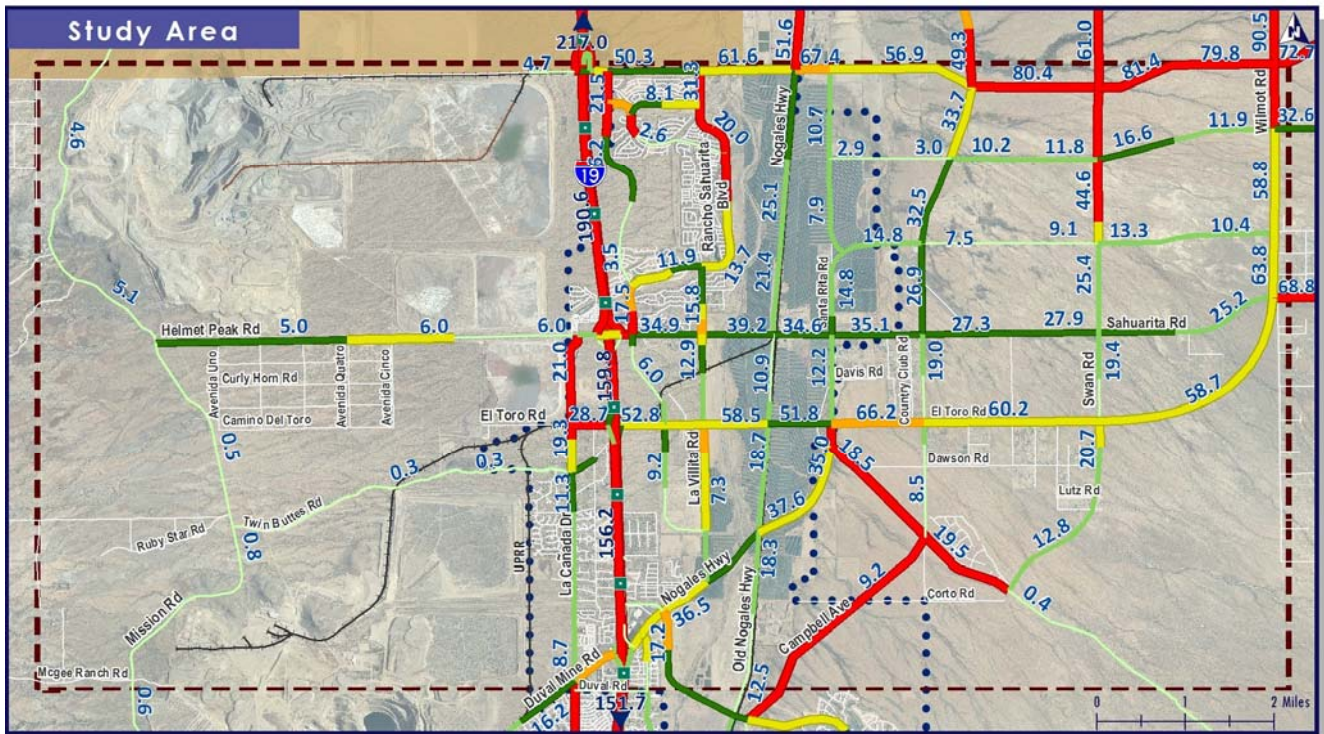


00 Daily Volume (display in Thousands)

REFERENCE

- Milepost
- Other Roads
- Railroad
- Abandoned Railroad
- Tohono O'odham Nation
- Town of Sahuarita
- Study Area

Sources: Town of Sahuarita, PAG, Pima County DOT, ALRIS, and ADOT



- LOS D**
(Moderate Congestion)
- Pima Mine Rd: three segments between I-19 and Country Club Rd
 - Calle Vista Larga: Camino Paso Corto to Rancho Sahuarita Blvd
 - Helmet Peak Rd: Avenida Quatro to 0.7 miles east of Avenida Cinco
 - Sahuarita Rd: between I-19 interchange ramps
 - El Toro Rd: I-19 to Nogales Hwy, again from Country Club Rd to Sahuarita Rd
 - Nogales Hwy: I-19 to La Villita Rd
 - Duval Mine Rd extension: Nogales Hwy to Santa Rita Rd
 - La Cañada Dr: south of El Toro Rd to Twin Buttes Rd
 - Abrego Dr: Nogales Hwy to Placita Del Petalo
 - Rancho Sahuarita Blvd: two segments between Camino Rancho Caliente and Avenida Mitla
 - La Villita Rd: three segments between Stagecoach Dr and Rancho Sahuarita Blvd
 - Country Club Rd: Pima Mine Rd to New Road A
 - Swan Rd: two segments between New Road B (north) and El Toro Rd (south)
 - Wilmot Rd: Sahuarita Rd to New Road A

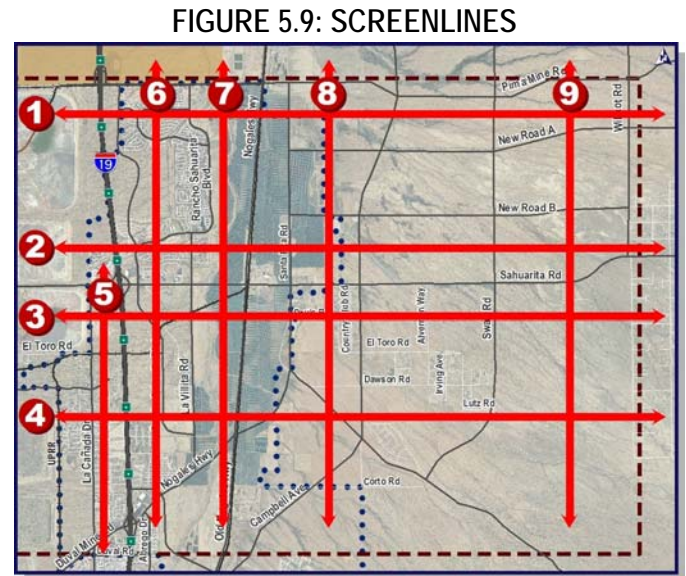
-
- LOS C**
(Moderate Congestion)
- Pima Mine Rd: Avenida Mitla to Rancho Sahuarita Blvd
 - Calle Vista Larga: Camino Rancheria to Camino Paso Corto
 - New Road A: Swan Rd to 0.9 miles west of Wilmot Rd
 - Helmet Peak Rd: Mission Rd to Avenida Quatro
 - Sahuarita Rd: Rancho Sahuarita Blvd to 0.87 miles east of Swan Rd
 - Twin Buttes Rd: La Cañada Dr to Camino De Las Quinta
 - Nogales Hwy: La Villita Rd to Old Nogales Hwy
 - La Cañada Dr: Twin Buttes Rd to Camino Antigua
 - Avenida Mitla: 0.4 miles south of Camino Rancheria to 1 mile north of Ranch Sahuarita Blvd
 - Rancho Sahuarita Blvd: two segments between La Villita Rd and El Toro Rd (south)
 - La Villita Rd: two segments between Rancho Sahuarita Blvd and Union Pacific Railroad tracks
 - Nogales Hwy: Pima Mine Rd to New Road A alignment
 - Quail Run Blvd extension: south 0.45 miles of Nogales Hwy to out of study limits
 - Santa Rita Rd: north of Sahuarita Rd
 - Country Club Rd: New Road A to Sahuarita Rd
-



Alternative Comparison

Screenline Analysis

In addition to reviewing the daily congestion levels and traffic volumes, a screen line analysis was conducted to evaluate the impacts of the improvements. As presented in Figure 5.9, nine screenlines were strategically placed throughout the study area to capture the distribution of traffic on the surrounding facilities for each alternative. Table 5.1 and Table 5.2 display the traffic volume results for each of the alternative across the east-west screenlines (1-4) and north-south screenlines (5-9). The results were compared to the No Build scenario. Key observations include:



- Alternative 1 has the highest impact on the transportation system, reducing traffic on the interstate and arterials.
- Alternative 4 significantly reduces travel on arterials as expected when two high capacity facilities are in place, however the single corridors in Alternative 1 and 2 are also efficient in distributing traffic.
- Locality of the new facility is an important component as results show for Alternative 3, where little traffic is diverted from other surrounding roadways.

TABLE 5.1: EAST - WEST SCREENLINE ANALYSIS

	Road Type	No Build	Alternative 1 (El Toro)	Alternative 2 (Pima Mine)	Alternative 3 (Modified El Toro)	Alternative 4 (El Toro & Pima Mine)
1	Interstate	193,244	189,741	192,748	187,634	190,551
	Parkway	n/a	79,722	n/a	79,098	79,619
	Arterial	237,390	161,187	228,817	164,506	161,944
2	Interstate	193,244	189,741	192,748	187,634	190,551
	Parkway	n/a	65,282	n/a	64,722	63,829
	Arterial	178,788	118,745	179,245	121,026	118,948
3	Interstate	148,695	159,296	161,513	147,652	159,816
	Parkway	n/a	59,364	n/a	53,891	58,668
	Arterial	177,663	101,760	157,929	120,959	101,426
4	Interstate	148,695	156,359	154,116	167,429	156,182
	Parkway	n/a	n/a	n/a	41,969	n/a
	Arterial	127,754	110,169	112,470	88,567	110,136



TABLE 5.2: NORTH - SOUTH SCREENLINE ANALYSIS

	Road Type	No Build	Alternative 1 (El Toro)	Alternative 2 (Pima Mine)	Alternative 3 (Modified El Toro)	Alternative 4 (El Toro & Pima Mine)
5	Interstate	n/a	n/a	n/a	n/a	n/a
	<i>Parkway</i>	<i>n/a</i>	<i>n/a</i>	<i>n/a</i>	<i>n/a</i>	<i>n/a</i>
	Arterial	81,087	83,614	83,723	83,601	83,625
6	Interstate	n/a	n/a	n/a	n/a	n/a
	<i>Parkway</i>	<i>n/a</i>	<i>52,967</i>	<i>51,897</i>	<i>38,682</i>	<i>103,129</i>
	Arterial	184,973	140,185	141,449	148,381	90,587
7	Interstate	n/a	n/a	n/a	n/a	n/a
	<i>Parkway</i>	<i>n/a</i>	<i>58,616</i>	<i>63,307</i>	<i>41,969</i>	<i>120,147</i>
	Arterial	172,735	131,069	127,076	147,713	69,629
8	Interstate	n/a	n/a	n/a	n/a	n/a
	<i>Parkway</i>	<i>n/a</i>	<i>65,852</i>	<i>58,532</i>	<i>48,959</i>	<i>123,078</i>
	Arterial	166,976	119,254	127,203	134,671	61,883
9	Interstate	n/a	n/a	n/a	n/a	n/a
	<i>Parkway</i>	<i>n/a</i>	<i>59,364</i>	<i>83,722</i>	<i>53,891</i>	<i>140,078</i>
	Arterial	172,398	127,779	106,458	132,514	47,519

VMT and VHT Analysis

Vehicles miles traveled (VMT) and vehicles hours traveled (VHT) are frequently used to measure mobility in terms of congestion. Their ratio is often referred to as the “average network speed”. Since the speed is an average for an entire roadway system, minor changes are significant. Regardless if VMT increases, VHT should decrease to show improved performance. As a consequence the average network speed increases thus improving mobility. Table 5.3 shows the comparison of the VMT and VHT for the various alternatives. Key observations include:

- The alternatives, compared to the no build, move traffic through the study area more efficiently with an additional facility.
- Alternative 1 was slightly faster in moving traffic by minimizing distance and reducing travel time through the study area.

TABLE 5.3: MOBILITY IMPROVEMENT ANALYSIS

	No Build	Alternative 1 (El Toro)	Alternative 2 (Pima Mine)	Alternative 3 (Modified El Toro)	Alternative 4 (El Toro & Pima Mine)
VMT	3,697,039	3,782,200	3,783,141	3,795,171	3,783,168
VHT	87,555	85,050	85,652	85,647	85,757
Ave. Speed	42.2	44.5	44.2	44.3	44.1



Criteria Matrix

A comparative analysis was conducted to evaluate potential constraints which may have some bearing on the location and possible configuration of the new corridor as well as the feasibility of the corridor itself. As not to define an alignment, a 0.25 mile buffer was applied to each of the corridor with exception of locations where known ROW is limited. At these locations the buffer was no more than 800 feet. Potential constraints included features that are of significance and should be avoided if possible or have limited contact with to reduce cost and mitigation. Evaluation of each of the alternatives are summarized in the matrix below and measured against the each other.

TABLE 5.4: CRITERIA MATRIX

	Alt. 1 (El Toro)	Alt. 2 (Pima Mine)	Alt. 3 (Modified El Toro)	Alt. 4 (El Toro & Pima Mine)
Financial/Economic Criteria				
Corridor Length	○	○	○	●
Right of Way needs	○	○	●	●
Connect to Interstate	○	○	○	○
River/Wash Crossing	○	○	○	●
Railroad Crossing	○	○	○	●
Major Utilities	○	○	○	●
Traffic Criteria				
Impact on Surround Roadway	○	○	○	●
Local and Regional Connectivity	●	●	●	●
Improves Mobility	○	○	●	○
Improves Safety	○	○	○	○
Environmental/Cultural Criteria				
Impact to Conservation Area*	○	●	○	●
Impact to Open Space	●	●	●	●
Additional Criteria				
Impact to Neighborhoods	○	○	●	○
Future Development Compatibility	●	○	○	●

*Includes Sensitive species, Archaeological/ Cultural Sites, Riparian Areas, and etc.

Level of Impact:

Positive

○ Moderate

● High

Negative

○ Moderate

● High



Summary of Findings

In general, a parkway facility is needed to help alleviate congestion on the local roadway system and provide better access to regional traffic and major activity centers in the study area. With the projected growth, one parkway meets the majority of the future travel needs of the study area. Access should be provided to potential future employment areas to not only enhance the economic development but to increase mobility in the study area. A connection west of I-19 would be of the upmost importance, as it further increases local connectivity and mobility.

Alternative 1 displays the best combination of improved mobility with the least impact:

- The conceptual location of the corridor provided the most efficient movement and connectivity to major local roads and future planned employment centers.
- Could potentially impact some residents located along the corridor and will need to minimize a potential conflict with UPRR line the vicinity of the I-19.

Alternative 2 has the shortest corridor length and the least anticipated costs, however the corridors:

- Borders the Tohono O'odham Nation and parallels the UPRR west of Nogales Hwy with roughly 100 feet of ROW
- Does not provide much opportunity for access to local streets.
- A large portion of the corridor is located within several conservation areas.

Alternative 3 perform better by increasing mobility, however the corridor:

- Is the longest corridor at 9.3 miles in length
- Provides limited opportunity to access local streets and does not promote system continuity
- A large number of residents located in the corridor would be impacted as well as Anamax Park which is located in the proximity of the planned interchange with I-19.

Alternative 4, although very effective in increasing mobility in the study area, would not be financially feasible as it entails the construction of the two facilities (Alternative 1 and Alternative 2).

- Even with the two corridors the impact on the study area mobility is not more substantial than in the previous alternatives thus minimizing its overall effect.

The Study Team is aware that PAG and RTA have approved funding, in December 2012, to conduct a study of the Aerospace and Defense Corridor Economic Development Initiative Planning and Implementation. Corridor concepts could include both Pima Mine Road and/or El Toro Road. The Study Team did not evaluate these particular concepts because they were presented at the conclusion of this study.

Corridor Recommendations

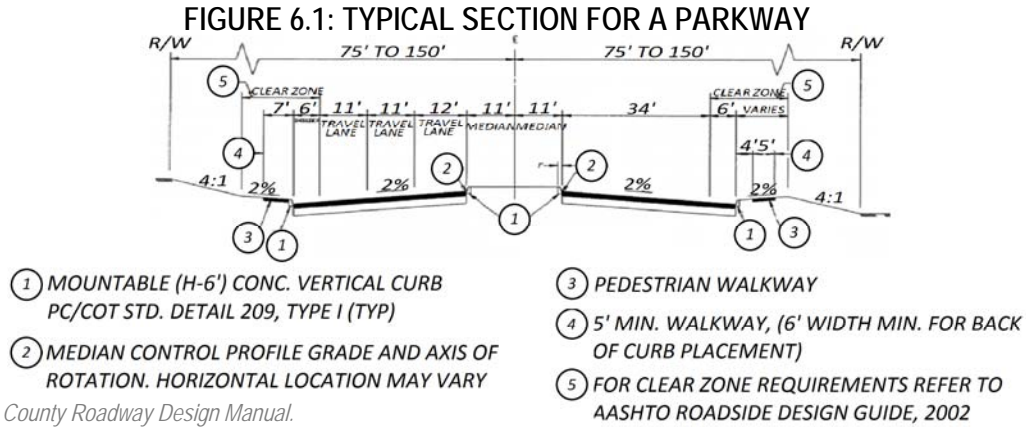
As a result of the analysis, TAC, stakeholders, and general public comments and feedback, Alternatives 1 and 2 corridors were selected for further study. It should be noted that Alternative 2 has cultural and environmental challenges.



6.0 CORRIDOR FEATURES

Design Guidelines and Typical Cross-Sections

In Town of Sahuarita Area Transportation Study, a parkway was classified as a restricted access control facility with ROW of 300-feet to include a center median or barrier. Intersections are limited to one-mile spacing for traffic signals and right-in/right-out for non-signalized intersections at 1/4- and 1/2-mile spacing. A typical parkway section may look similar to Pima County DOT typical section for a six-lane divided road, as shown in Figure 6.1



An additional parkway concept that should be considered is an Arizona parkway. The parkway is an enhance arterial which employs an indirect left turn intersection configuration otherwise known as the Michigan left-turn as shown in Figure 6.2. Left-turns are not permitted at the principal intersection but allowed indirectly as U-turns at secondary intersections located beyond the initial intersection. In areas of high traffic volume, secondary intersections or U-turn breaks can be signalized. The Arizona parkway has been utilized in the Phoenix metro areas to increase capacity, travel times, and safety on restricted access controlled facilities that not freeways. Figure 6.3 illustrates the Maricopa County DOT typical section for an urban six-lane parkway per the *Design Guidelines Recommendations for the Arizona Parkway*.

FIGURE 6.2: INDIRECT LEFT-TURN MOVEMENTS

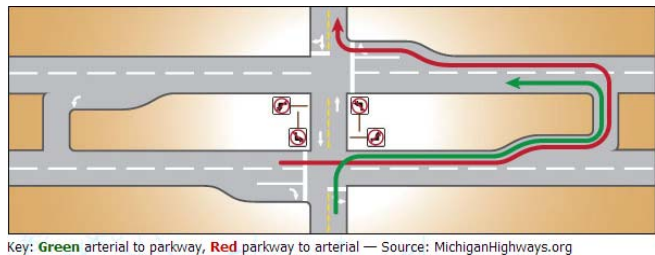
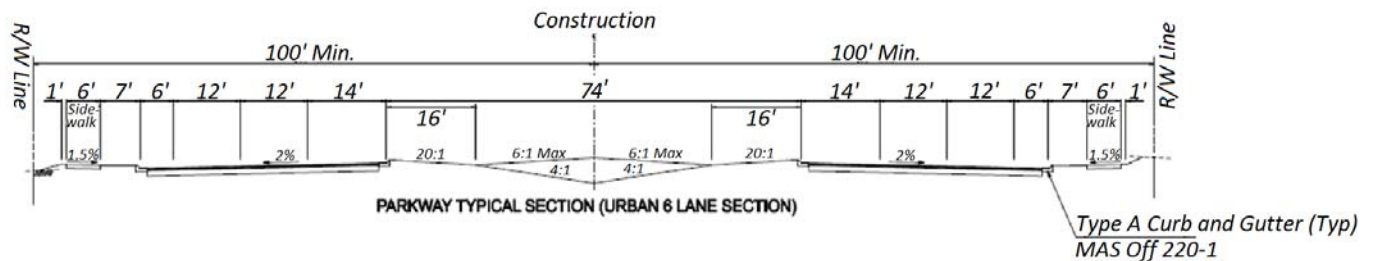


FIGURE 6.3: TYPICAL SECTION FOR AN ARIZONA PARKWAY



Source: Design Guidelines Recommendations for the Arizona parkway.



Table 6.1 provides a comparison of the two parkways.

TABLE 6.1 PARKWAY TYPICAL CROSS-SECTION COMPARISON

	Parkway	Arizona Parkway*
Lanes and Width	Six-lane	Six -12' lanes
Design Speed	55 mph	55 mph
ROW Width	300'	Minimum 200'
Median	Minimum 24' landscape median	Minimum 60' for three-12' receiving lanes
Left Turn Lanes	Limited to 1-mile spacing, at locations where permitted and warranted	Prohibited at full median breaks and from side-street or driveway to parkway. Left turn from parkway to side street or driveway should be limited
Right Turn Lanes	Limited to 1-mile spacing, at locations where permitted and warranted	Right-in/right-out at median breaks, side streets, and driveways
U-Turn Crossovers	-	U-turn crossovers limited to 8 per mile, optimal spacing along corridor is 660' (± 100') including distance from major intersection. Back to back crossover spacing is 100' minimum
Signalized Intersections Spacing	1-mile minimum spacing, at mile locations, fully coordinated and progressed.	1-mile spacing recommend but ½-mile minimum
Non-Signalized Intersections Spacing	Right-in/right-out only at ¼-mile and ½-mile locations	Not permitted
Driveway Access	Not permitted	330' minimum spacing for high volume roads and 165' minimum for low volume roads from centerline to centerline
Parking	Prohibited	Prohibited
Transit	Bus pullouts and Queue Jumpers where warranted	Bus stops should be on the far-side of intersection and include bus.
Bicycle Lanes	Wide shoulder; No on-street bicycle lanes; separated multiuse path may be provided where warranted	Wide shoulder (6'), No on-street bicycle lanes
Pedestrian Facilities	Separated multiuse path may be provided where warranted	6'sidewalk on either side.

Source: Town of Sahuarita Area Transportation Study and Design Guidelines Recommendations for the Arizona parkway.

*Design vehicle is WB-50, Area Type is Urban

In the areas of high environmental and cultural significance, where mitigation is necessary, the cross-section may be altered to accommodate mitigation measures. Both parkway concepts would work for the study area, however the final parkway cross-section will be determine later during the design and engineering stage.



Planning Level Cost Estimates

Estimated costs for the recommended alternatives (1 and 2) are expressed in 2012 dollars and are general estimates. *Estimates do not include detailed roadway design and engineering costs, mitigation cost of various environmental and cultural issues or ROW acquisition and relocation expenditures therefore actual project costs could vary at the time of construction.* Unit cost for each of the two parkway concepts are summarized in Table 6.2 and were applied to each of the two alternatives to determine order of magnitude project costs for a six-lane parkway. Construction cost for medians and shoulders using on design criteria for each of the parkway concepts were included in the overall unit cost for new roadway construction and roadway widening. Since portions of the corridor in Alternative 2 currently exist and the extent and scope work needed is unknown, an average cost for intersection signalization was used. The cost of the drainage features were approximated using reinforced concrete box unit cost, and the review of aerials and bridge inventory data determined that a concrete box was typically used in the study area.

TABLE 6.2: PARKWAY UNIT COSTS

	Units	Cost Per Unit	
		Parkway	Arizona Parkway
Lanes			
Widen roadway to six-lanes*	miles	\$3,000,000	\$3,500,000
Construct new six-lane road*	miles	\$6,500,000	\$7,200,000
Sidewalk	feet	\$28	\$28
Traffic Control			
New diamond interchange at I-19	each	\$25,000,000	\$25,000,000
Upgrade to signalized intersection**	aver. cost	\$150,000	\$150,000
New Signalized intersection	each	\$300,000	\$300,000
U-Crossovers	each	-	\$175,000
River/Wash Crossing			
Widen existing bridge to six-lanes	sq. feet	\$120	\$120
Construct new six-lane bridge	sq. feet	\$150	\$150
Widen existing drainage feature to six-lanes	sq. feet	\$75	\$75
Construct new six-lane drainage feature	sq. feet	\$80	\$80
Railroad crossing			
Construct 6-lane grade-separated overpass	each	\$2,500,000	\$2,500,000

* Includes cost of median, lane width, and shoulder

** Average Cost,, scope of work will determine final unit cost



Alternative 1: El Toro

The estimated cost of construction for a six-lane parkway using the *Sahuarita Area Transportation study* design criteria is \$103,982,152 while construction of the Arizona Parkway is estimated at \$116,162,512. Project costs for each of the parkway concepts are summarized in Table 6.3 and do not include ROW acquisition and relocation expense which may impact the overall project cost for each parkway concept. The corridor would consist of newly constructed facilities, including a new diamond interchange at I-19, a bridge at the Santa Cruz River, and a grade-separate over pass at the UPRR tracks.

TABLE 6.3: ALTERNATIVE 1 COST ESTIMATES

	Units	Unit-Amount	Total Cost	
			Parkway	Arizona Parkway
Lanes				
Widen existing to six-lanes	miles	-	-	-
Construct new six-lane road	miles	8.9	\$57,850,000	\$64,080,000
Sidewalk on each side	feet	93,984	\$2,631,552	\$2,631,552
Traffic Control				
New diamond interchange at I-19	each	1	\$25,000,000	\$25,000,000
Upgrade to signalized intersection	each	-	-	-
New signalized intersection	each	7	\$2,100,000	\$2,100,000
U-Crossovers	each	34	-	\$5,950,000
River/Wash Crossing				
Widen existing bridge to six-lanes	sq. feet	-	-	-
Construct new six-lane bridge	sq. feet	17,200	\$2,580,000	\$2,580,000
Widen existing drainage feature to six-lanes	sq. feet	-	-	-
Construct new six-lane drainage feature	sq. feet	16,512	\$1,320,960	\$1,320,960
Railroad crossing				
Construct six-lane grade-separated crossing	each	1	\$2,500,000	\$2,500,000
Engineering & Design				
General Cost for Engineering and Design			\$9,000,000	\$10,000,000

**Includes cost of median, lane width, and shoulder*



Alternative 2: Pima Mine

Located along the northern portion of the study area, sandwiched between the San Xavier District of the Tohono O'odham Nation and UPRR, Pima Mine Rd is currently a two-lane from I-19 to Nogales Hwy. The estimated cost to widen and construct a six-lane parkway using the *Sahuarita Area Transportation study* design criteria is \$58,425,152 while construction of the Arizona Parkway is estimated at \$67,795,152. Project costs for each of the parkway concepts are summarized in Table 6.4 and do not include environmental and cultural mitigation expense which may impact the overall project cost for each parkway concept. It should be noted the interchange a Pima Mine Rd and I-19 was recommend to be updated, final design and location of interchange will influence project cost. Although portions of the corridor exists which reduces the cost of construction, the extent and scope of work required to widen the existing roadway segment is unknown at this time.

TABLE 6.4: ALTERNATIVE 2 COST ESTIMATES

	Units	Unit-Amount	Total Cost	
			Parkway	Arizona Parkway
Lanes				
Widen existing to six-lanes	miles	2.3	\$6,900,000	\$8,050,000
Construct new six-lane road	miles	5.6	\$36,400,000	\$40,320,000
Sidewalk on each side	lin-feet	83,424	\$2,335,872	\$2,335,872
Traffic Control				
New diamond interchange at I-19	each	-	-	-
Upgrade to signalized intersection	each	3	\$450,000	\$450,000
New Signalized intersection	each	4	\$1,200,000	\$1,200,000
U-Crossovers	each	20		\$3,500,000
River/Wash Crossing				
Widen existing bridge to six-lanes	sq. feet	8,736	\$1,048,320	\$1,048,320
Construct new six-lane bridge	sq. feet	-	-	-
Widen existing drainage feature to six-lanes	sq. feet	3,600	\$270,000	\$270,000
Construct new six-lane drainage feature	sq. feet	16,512	\$1,320,960	\$1,320,960
Railroad crossing				
Construct six-lane grade-separated crossing	each	1	\$2,500,000	\$2,500,000
Engineering & Design				
General Cost for Engineering and Design			\$6,000,000	\$6,800,000



Implementation Strategies

The implementation of the corridor is contingent upon that availability of funding for the design and construction phases. As a multimodal corridor that incorporates not only auto but transit, pedestrians, and bicycles, a variety of funding sources may be applicable. Primary funding sources include federal programs, ADOT, and other regional government agencies such as PAG. It should be noted that federal funding was recently modified. The recently enacted, MAP-21 or Moving Ahead for Progress in the 21st Century Act, will fund surface transportation programs for the next two years (FY 2013, and FY 2014). MAP-21 either consolidated, restructured, or eliminated programs from SAFETEA-LU; most of the eliminated programs however are covered in other programs. Figure 6.4 display those programs that would most commonly be used for funding, however funding should not be specifically limited to these programs further research and analysis should be done prior to final design and construction.

In addition, funding for public transportation projects were also restructured; programs were either consolidated or eliminated. Figure 6.5 displays those programs that would be mostly commonly used as funding sources, as with the roadway funding sources, it should not be specifically limited to these programs.

Table 6.5 is a comprehensive funding matrix of funding sources that may potential be used as funding, however it is recommend that additional sources be investigated for funding purposes since MAP-21 currently covers two fiscal years (2013 and 2014) and implementation of the corridor is unknown. Additional, program allocation at the state level is yet to be determine, which will largely depend on the performance and measures plan that will need to be generated by the state.



FIGURE 6.4: MAP-21 HIGHWAY PROGRAMS

SAFETEA-LU	MAP-21	Eligible Projects
Interstate Maintenance Program	<p>National Highway Performance Program (NHPP)</p> <p><i>Provides funding for construction and maintenance projects located on the expanded National Highway System, it includes the Interstate system and all other highways classified as principal arterials</i></p>	<ul style="list-style-type: none"> • Construction, reconstruction, rehabilitation and preservation of highways and bridges • Bridge and tunnel inspections, evolution and training for bridge and tunnel inspectors • Construction, rehabilitation, or replacement of ferry boats and facilities • Safety projects • Environmental restoration and mitigation • Bicycle and pedestrian infrastructure • ITS • With certain conditions: transit projects or federal aid highways
National Highway System (NHS)		
Highway Bridge Program		
Surface Transportation Program	<p>Surface Transportation Program (STP)</p> <p><i>Provides funding for highways, bridges, transit projects, as well as for pedestrian and bicycle infrastructure. It is the largest and most flexible program</i></p>	<ul style="list-style-type: none"> • Highway and bridge construction and rehabilitation • Federal-aid and off-system bridge repair, including de-icing • Congestion pricing and travel demand management • Transit projects • Development of state asset management plan • Carpool projects including fringe and corridor parking • Environmental mitigation • Bicycle, pedestrian, and trails infrastructure • ITS • Border infrastructure projects
Border Infrastructure Program		
Equity Bonus		
Highway Bridge Program (15% for off-system bridges)		
Safe Routes to Schools	<p>Transportation Alternative Program (TAP)</p> <p><i>Provides funding for bicycle and pedestrian infrastructure and facilities, enhancement of connectivity between modes for non-drivers, environmental mitigation and transportation enhancement projects</i></p>	<ul style="list-style-type: none"> • Projects eligible under previous programs still eligible • Bicycle and pedestrian facilities • Safe routes for non-drivers • Construction of turnouts and overlooks • Vegetation management • Historic preservation and rehabilitation of historic transportation facilities • Rails to trails • Archaeological activities related to transportation • Environmental mitigation activity including NEPA compliance • Design or construction of boulevards • Workforce development, training, and education
Recreational Trails		
National Scenic Byways		
Transportation Enhancements (TE) (10% of STP)		
Congestion Mitigation and Air Quality (CMAQ)	<p>Congestion Mitigation & Air Quality Program (CMAQ)</p> <p><i>Provides funding for projects that will reduce congestion and pollution levels to help meet federal air quality standards</i></p>	<ul style="list-style-type: none"> • Establishment or operation of traffic monitoring, management, and control facility • Traffic flow improvements, i.e. HOV lanes, turning lanes • Alternative modes including carpool, and vanpool • Diesel retrofits • Alternative fuel facilities • ITS • Transit projects • Bicycle and pedestrian facilities • Fringe and corridor parking facilities • Intermodal freight capital • Variable roadway pricing
Highway Safety Improvement Program	<p>Highway Safety Improvement Program (HSIP)</p> <p><i>Provides funding for projects that will reduce injuries or fatalities on public roads, pathways, or trails per the State's Strategic Highway Safety Plan</i></p>	<ul style="list-style-type: none"> • Projects that would rectify a safety problem or element, or a hazardous location • High risk rural roads improvements • Traffic calming • Data collection • Improvements for bicyclists, pedestrians, and individuals with disabilities • Safety education, training, and workforce development • Older driver improvements • Truck parking facilities • Safety audits • Projects that were eligible under SAFETEA-LU
High Risk Rural Roads Programs (HRRR)		
Strategic Highway Safety Plan (SHSP)		
Transportation Safety Planning (TSP)		

Source: Transportation for America, and FHWA



FIGURE 6.5: MAP-21 TRANSIT PROGRAMS

SAFETEA-LU	MAP-21	Eligible Projects
Urbanized Area & Growing States (5307) Job Access and Reverse Commute (5316)	<p>Urbanized Areas (5307)</p> <p><i>Provides funding for new bus and rail projects, and maintenance on existing systems for areas with population over 50,000 and may cover operation costs for areas with population less than 200,000</i></p>	<ul style="list-style-type: none"> Public transportation capital Planning Job access and reverse commute projects Under certain limits, operating costs for grantees in areas with population more than 200,000 who operate a maximum of 100 buses in fixed-routes service during peak hours
Job Access and Reverse Commute (5316) Rural Area Grants (5311)	<p>Rural Area Grants (5311)</p> <p><i>Provides funding for public transportation projects in rural communities with a population less than 50,000</i></p>	<ul style="list-style-type: none"> Planning, capital, and operating costs Job access and reverse commute projects Acquisition of public transportation services
Elderly and Disabled (5310) New Freedom Program (5317)	<p>Elderly and Disabled (5310)</p> <p><i>Provides funding for projects that will improve mobility for seniors and individuals with disabilities</i></p>	<ul style="list-style-type: none"> 55% of funds must be used on capital projects: <ul style="list-style-type: none"> Public transportation projects (planned, designed, and carried out) that meet the needs of seniors or individuals with disabilities 45% of funds may be used for: <ul style="list-style-type: none"> Public transportation projects that exceed ADA requirements or improve access to fixed-routes while decreasing dependency on paratransit Alternatives to public transportation
Bus and Bus Facilities (5309)	<p>Bus and Bus Facilities (5339)</p> <p><i>Provides funding for the purchase, rehabilitation, and repair of buses and bus facilities</i></p>	<ul style="list-style-type: none"> Replace, rehabilitate, and purchase buses, vans, and/or related equipment Construct bus-related facilities
Fixed-Guideway Modernization (5309)	<p>State of Good Repair (5337)</p> <p><i>Provides funding for maintenance projects to keep existing rail and bus systems in state of good repair</i></p>	<ul style="list-style-type: none"> Replacement and/or rehabilitation of: rolling stock, line equipment and structures, signals and communications, power equipment and substations, passenger stations and terminals, security equipment and systems, maintenance facilities and equipment, and operational support equipment Transit asset management plan development and implementation
New Starts (5309)	<p>New Starts (5309)</p> <p><i>Provides funding for new and expanded streetcar, light rail, bus-rapid transit, ferries, and heavy rail transit projects</i></p>	<ul style="list-style-type: none"> Core capacity improvements (expand capacity by 10% in existing guideways*) New fixed-guideways or extension to fixed-guideways Bus rapid transit operating in mixed traffic <p><i>*Fixed-guideways include those for rapid rail, commuter rail, light rail, hybrid rail, trolley bus, cable car, passenger ferries, and bus rapid transit</i></p>
Alternative Analysis (5339)	<p>TOD Planning Grants (20005(b) of MAP-21)</p> <p><i>Provides funding for new fixed-guideway and capacity improvement projects that support transit-oriented development (TOD)</i></p>	<ul style="list-style-type: none"> Planning activities with emphasis on growth around transit stations, housing near transit facilities, revitalizing downtown centers and neighborhoods, and local development

Source: Transportation for America, FHWA, and FTA



TABLE 6.5: FUNDING SOURCES

SAFETEA-LU Program	MAP-21 Program	Description	Requirements	Eligible Uses	Source	Application
Interstate Maintenance Program National Highway System (NHS) Highway Bridge Program	National Highway Performance Program (NHPP)	Provides funding for construction and maintenance projects located on the expanded National Highway System, it includes the Interstate system and all other highways classified as principal arterials	Must be located on the Interstate or the National Highway System	<ul style="list-style-type: none"> -Construction, reconstruction, rehabilitation and preservation of highways and bridges -Bridge and tunnel inspections, evaluation, and training for bridge and tunnel inspectors -Construction, rehabilitation, or replacement of ferry boats and facilities -Safety projects -Environmental restoration and mitigation -Bicycle and pedestrian infrastructure -ITS -With certain conditions: transit projects or federal aid highways 	Federal	
Surface Transportation Program Border Infrastructure Program Equity Bonus Highway Bridge Program <i>(15% for off-system bridges)</i>	Surface Transportation Program (STP)	Provides funding for highways, bridges, transit projects as well as for pedestrian and bicycle infrastructure.	<ul style="list-style-type: none"> - Located on Federal-aid highway -Bridge project on any public road -Transit capital products -Intracity/intercity bus terminals and facilities. -Facilities for non-motorized transportation 	<ul style="list-style-type: none"> -Highway and bridge construction and rehabilitation -Federal-aid and off-system bridge repair, including de-icing -Congestion pricing and travel demand management -Transit projects -Development of state asset management plan -Carpool projects including fringe and corridor parking -Environmental mitigation -Bicycle, pedestrian, and trails infrastructure -ITS -Border infrastructure projects 	Federal	
Safe Routes to Schools Recreational Trails Scenic Byways Transportation Enhancements <i>(10% of STP)</i>	Transportation Alternative Program (TAP)	Provides funding bicycle and pedestrian infrastructure and facilities, enhancement of connectivity between modes for non-drivers, environmental mitigation and transportation enhancement projects		<ul style="list-style-type: none"> -Projects eligible under previous programs still eligible -Bicycle and pedestrian facilities -Safe routes for non-drives -Construction of turnouts and overlooks -Vegetation management -Historic preservation and rehabilitation of historic transportation facilities -Rails to trails -Archeological activities related to transportation -Environmental mitigation activity -Design or construction of boulevards -Workforce development, training, and education 	Federal	
Congestion Mitigation and Air Quality Improvement Program (CMAQ)	Congestion Mitigation and Air Quality Improvement Program (CMAQ)	Provides funding for projects that will reduce congestion and pollution levels to help meet federal air quality standards	Located in nonattainment or maintenance areas	<ul style="list-style-type: none"> -Establishment or operation of traffic monitoring, management, and control facility -Traffic flow improvements, i.e. HOV lanes, turning lanes -Alternative modes including carpool, and vanpool -Diesel retrofits -Alternative fuel facilities -ITS -Transit projects -Bicycle and pedestrian facilities -Fringe and corridor parking facilities -Intermodal freight capital -Variable roadway pricing 	Federal	



TABLE 6.5: FUNDING SOURCES (Continued)

SAFETEA-LU Program	MAP-21 Program	Description	Requirements	Eligible Uses	Source	Application
Highway Safety Improvement Program (HSIP) High Risk Rural Roads Programs (HRRR) Strategic Highway Safety Plan (SHSP) Transportation Safety Planning (TSP) Railroad Highway Grade Crossing Program	Highway Safety Improvement Program (HSIP)	Provides funding for safety projects that will reduce injuries or fatalities on public roads, pathways, or trails per the State’s Strategic Highway Safety Plan.	Project must be located on public roads, which includes non-state owned roads and roads on tribal lands.	-Projects that would rectify a safety problem or element, or a hazardous location. -High risk rural roads improvements -Traffic calming -Data collection -Improvements for bicyclists, pedestrians, and individuals with disabilities -Safety education, training and workforce development -Older driver improvements -Truck parking facilities -Safety audits -Projects that were eligible under SAFETEA-LU	Federal	
Highway Safety Improvement Program (HSIP)	Railroad-Highway Crossing Program	Provides funding for safety improvements at grade-crossing to the number of fatalities, injuries and crashes	Project must be located on public road	-Eligibility criteria under SAFETEA-LU HSIP program still applicable	Federal	
-5310: Transit programs for elderly and disabled -5311: Local transit systems in non-urbanized areas -5313: State planning and research programs -5316: Job access and reverse commute -5317: New freedom	Transit Funds – Section 5305, 5310, 5311, 5337, and 5339	Provides funding for local transit.		-5305: State planning and research programs -5310: transit programs for elderly and disabled -5311: local transit systems for rural areas -5337: maintenance projects -5339: bus and bus facilities	Federal	Applications for funds are generally made available in January through ADOT
	Governor’s Office of Highway Safety	Finances State and local government highway safety projects.	Cannot be used for the construction, design, or maintenance of highways or for highway construction research projects.	Inventories, need studies, engineering studies, systems development, program implementation, or for purchasing equipment.	State	
	State and Community Highway Safety Grants	Funds to assist jurisdictions in the development and implementation of highway safety programs designed to reduce traffic crashes, deaths, injuries and property damage.		- Alcohol countermeasures - Occupant protection - Police traffic services (e.g. enforcement) - Emergency medical services - Traffic records - Motorcycle safety - Pedestrian and bicycle safety (jointly administered by FHWA and NHTSA) - Non-construction aspects of roadway safety (administered by FHWA) - Speed control (jointly administered by NHTSA and FHWA)	Federal	Formula based funds are distributed to States
	Highway User Revenue Fund (HURF)	Funds derived from fuel taxes, vehicle license tax, registration fees and other fees.	Project must be on highway	Highway construction, improvements, and other related expenses	State	Distributed directly to jurisdictions based on population
	Vehicle License Tax (VLT)	Arizona tax paid by vehicle owners			State	



TABLE 6.5: FUNDING SOURCES (Continued)

SAFETEA-LU Program	MAP-21 Program	Description	Requirements	Eligible Uses	Source	Application
	Arizona Game and Fish Department Heritage Funds	Funds derived from lottery proceeds to preserve natural and cultural resources		Public Access Environmental Education Schoolyard Habitat Urban Wildlife and Urban Wildlife Habitat IIAPM	State	Available annually in November through Arizona State Parks
	Development Impact Fees	Impact fees or development requirements for targeted projects or areas.	Amount of the assessment needs to be in direct proportion to the magnitude of the need created by the project		Local	
	Development Stipulations	Developers dedicate appropriate ROW and build adjacent streets			Local	
	Hotel Bed Tax	Tax added to hotel room charge that is paid to the state during tax returns and refunded to the local jurisdiction by the state of Arizona.			Local	
	Sales Tax	Funds from a portion of a municipality's sales tax		Motorized and non-motorized improvements	Local	
	Developer Exactions	Require developers to construct off-site facilities necessary to serve their development.			Local	
	Equity Bonus	Funding to States based on equity considerations				Applications available year-round
	Community Facilities District (CFD)	Special District created for the purpose of financing the acquisition, construction, operation and maintenance of public infrastructure improvements.		<ul style="list-style-type: none"> - Water and sewer projects - Police and fire facilities (and sites) - Public buildings (and sites) - Flood control and drainage projects - Roadways - Public parking structures - Landscaping and lakes - Lighting and traffic control - Parks and recreational facilities - Schools and school sites - Pedestrian malls - Enhanced public services 	Local	Applications available year-round



