ORDINANCE 11-01-2014

AN ORDINANCE ADOPTING A MASTER TRANSPORTATION PLAN, PROVIDING FOR CODIFICATION, CORRECTION OF SCRIVENER'S ERRORS, SEVERABILITY, AND AN EFFECTIVE DATE.

WHEREAS, Santaquin City (the *"City"*) is a political subdivision of the State of Utah, authorized and organized under applicable provisions of Utah law; and

WHEREAS, Santaquin has experienced tremendous growth in the past and anticipates more growth in the future; and

WHEREAS, a transportation and circulation plan is necessary for the orderly and safe flow of vehicular and pedestrian traffic within the community, and Santaquin anticipates needing to expand its transportation system as future growth occurs in the City; and

WHEREAS, the City recently commissioned InterPlan to prepare a Master Transportation Plan to establish long term plans for the vehicular and pedestrian infrastructure in the City.

NOW, THEREFORE, BE IT ORDAINED BY THE CITY COUNCIL OF Santaquin CITY, STATE OF UTAH, AS FOLLOWS:

SECTION I. Adoption of Master Transportation Plan

The attached Master Transportation Plan, prepared by InterPlan, is hereby adopted as the official Transportation Plan of Santaquin City.

SECTION II. Codification, Inclusion in the Code, and Scrivener's Errors

It is the intent of the City Council that the provisions of this ordinance be made part of the City Code as adopted, that sections of this ordinance may be re-numbered or re-lettered, that the word ordinance may be changed to section, chapter, or other such appropriate phrase in order to accomplish such intent regardless of whether such inclusion in a code is accomplished, sections of the ordinance may be re-numbered or re-lettered. Typographical errors which do not affect the intent of this ordinance may be authorized by the City without need of public hearing by its filling a corrected or re-codified copy of the same with the City Recorder.

SECTION III. Severability

If any section, phrase, sentence, or portion of this ordinance is for any reason held invalid or unconstitutional by any court of competent jurisdiction, such portion shall be deemed a separate, distinct, and independent provision, and such holding shall not affect the validity of the remaining portions thereof.

SECTION IV. Effective Date

The City Recorder shall deposit a copy of this ordinance in the official records of the City on November 6, 2014, and before 5:00 p.m. on that day, shall place a copy of this ordinance in three places within the City. This ordinance shall become effective at 5:00 p.m. on November 6, 2014.

PASSED AND APPROVED this 5th day of November, 2014.

By: _____
Mayor Kirk Hunsaker

ATTEST:

By _____
Susan Farnsworth, City Recorder

SANTAQUIN CITY
Incorporated
January 4,
1932
STATE OF UTAH

Voting

Council Member Keith Broadhead	Absent
Council Member Matthew Carr	yes
Council Member David Hathaway	yes
Council Member Mandy Jeffs	yes
Council Member Nick Miller	yes

STATE OF UTAH)
) ss.
COUNTY OF UTAH)

I, SUSAN B. FARNSWORTH, City Recorder of Santaquin City, Utah, do hereby certify and declare that the above and foregoing is a true, full, and correct copy of an ordinance passed by the City Council of Santaquin City, Utah, on the 5th day of November, 2014, entitled

"AN ORDINANCE ADOPTING A MASTER TRANSPORTATION PLAN, PROVIDING FOR CODIFICATION, CORRECTION OF SCRIVENER'S ERRORS, SEVERABILITY, AND AN EFFECTIVE DATE."

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the Corporate Seal of Santaquin City Utah this 5th day of November, 2014.

SUSAN B. FARNSWORTH
Santaquin City Recorder

(SEAL)

SANTAQUIN CITY
Incorporated
January 4,
1932
STATE OF UTAH

AFFIDAVIT OF POSTING

STATE OF UTAH)
) ss.
COUNTY OF UTAH)

I, **SUSAN B. FARNSWORTH**, City Recorder of Santaquin City, Utah, do hereby certify and declare that I posted in three (3) public places the ordinance which is attached hereto on the 6th day of November, 2014.

The three places are as follows:
1. Zions Bank
2. Post Office
3. City Office

I further certify that copies of the ordinance so posted were true and correct copies of said ordinance.

SBFarnsworth
SUSAN B. FARNSWORTH
Santaquin City Recorder

The foregoing instrument was acknowledged before me this 6 day of NOV, 2014 by SUSAN B. FARNSWORTH.

My Commission Expires: 9/10/18

Jenna O. Worthen
Notary Public

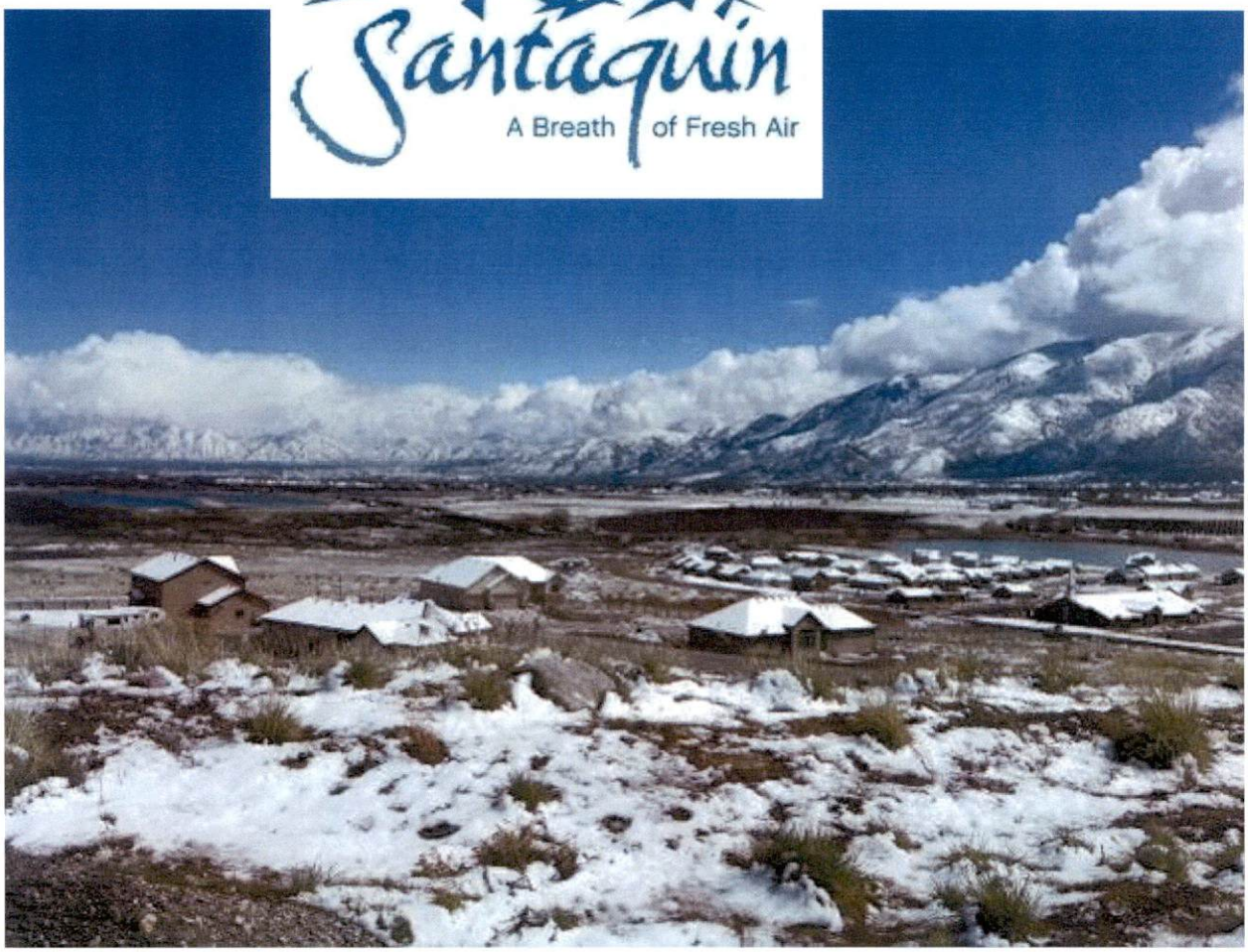
Residing at: Utah County

JENNA O. WORTHEN
Notary Public, State of Utah
Commission #679481
My Commission Expires
September 10, 2018

SANTAQUIN MASTER TRANSPORTATION PLAN

Prepared for

Santaquin
A Breath of Fresh Air



Draft. Project Number 140352

May 2014

InterPlan
Transportation Planning

7719 South Main Street
Midvale, Utah 84047
801-307-3400

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List of Figures and Tables

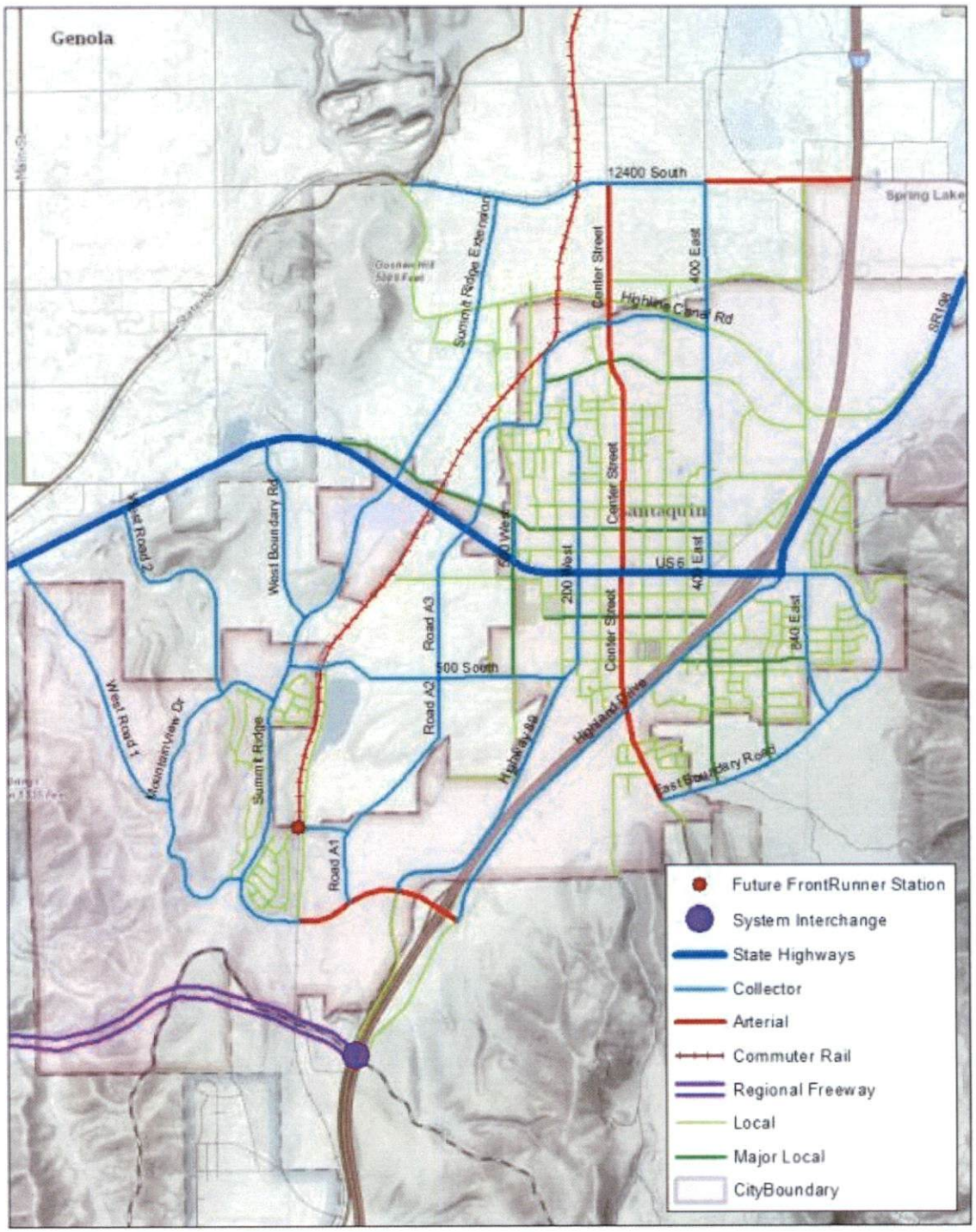
Introduction

The purpose of the Santaquin City Master Transportation Plan is to create a transportation plan that upholds Santaquin's ethos as "a community prospering in country living" while effectively managing an increasing need for transportation infrastructure. Santaquin has seen steady growth in the past decade and is projected to nearly triple in population by 2040. This growth will ultimately exceed the capacity of the City's existing transportation system. This plan responds to future demands on the City's transportation system while retaining safe and active streets for non-motorized travel.

This plan has been organized into five sections which cover the components of the transportation plan. The first section reviews Santaquin City's existing conditions and compares Santaquin to identified peer cities. This is followed by a section which summarizes short term recommendations to improve the quality of transportation in Santaquin. Section three attempts to look at the future transportation conditions that Santaquin City will likely encounter. The fourth section presents the Master Transportation Plan and makes transportation implementation recommendations. Section five proposes funding and a Capital Facilities Plan.

A map of the proposed Santaquin Master Transportation Plan streets is shown below.

Figure 1: Santaquin Master Transportation Plan Map



Planning Process

Santaquin City contracted with InterPlan to update their existing, 2010 Transportation Master Plan. Major efforts to create this plan began in January of 2014. InterPlan relied on its master transportation planning experience, as well as the existing plan, to guide the update.

A Stakeholder Committee was formed to ensure that the new plan was consistent with the needs of those who play a major role in the development of the city. The committee consisted of city staff, local officials, developers, business owners, as well as representatives from The Mountainland Association of Governments (MAG) and the Utah Transit Authority (UTA). The Utah Home Builders Association was invited to participate but did not attend any of the Stakeholder Committee meetings. The Stakeholder Committee provided input during two meetings during the development of this document. The Stakeholder Committee Member Appendix lists the members of the Stakeholder Committee and their attendance at the meetings. The Stakeholder Committee was directly involved in the formulation of the plan through planning and mapping exercises hosted at the committee meetings.

The meetings hosted key discussions on all aspects of the plan.

Coordination between city staff and InterPlan was key to the process. Frequent internal coordination meetings occurred as well as email and phone communication. This coordination was to insure that the development of the plan was on course and on schedule. The meetings hosted key discussions on all aspects of the plan including: population and employment forecasts, street alignments and cross sections, maintenance and plan phasing.

Existing Conditions

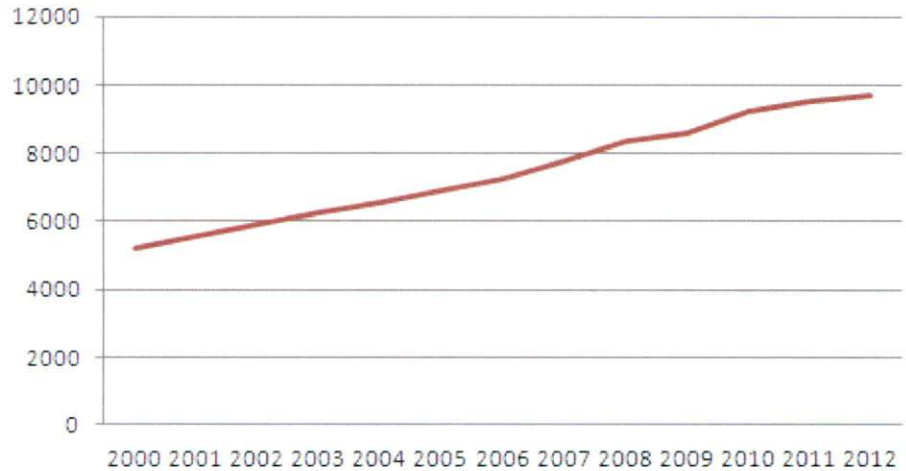
Santaquin City

Santaquin's General Plan, adopted 2007, states it is a "community prospering in country living - Agriculture, Equestrian, Recreation." Santaquin is bisected by Interstate 15, running north/south and is also split east/west by U.S. 6 and S.R. 198. These two large transportation facilities connect Santaquin with the rest of Utah County. One freeway interchange, connecting U.S. 6 to I-15 is wholly within Santaquin's boundaries. Another interchange is just outside the city to the south.

Demographics

Located south of Utah Lake in Utah County, Santaquin City has experienced a steady population growth over the past 13 years. Figure 1 shows Santaquin's growth since 2000. Incorporated in 1932, Santaquin City began with a population of 1,115.

Figure 2: Santaquin City Population



Source: US Census

The household characteristics of Santaquin are unique from the county and the state. Compared to the state, Santaquin has an above average household size of 4.02 and a younger than average median age of 22.3. Dependency ratios are an age-population ratio for those typically too young (0-14, child dependency) or too old (65 and over, aged

dependency) to be in the labor force, and are used as an indication of what portion of the population is dependent. In other words, higher dependency ratios indicate a higher percentage of the overall population that is not working, and thereby dependent. The aged dependency ratio for Santaquin is less than the county and state, while the child dependency ratio is significantly higher. These household characteristics all point to a young population of large families.

Table 1: Household Characteristics

Household Characteristic	Santaquin	Utah County	State of Utah
Average Household Size	4.02	3.57	3.09
Median Age	22.3	24.5	29.3
Aged Dependency Ratio	10.0	11.2	15.3
Child Dependency Ratio	88.7	59.8	52.6
Bachelor's degree or higher	19.4%	35.6%	29.8%

Source: US Census, 2012 ACS 5-Year Estimates

These household characteristics all point to a young population of large families.

Economically speaking, Santaquin is above average as compared to Utah County and the state. Table 2 shows several economic characteristics for Santaquin as well as county and state comparisons. Santaquin is doing very well with more workers, lower unemployment, higher median income and a lower poverty rate than both county and state averages.

Table 2: Economic Characteristics

Economic Indicator	Santaquin	Utah County	State of Utah
In Labor Force	69.4%	68.2%	68.9%
Unemployed	2.3%	4.7%	4.9%
Median Household Income	$63,075	$59,864	$58,164
People whose income in the past 12 months is below the poverty level	7.3%	13.6%	12.1%

Source: US Census, 2012 ACS 5-Year Estimates

Peer City Analysis

To contextualize Santaquin City for the purpose of this plan, a peer city analysis was conducted. Peer cities were chosen based on similarities to Santaquin in population size and geographic proximity to a major interstate highway. Based on these criteria, Mapleton, Pleasant View, Tremonton, West Point and Woods Cross were chosen (see Figure 3). These cities were then compared to Santaquin utilizing the most currently available 2012 American Community Survey (ACS) data on median age, place of work (relative to place of residence), mode of travel to work, and travel time to work.

Figure 3: Peer City Locations

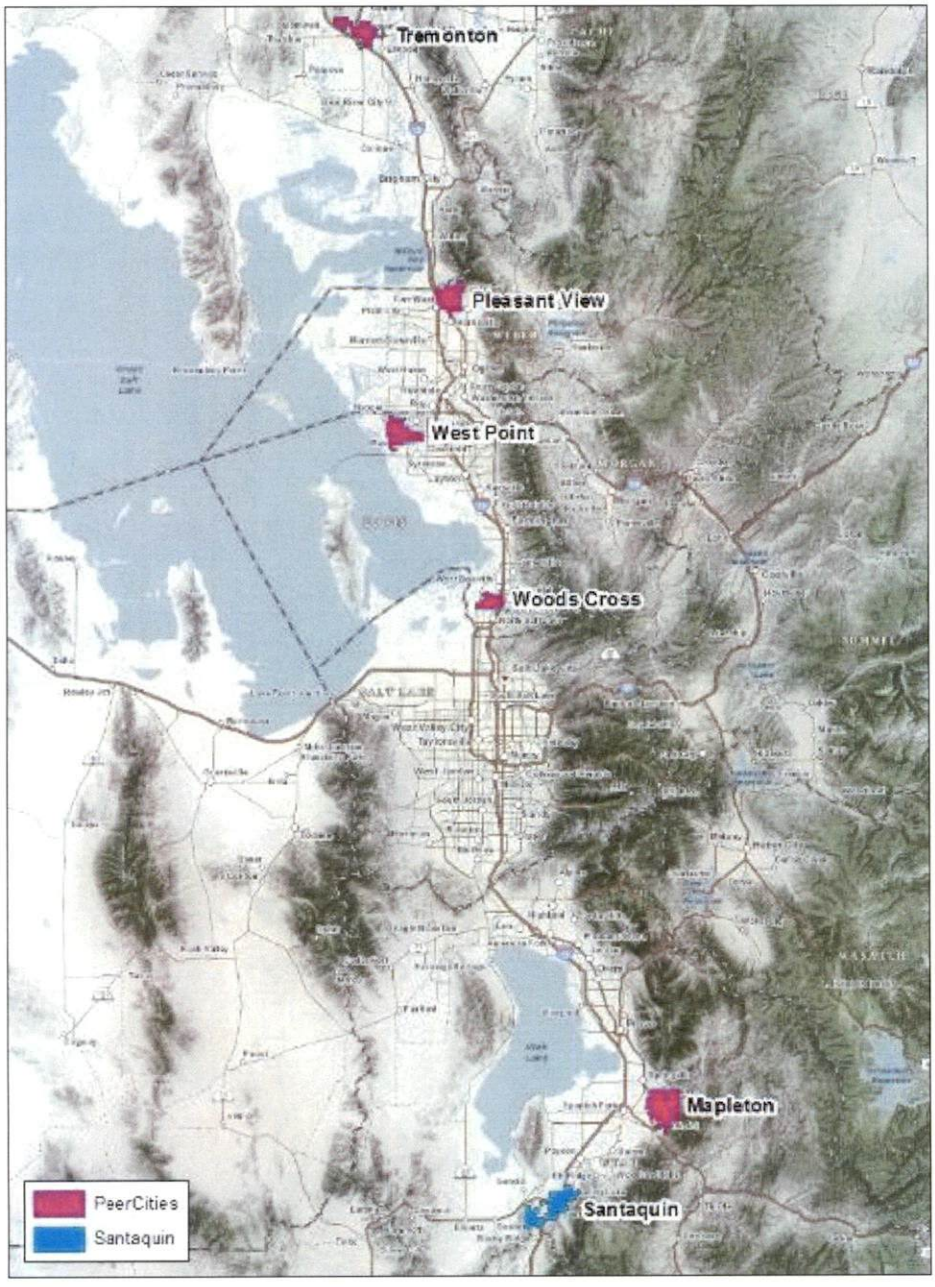
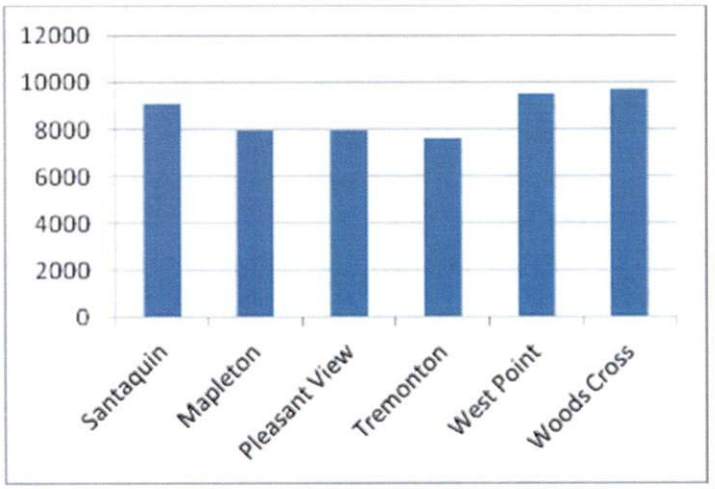
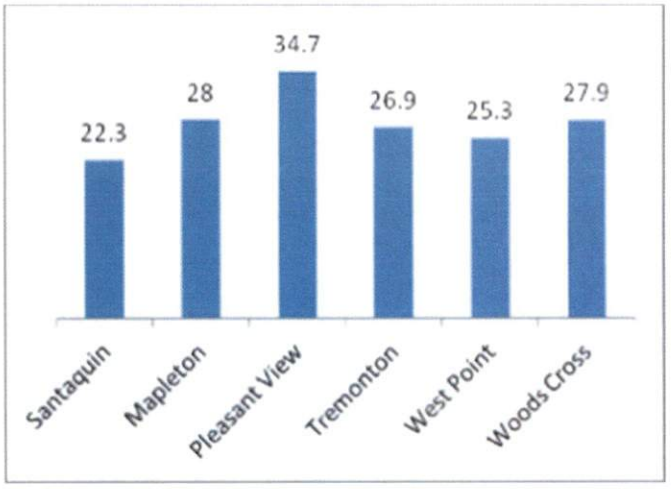


Figure 4: Peer City Population



Source: US Census, 2012 ACS 5-Year Estimates

Figure 5: Peer City Median Age)

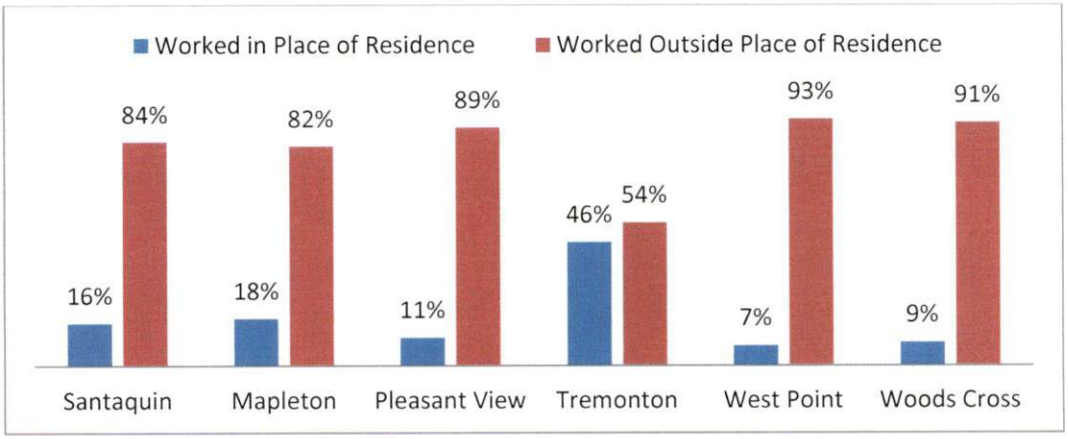


Source: US Census, 2012 ACS 5-Year Estimates

Santaquin has a median age of 22.3 years old, which is the youngest compared to the group, which has a maximum of 34.7 and a mean of 27.5 (see Figure 5).

Approximately 16% of Santaquin residents work in Santaquin, while the remainder leaves the city to work. This is higher than in Pleasant View, West Point and Woods Cross, but much lower than Tremonton (see Figure 6). The higher rates in Tremonton can largely be explained by its relative isolation from a major metropolitan area.

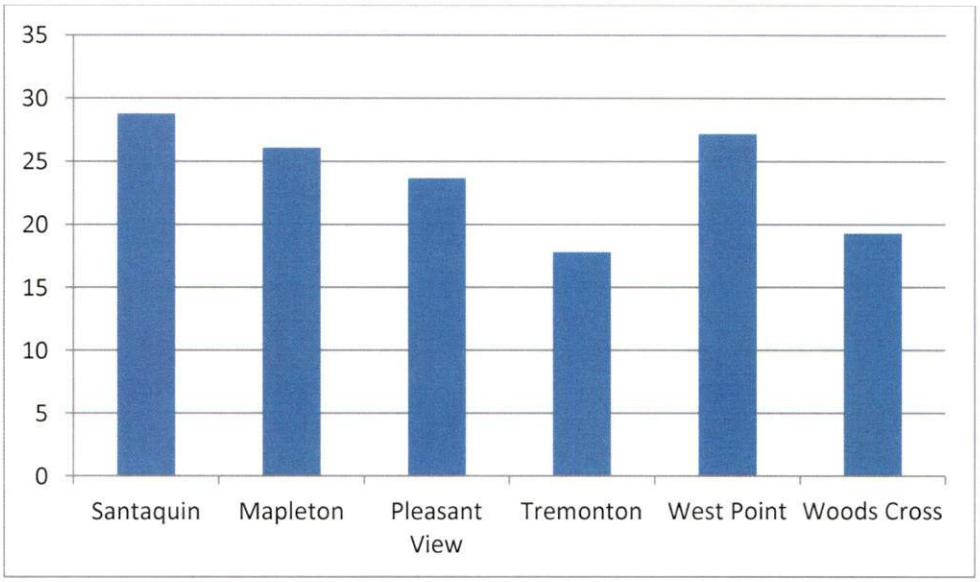
Figure 6: Peer City Place of Work



Source: US Census, 2012 ACS 5-Year Estimates

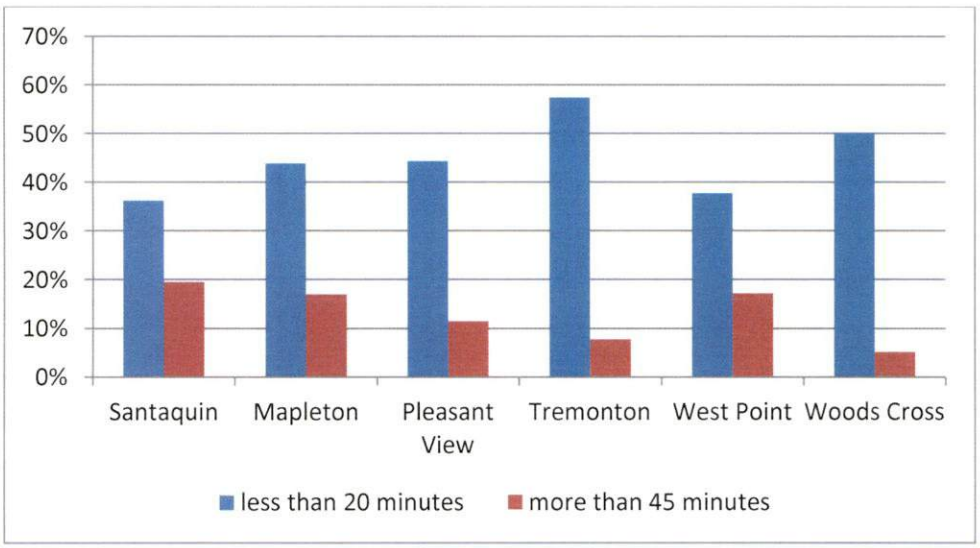
Only 36% of commuters have a travel time to work of less than 20 minutes, which is lower than the group. In Santaquin, the mean travel time to work is 28.8 minutes (see Figure 7), with 20% of residents having a commute of over 45 minutes (see Figure 8).

Figure 7: Peer City Mean Travel Time to Work (Minutes)



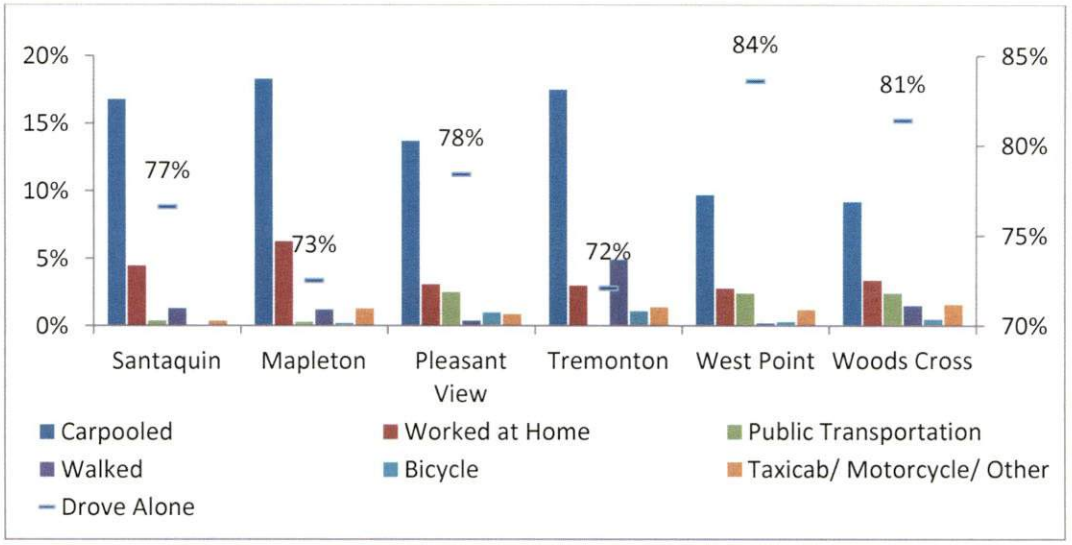
Source: US Census, 2011 ACS 5-Year Estimates

Figure 8: Travel Time to Work



The method by which residents get to work is shown in Figure 9. In Santaquin 77% of people drive alone to work, which is average for the group. For carpooling the rate for Santaquin residents is 17%, which is higher than Pleasant View, West Point and Woods Cross but lower than Mapleton or Tremonton. No one reported using a bicycle as a means to travel to work, while 1.0% walk and 0.4% use public transportation. 4.5% work from home, which is above average for the group. This auto-dominated mode split can largely be explained by long distances to major employment centers and a lack of regular and extensive public transit service.

Figure 9: Peer City Mode of Transportation to Work



Source: US Census, 2012 ACS 5-Year Estimates

Existing Land Use

Transportation planning depends on estimating land uses in addition to demographic changes.

The existing land use of Santaquin is typical of a small, bedroom community, with a commercial core along Main Street, emanating with a residential grid. Southern and eastern Santaquin consists of new and developing residential neighborhoods, with characteristics typical to the suburban norm in the area.

Transportation planning depends on estimating land uses in addition to demographic changes. This information is used in a computer modeling tool, known as the Travel Demand Model, which forecasts trips to and from destinations based on smaller regions known as traffic analysis zones (TAZs). The traffic analysis zones are geographically smaller than a municipality and are similar in size to census block groups. Traffic analysis zones are defined by the Wasatch Front Regional Council (WFRC) and MAG. The existing land use by TAZ was used to generate 2014 population and employment numbers for each TAZ within Santaquin City by city staff. Figure 10 shows the TAZs within Santaquin.

Figure 10: Santaquin Area Traffic Analysis Zones (TAZs)

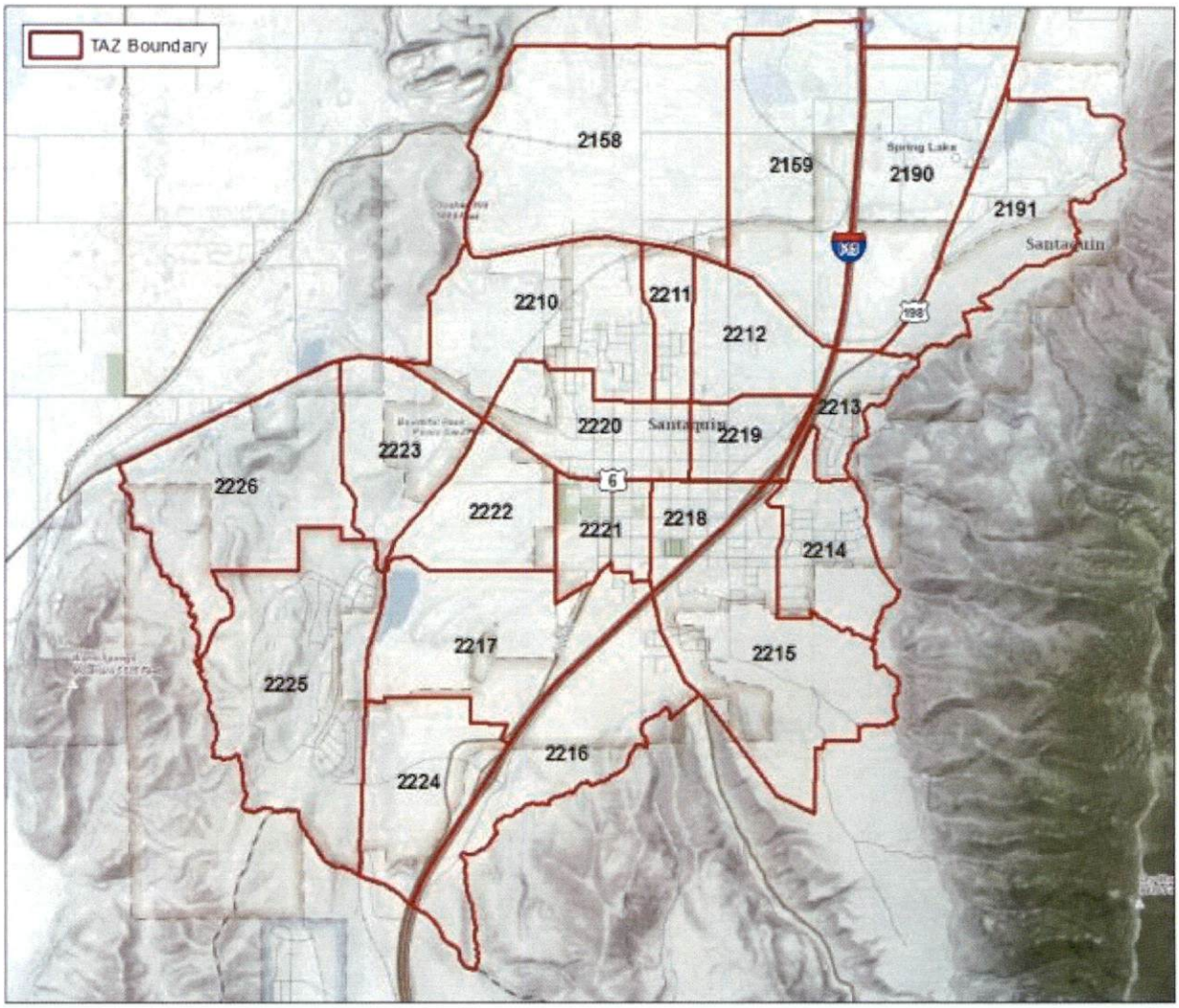


Figure 11 shows the current number of households by TAZ. The highest number of households are found in the central and southwestern portions of the city. Adjacent to the Main Street corridor are smaller lot, single family land uses. In the southwestern portion of the city, the new and growing Summit Ridge development creates many households.

Figure 11: Households by TAZ

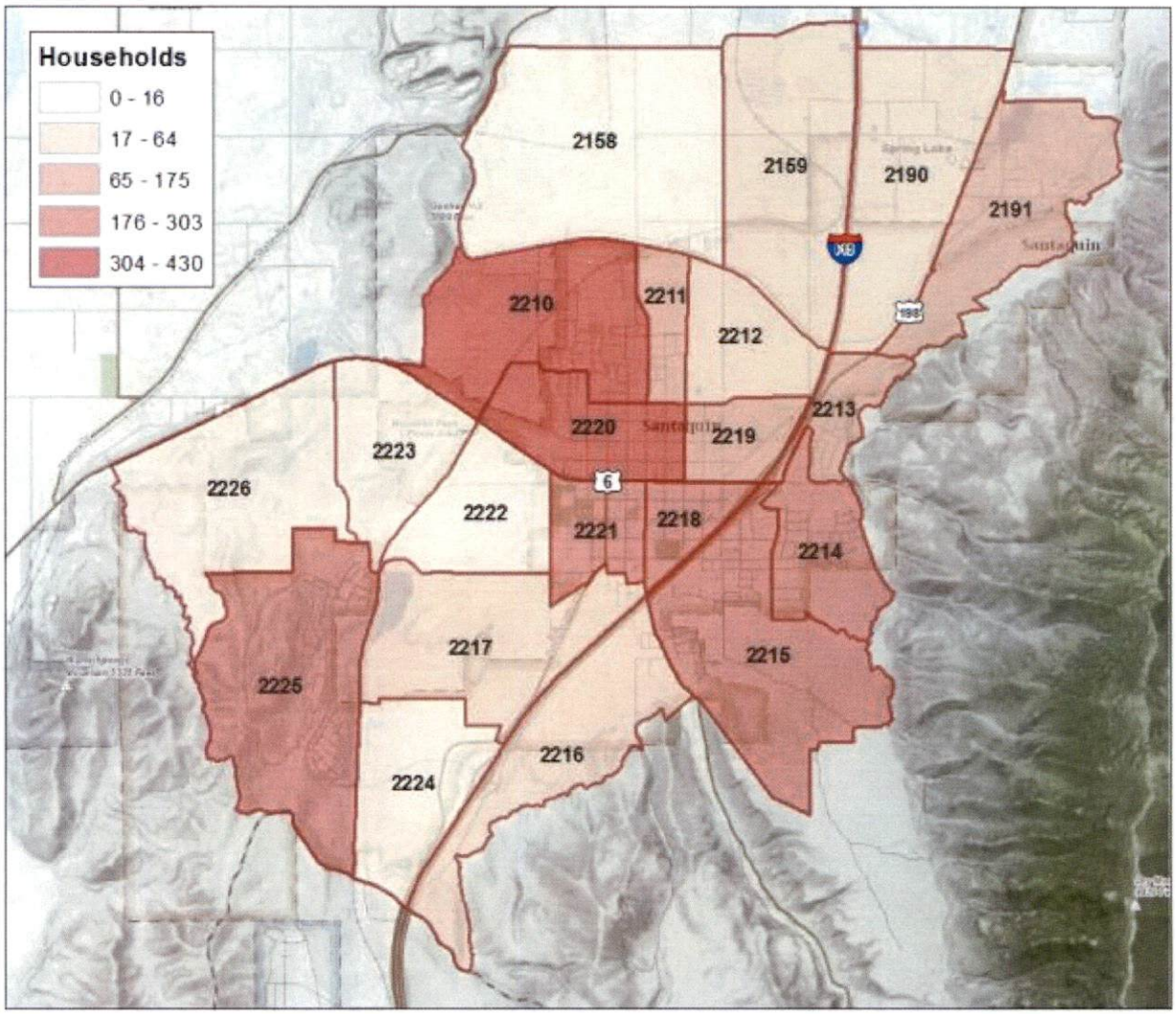
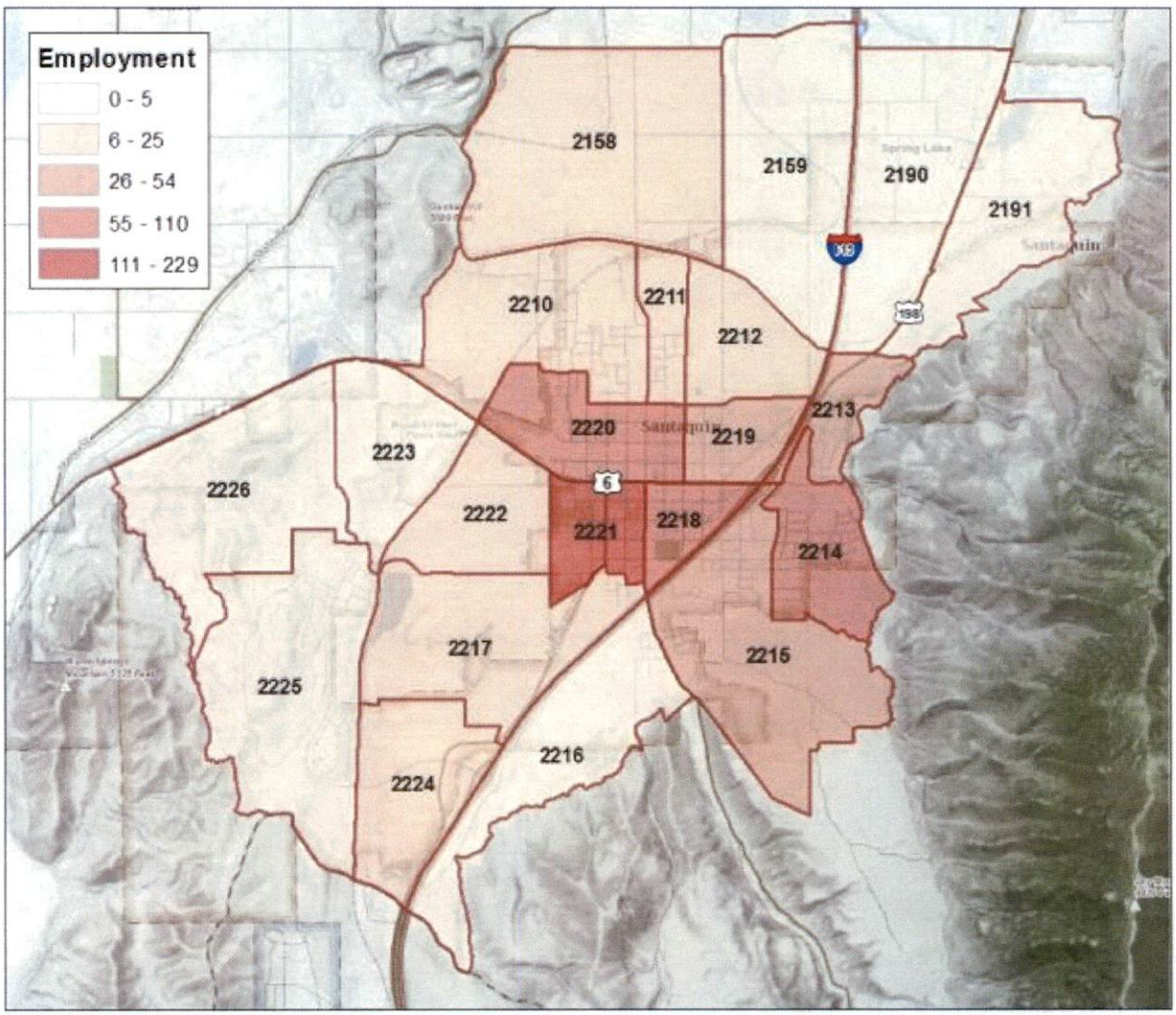


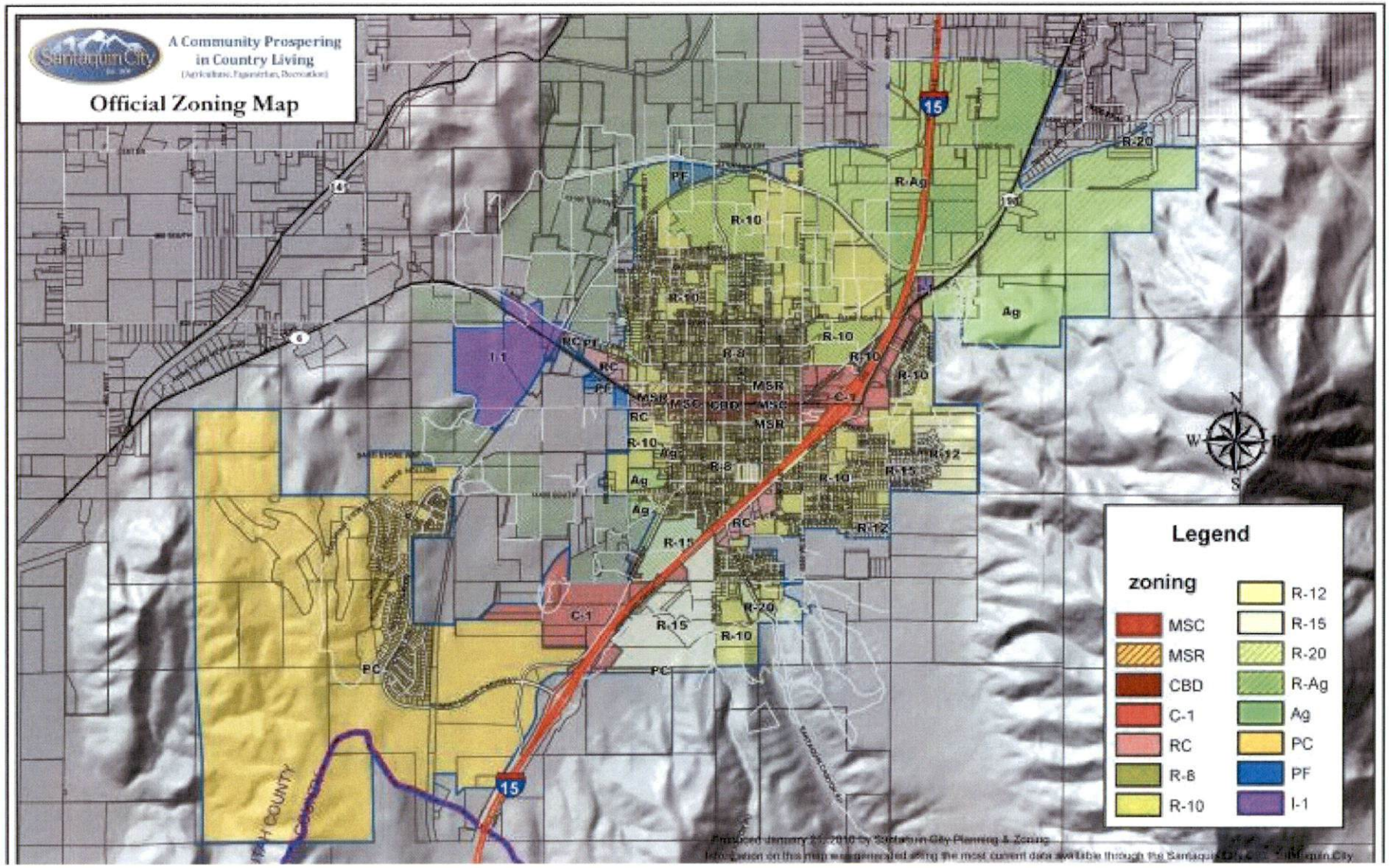
Figure 12 shows the employment, as a number of jobs, in Santaquin by TAZ. Here you will notice employment is concentrated along Main Street in the central portion of the city. Away from the Main Street corridor there are very low concentrations of employment, as these areas are residential in composition. While TAZ 2214 shows a large amount of employment this is misleading, in that the jobs are concentrated near the I-15 interchange and the remainder of the area has residential single family land uses.

Figure 12: Employment by TAZ



The current official zoning map mainly echoes the existing land uses in the city. A central commercial core along the Main Street corridor is sandwiched with residential zones. Future aspirations are evidenced by commercial and residential zones to the south over currently undeveloped land.

Figure 13: Santaquin City Zoning Map



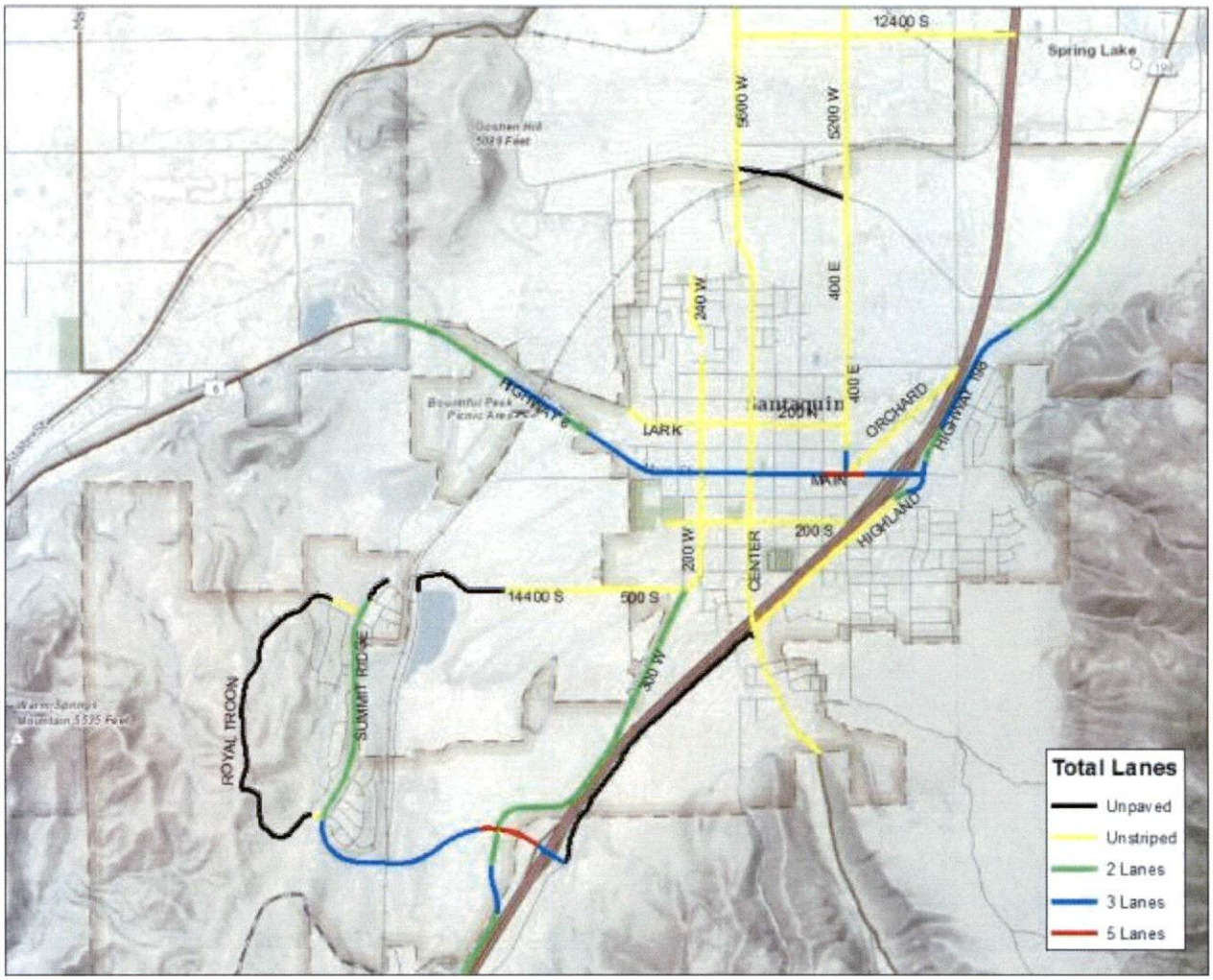
Street Inventory

To assess the current conditions of the Santaquin City street network, two inventories were performed: a major street inventory and a pavement quality inventory. Routes included in the major street inventory were those functionally classified as collector streets or arterial streets. Functional classification is a system of categorizing roads based on their size and traffic capacity. "Collector" roads are medium-sized roads that connect smaller residential roads to "arterial" roads which provide regional access. A discussion of Functional Classification is included in the Plan Recommendations section of this report. Several roads included in the major street inventory were not yet built; however, they were identified as collectors or arterials on future street network maps. Observations for this inventory included: pavement width, number of travel lanes, a street cross section, as well as the presence and condition of sidewalks. The pavement quality inventory assessed pavement conditions on all publically accessible streets.

Functional classification is a system of categorizing roads based on their size and traffic capacity.

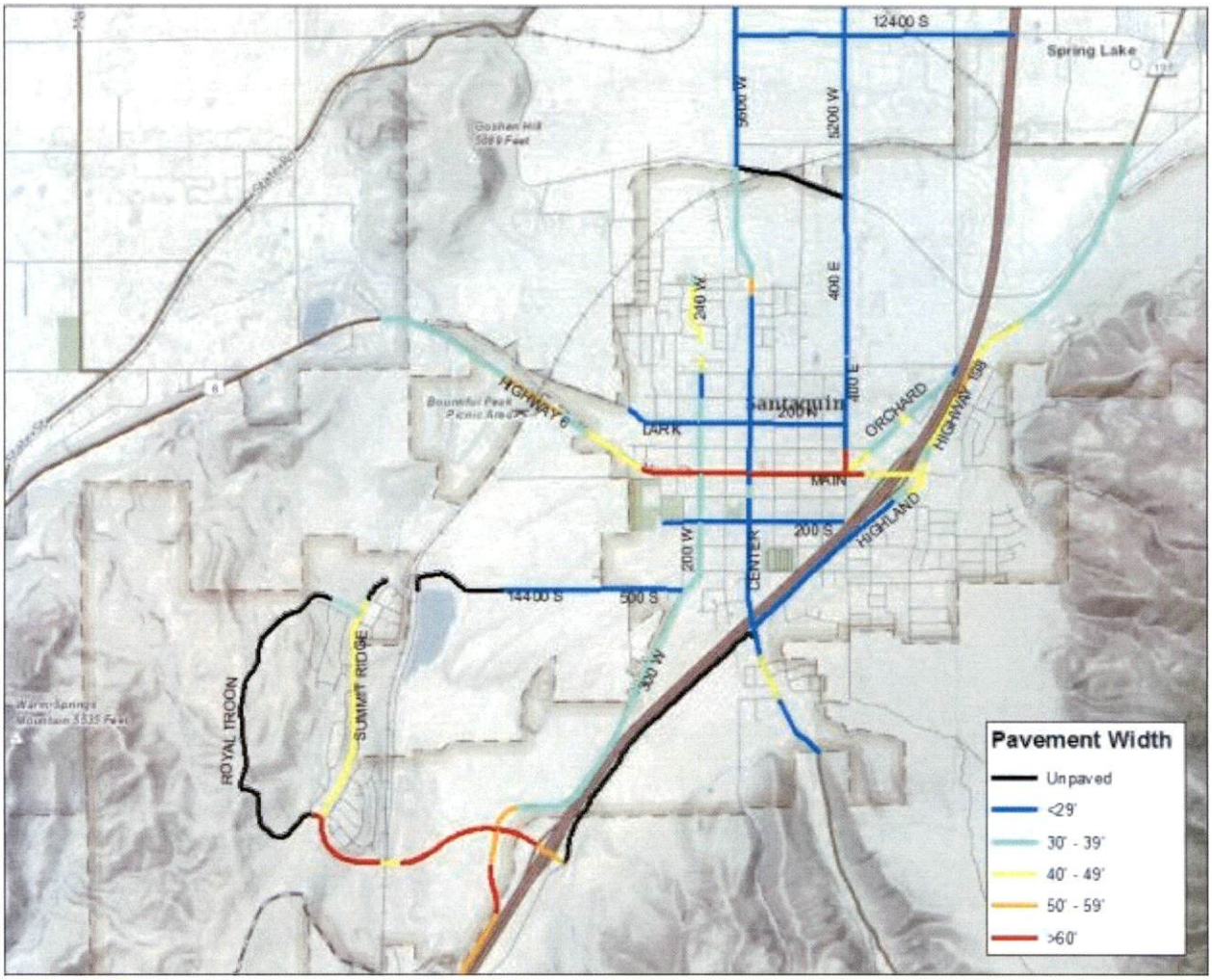
The Santaquin street network is mainly comprised of unstriped roads. Although roadway striping is a good practice for a community, it is not uncommon for two-lane roads not to have a center delineating stripe. Areas with striped lanes mostly emanate from the I-15 interchanges. Three and four lane sections of road are limited to Main Street/U.S. 6, Summit Ridge Parkway, and S.R. 198. (See Figure 14).

Figure 14: Street Network, 2013



The pavement width varies greatly, from 20 feet on local roads, to greater than 60 feet on roads such as Main Street and Summit Ridge Parkway (see Figure 12). With the growth in the area and the development that goes along with it, there are some roads that are as yet unpaved but will be paved as buildings come.

Figure 15: Pavement Width, 2013



A detailed inventory of the streets currently in Santaquin City can be found in the Street Inventory Appendix.

Pavement Quality

A pavement quality inventory of all publically accessible city streets was performed to quantify the scale of needed maintenance. Pavement quality conditions in Santaquin run the gamut from fresh asphalt to unpaved roads. Certain residential developments to the north of town have roads that appear to be structurally deficient due to the poor ride quality and general unevenness of the roadway. It should be noted that Main Street/U.S. 6, I-15, and S.R. 198 are maintained by Utah Department of Transportation (UDOT) and were not inventoried. This inventory utilized a one to five scale to assist in identifying maintenance deficiencies that can be used as part of a larger pavement maintenance program. For example, structurally deficient roads would require an expensive reconstruction while new asphalt may require only on-going striping and minor crack sealing activities.

Level 1: Unpaved. These streets are included on city maps but are as yet unpaved.

Level 2: Dense Cracking or Structurally Deficient. InterPlan never tested the structure of the roadbeds, however, the driving experience paired with comments from the city suggest that some roads in Santaquin are structurally deficient. The density of cracking at this level is roughly three or more cracks in any given square yard of roadway. Cracking at this density, as well as pavement irregularity, are potential signs of structurally deficient roads. This cracking is often accompanied with potholes. Many of these roads have received layers of chipseal preservation. This blend of tar and aggregate creates a smoother roadbed but does not address the underlying pavement cracking issue. Level 2 roads may also feature chipseal that has been worn through, exposing the underlying pavement. Figure 16 contains examples of paving types that were classified as Level 2.

Figure 16: Level 2 Examples

Level 3: Moderate Cracking or Intact Chipseal. Pavement that was identified as Level 3 has slightly less dense cracking than Level 2. Generally at this level, fewer than three cracks exist in any given square yard of pavement surface. Also, chipsealed roads that are intact are given this classification as they have not started to wear through. Figure 17 contains examples of paving types that were classified as Level 3.

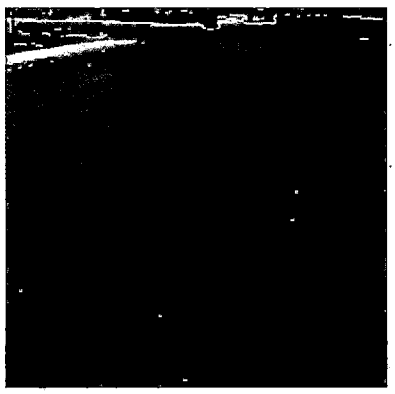
Figure 17: Level 3 Examples

Level 4: Light Cracking. Level 4 pavement has cracking that is less dense than Level 3. Any given square yard may contain one or no cracks at all. Blocks at this level contain several cracks but they generally have a density of less than one crack per yard. Figure 18 contains an example of paving that was classified as Level 4.

Figure 18: Level 4 Example

Level 5: New Pavement or Very Sparse Cracking: Level 5 pavement has recently been laid and has few current maintenance needs. Cracks at this level are very sparse and only one to two occur in any given block. Figure 19 contains an example of cracking at this density.

Figure 19: Level 5 Example



Pavement quality in Santaquin City would benefit from a consistent system of maintenance. The details of a pavement management system will be explored in greater detail in the Short Term Recommendations chapter of this report. Approximately half of the road length in Santaquin falls into the Level 4 to 5 range. The Summit Ridge development area has pavement in the best overall condition. Meanwhile, neighborhood streets to the northwest tend to be the poorest. Certain roads and connections currently displayed on city maps remain as yet unpaved. Figure 18 displays the current pavement quality conditions in Santaquin. Table 3 contains a length summary of roads inventoried.

Figure 20: Pavement Quality, 2014

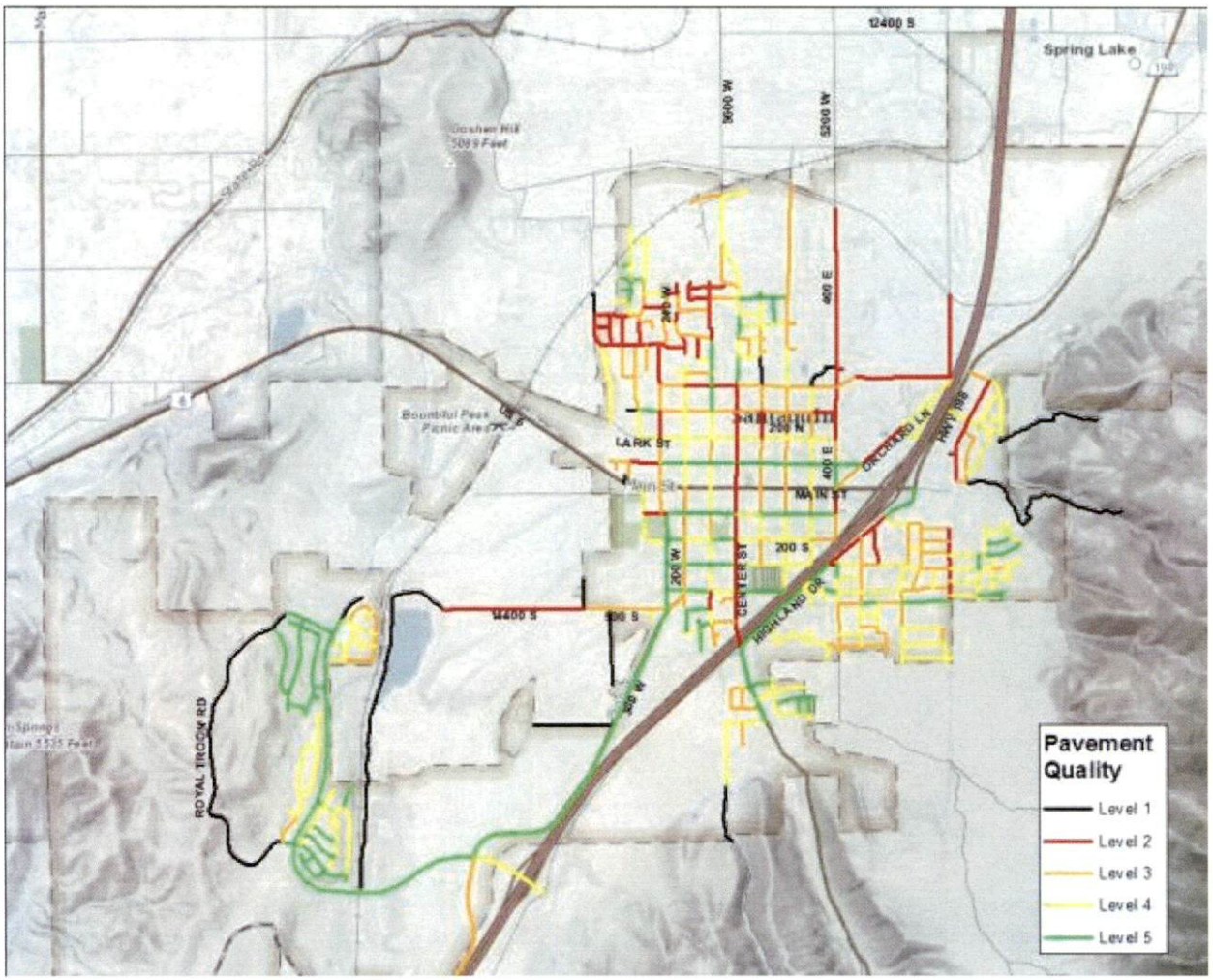


Table 3: Roads Inventoried

Pavement Quality Level	Length (miles)	% of Total
1	6.26	11%
2	8.50	14%
3	13.89	23%
4	17.52	29%
5	13.25	22%
Total	**59.41**	

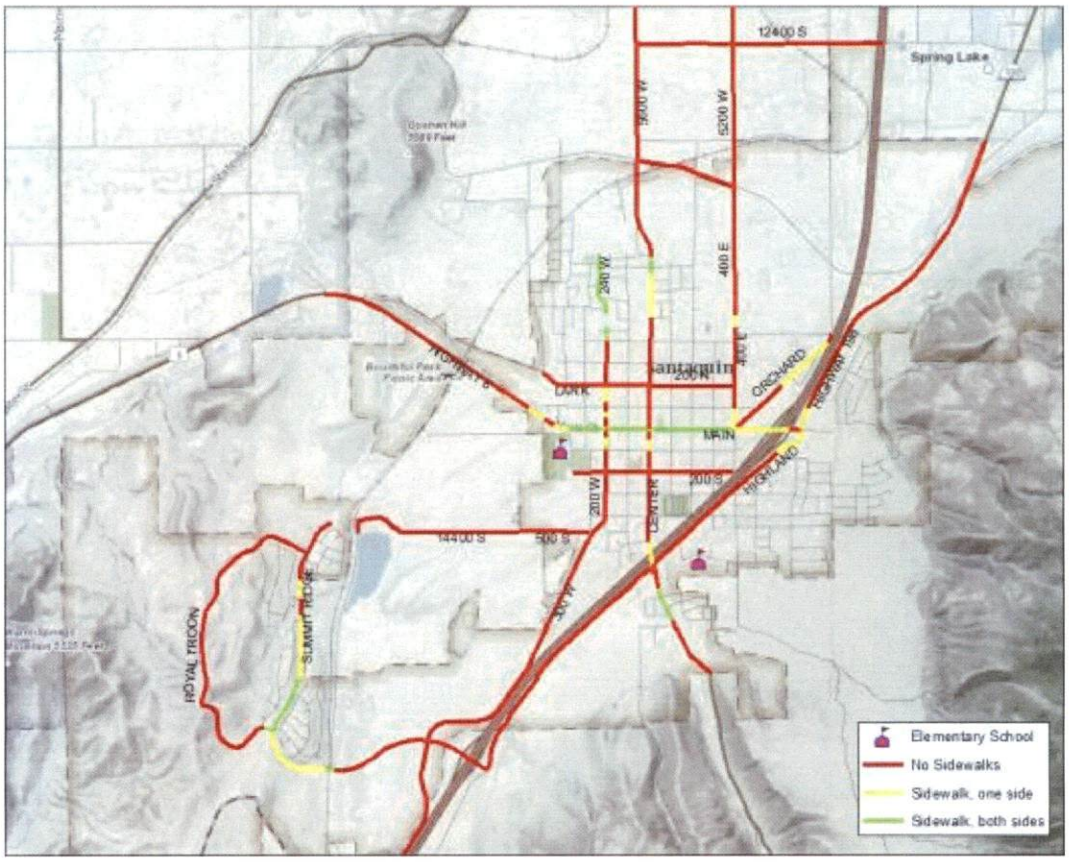
Pedestrian Facilities

The sidewalk network can best be described as 'sparse' and consistent with a rural community. Main Street and the more modern subdivisions - to the north, east and southwest - have good coverage. As development continues in these areas a more comprehensive sidewalk network will result. The older areas, adjacent to Main and Center Streets, have sporadic sidewalk coverage; often in need of upgrade. While these areas lack modern sidewalks, the low traffic volumes and ample shoulders within the right-of-way do not currently inhibit pedestrian access for a youthful population. The original town center features a rectilinear street grid, similar to other Utah communities. A street grid, unlike contemporary meandering road layouts, improves a community's walkability through enabling a diversity of shorter route options to pedestrians.

Pedestrian crosswalks are limited to areas near Santaquin Elementary, Orchard Hills Elementary, and the LDS Church at 250 South and 580 East. Signalized intersections with crossing signals include Main Street and 400 East and Main Street and Highland Drive. As Santaquin continues to develop, the need for quality pedestrian infrastructure will become more acute. The process of upgrading existing roadways is an excellent opportunity to improve the pedestrian infrastructure network. (See Figure 21). Ensuring that new roads adhere to a more rectilinear street network will build on the walkable legacy established by past generations. There are no designated bicycle lanes in Santaquin.

A street grid, unlike contemporary meandering road layouts, improves a community's walkability through enabling a diversity of shorter route options to pedestrians.

Figure 21: Current Pedestrian Facilities along Major Roads



Public Transportation

UTA currently offers one bus route in Santaquin, the Santaquin/Payson/Spanish Fork to Provo Central Station, route 805. This route offers weekday 30 minute AM peak service northbound and 30 minute PM peak service southbound. As the route's name suggests, it brings commuters from Santaquin, Payson and Spanish Fork to Provo and UVU weekday mornings and back again in the evenings. The route stops at three locations along U.S. 6: 500 West, Center Street, and 400 East.

Figure 22: Route 805, Santaquin/Payson/SF to Provo Central Station

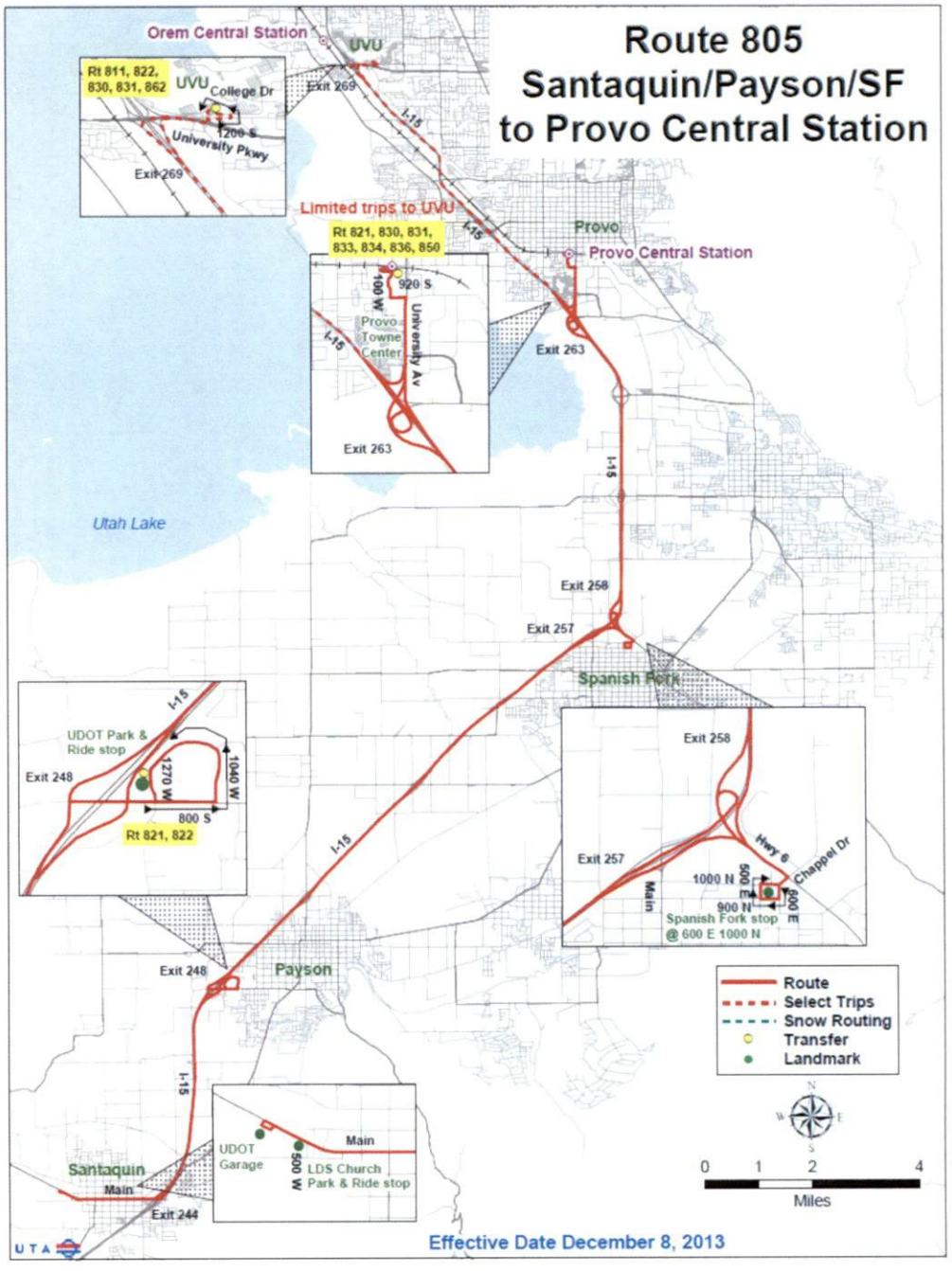


Table 4: Route 805 Schedule

Northbound to Provo Station/UVU					Southbound to Santaquin				
500 W & Main St (Santaquin)	800 S & 1270 W (Payson)	1000 N & 600 E (Spanish Fork)	Provo FrontRunner	Utah Valley University	Utah Valley University	Provo FrontRunner	1000 N & 600 E (Spanish Fork)	800 S & 1270 W (Payson)	500 W & Main St (Santaquin)
5:04 AM	5:15 AM	5:27 AM	5:41 AM		2:04 PM	2:19 PM	2:33 PM	2:48 PM	2:58 PM
5:34	5:45	5:57	6:11		3:04	3:19	3:33	3:48	3:58
6:34	6:45	6:57	7:11	7:24	4:04	4:19	4:33	4:48	4:58
7:04	7:15	7:27	7:41	7:54	4:34	4:49	5:03	5:18	5:28
7:34	7:45	7:57	8:11	8:24	5:04	5:19	5:33	5:48	5:58
8:04	8:15	8:27	8:41	8:54	5:34	5:49	6:03	6:18	6:28
					6:04	6:19	6:33	6:48	6:58

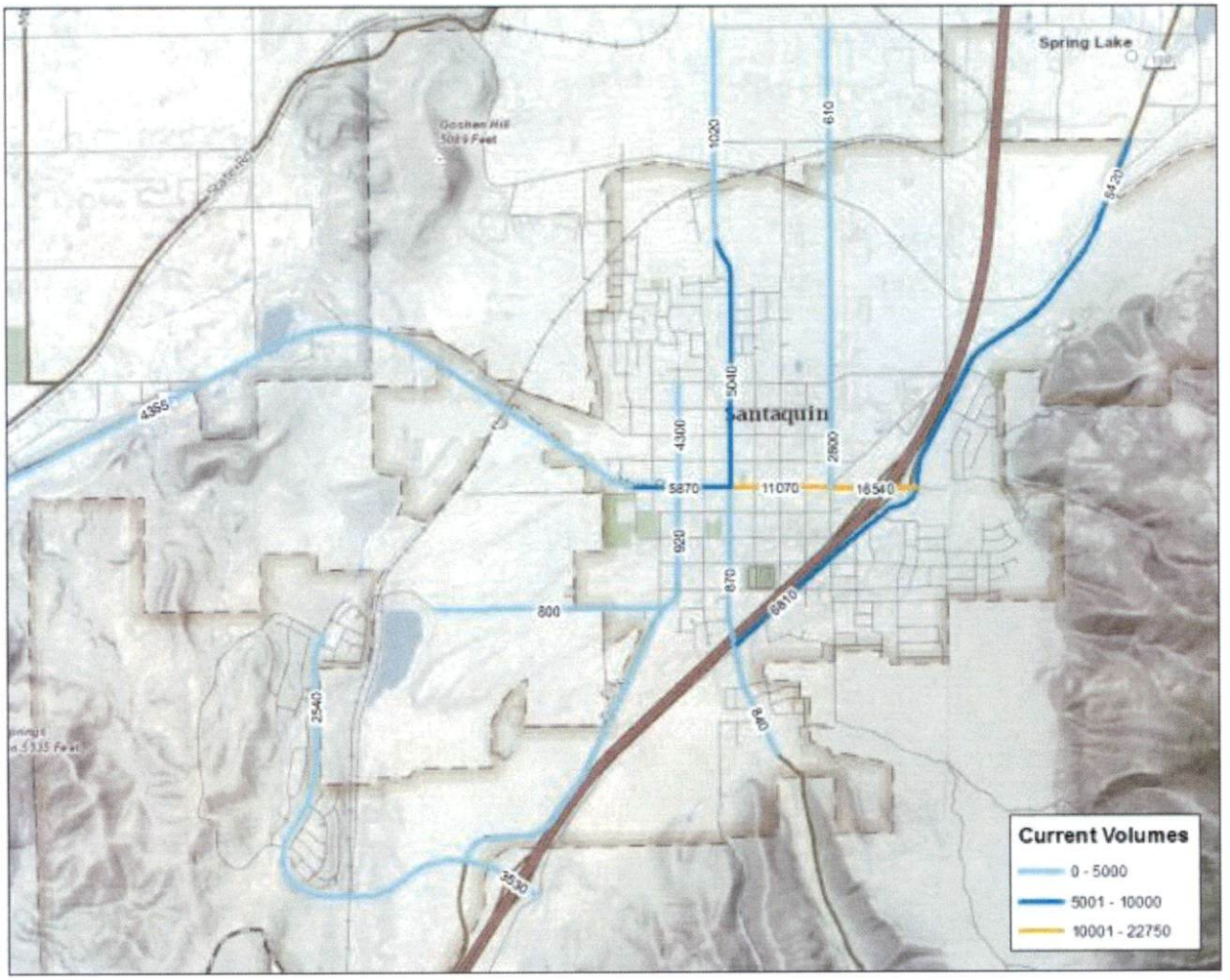
Level of Service

Level of Service (LOS) is a measure used to rate the quality of traffic service. LOS is determined by categorizing traffic flow and assigning quality levels of traffic based on performance measures such as speed, travel lanes, truck traffic, etc. Utah's Unified Transportation Plan states that "level of service (LOS) standards for urban areas are typically 'D' or better while LOS standards for rural areas are typically 'C' or better." In keeping with a desire to uphold a rural feel within Santaquin, the City has opted to maintain LOS C. Level of service standards are defined in the American Association of State Highway and Transportation Officials (AASHTO), *A Policy on Geometric Design of Highways and Streets*, 2011 (6th Edition) where LOS C is defined by traffic levels which represent "stable flow." This level can be measured by methods included in the Transportation Research Board (TRB), *Highway Capacity Manual HCM2010*, October 2010.

Currently LOS C or better is maintained throughout Santaquin City.

Currently LOS C or better is maintained throughout Santaquin City. The traffic volumes in Santaquin are modest, with Average Daily Traffic (ADT) only rising above 10,000 on the eastern portion of Main Street. UDOT estimated 2012 ADT data was used for U.S. 6, S.R. 198 and Highway 89. For the remaining volumes, estimates were generated from the calibrated 2014 travel model. Figure 13 shows current traffic volumes. For comparison, the ADT of I-15 in Santaquin is 31,125 north of Main Street and 24,010 south of Main Street.

Figure 23: Current Daily Traffic Volumes on Major Roads



Source: UDOT 2012 ADT & calibrated 2014 Travel Demand Model.

Short-Term Recommendations

Pavement Quality

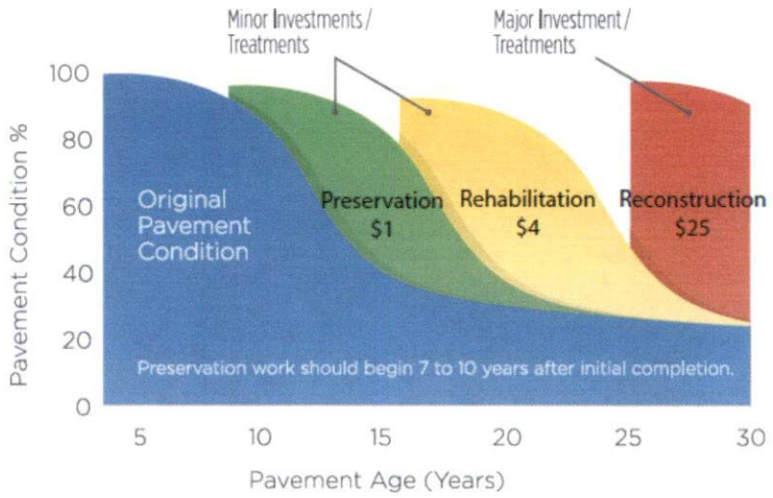
Understanding the quality of existing pavement can help municipalities prepare for future maintenance expenses. Any holistic capital facilities plan should consider these expenses. Some cities utilize an "impact fee" charged to new development which can help fund new transportation infrastructure required by the new development. Developer impact fees, however, can only be used for new construction or upgrading existing facilities to maintain current LOS conditions; they cannot be used for pavement maintenance.

Most cities in Utah rely on the state gas tax and other user fees distributed in the form of B&C road funds from UDOT to perform roadway maintenance activities. With the increase in more fuel efficient vehicles, many communities have found that B&C road funds are insufficient to keep pace with maintenance expenses. Some communities have turned to general fund money or tax increases as a means of supporting ongoing roadway maintenance. Recently, Provo City has looked towards a concept called transportation utility fees as a means to avoid larger tax increases on some properties due to large amounts of property held by tax exempt property owners. Transportation utility fees are untested in Utah but in other states they are levied based on a land use's relative impact on the transportation system, regardless of tax exempt status or property value.

It is recommended that Santaquin implement a routine pavement maintenance program. Proactive, routine maintenance before pavement quality significantly deteriorates helps delay the need for a much more expensive, total reconstruction. UDOT describes this approach as the "good roads cost less" approach to maintenance. Figure 24 demonstrates this principle.

Many communities have found that B&C road funds are insufficient to keep pace with maintenance expenses

Figure 24: "Good Roads Cost Less" Pavement Maintenance Methodology



Source: Utah Unified Transportation Plan 2011-2040.

Currently, maintaining pavement on the worst roads—a "worst, first" approach—consumes funds that could be better spent on routine maintenance of roads in better condition. Table 5 displays Santaquin's infrastructure using the categorizing methodology described in the Existing Conditions chapter.

Table 5: Lane Miles by Pavement Quality Level

Level	Length (in lane miles)	Percent of Total
1 – Unpaved	12.5	10%
2 – Poor	17.0	14%
3 – Fair	28.2	23%
4 – Good	36.2	30%
5 – Excellent	27.8	23%
Total	**121.6**	

Annual costs to maintain these lane miles depend largely on the extent of damage to the pavement. The more damaged a road is, the more expensive it is to maintain. Table 6 compares the estimated annual maintenance costs of a "worst, first" strategy to the costs after Santaquin has invested in addressing the root cause of pavement cracking. Under the current strategy, we assumed that annually, Level 2 roads (poor condition) cost approximately $25,000 per lane mile. Level 3 and 4 roads annually cost approximately $4,000 and $3,000 per lane mile, respectively. Level 5 roads annually cost approximately $1,000 per lane mile. If the city undertakes the significant investment to improve the

pavement quality overall, costs per lane mile would be reduced. The consistent maintenance strategy assumes that all paved roads are brought up to a 3 or 4 quality level and require annual maintenance of $3,000 to $4,000 per lane mile.

Table 6: Annual Pavement Maintenance Program Estimated Costs

Worst, First Maintenance Strategy Annual Cost	Consistent Maintenance Strategy Annual Cost
$674,000-$845,000	$327,000-$436,000

Source: InterPlan estimates, based on Figure 24 and the pavement quality inventory.

According to the 2013 UDOT Annual Statistical Survey, Santaquin received approximately $347,000 in B&C road maintenance funding in 2013. Santaquin City will need to catch-up on deficient maintenance but, once caught up it appears as if annual B&C road funds will be sufficient to keep pace with annual maintenance needs, if performed on an ongoing basis. B&C road funds are distributed annually based on a statewide formula that considers population and roadway mileage. It is reasonable to anticipate that Santaquin's share of B&C road funds will continue to rise with the increase in traffic volumes and population growth in both Santaquin City and statewide. A more consistent maintenance program would reduce the frequency of total pavement reconstruction projects and lower the overall maintenance cost to be closer to the annual B&C roadway revenue. The Utah State University's LTAP Center provides pavement preservation resources to cities, and can help Santaquin develop a pavement preservation plan, free of charge.

A more consistent maintenance program would lower the overall maintenance cost.

Maintenance

Various maintenance activities are important to optimize the function of the roadway network. While this maintenance can be expensive, the roadway system is one of the largest assets of the City and this asset requires ongoing maintenance. Annual maintenance activities will include ongoing improvements to pavement markings and signage which meets standards outlined in the Manual on Uniform Traffic Control Devices (MUTCD). Other annual maintenance costs may include snow removal, litter removal, pothole repair, lawn care and landscaping, culvert and drainage improvements, and similar efforts that will require ongoing vigilance. Additionally the city should develop a plan, schedule and budget to address crack sealing and minor pavement overlays on an annual basis so that all roads are maintained on a systematic schedule of performing treatments every three to seven years, depending on a variety of factors. A steady maintenance program should cost approximately $3,000 per lane mile per year. With this in mind, such a program would cost approximately $327,000-$436,000 annually.

Hot Spot Analysis: Traffic Safety

Four intersections along Main Street stand out with small concentrations of accidents: 100 West, Center Street, 400 East, and the I-15 interchange (see Figure 25). InterPlan obtained the most recent available (2009-2012) crash data for Santaquin from the UDOT Traffic & Safety Division. A safety analysis was performed, and, based on the frequency of crashes, several intersections were identified as "intersection hot spots." Given the data's four year time frame and the number of crashes found, there are not any major safety concerns in Santaquin.

Anecdotally, the accident 'hot spots' on 100 West and Center Street may be due to their wide, 99 foot road widths and a lack of clear street striping. These attributes may be causing confusion on proper street position, resulting in unpredictability. Road width reductions and/or street striping would likely correct this and should be considered by Santaquin City.

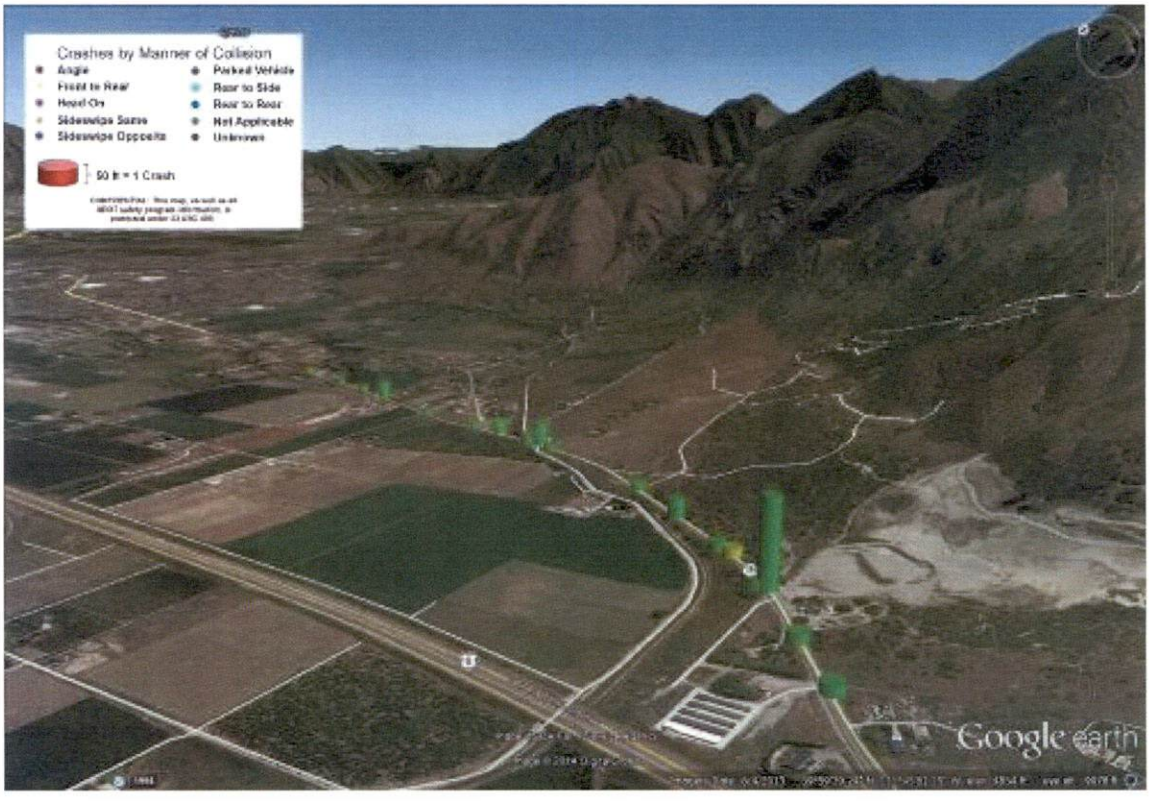
Relatively high traffic volumes coupled with undefined lane markings within wide pavement widths are likely causing unpredictable vehicle positioning leading to the higher crash rates. A striping effort, which clearly marks driving and parking lanes, could improve safety conditions. Ultimately, once the city's recommended 99 foot cross sections for local and arterial roads are implemented along 100 West and Center Street, uniform and predicable roadway conditions will be established and this problem will be greatly mitigated. No specific recommendations in the form of a striping plan are offered other than to flag these locations as areas of concern.

The accidents found concentrated on 400 East are likely due to the 5-leg intersection which used to exist there. The recent correction of this will likely result in fewer crashes at this intersection in the future. No action is likely necessary.

Another area of concern is along S.R. 198 from Cherry Lane extending northwards (see Figure 26). There are frequent wildlife crashes on this road (shown on map as NA). Again, given the four year time frame, this is not extremely concerning, but accidents along this stretch of road may be reduced greatly with the addition of wildlife fencing along the foothills. Wildlife fencing is a complex issue and further details would need to be defined, but this analysis simply flags this location and this corrective action for a short term consideration.

Figure 25: Santaquin Crashes by Manner of Collision 2009-2012

Figure 26: S.R. 198 Crashes by Manner of Collision 2009-2012



Future Conditions

Land Use

Santaquin City expects its population to grow to 37,978 by 2040, which is slightly less than region-wide population estimates made by MAG, who project a population of 38,123 for the city. Estimates provided by Santaquin City were utilized for the purposes of this plan, primarily to adjust TAZ level demographic information. Table 7 shows projections for population, households, and employment from MAG and Santaquin City. For detailed tables with information at the TAZ level see the TAZ Projections Appendix.

Table 7: Demographic Projections

	Current MAG	Santaquin Revisions	MAG Projections		Santaquin Projections	
	2014	2014	2024	2040	2024	2040
Population	12,288	10,884	21,227	38,123	14,014	37,978
Households	3,202	2,818	5,737	11,342	4,260	11,336
Employment	861	788	1,977	6,250	1,869	8,217

The number of projected 2040 households by TAZ is shown in Figure 27, and Figure 28 shows how these were adjusted from the MAG estimates. The number of households in Santaquin will grow in currently undeveloped areas, where geography allows it. The most dramatic changes in 2040 are seen in the southwest and southeast, where new developments are forming.

Figure 27: 2040 Households by TAZ, Santaquin Forecast

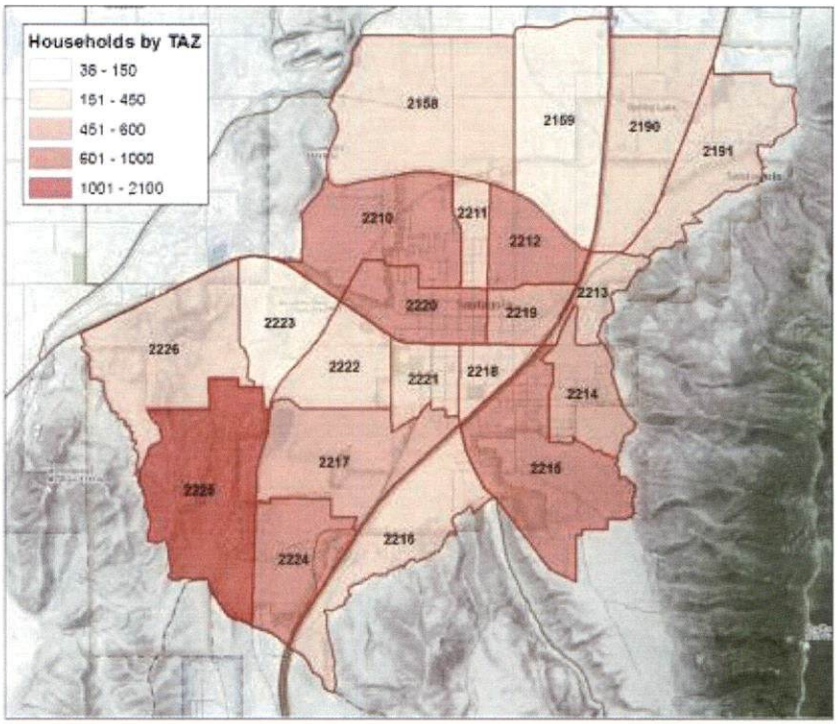
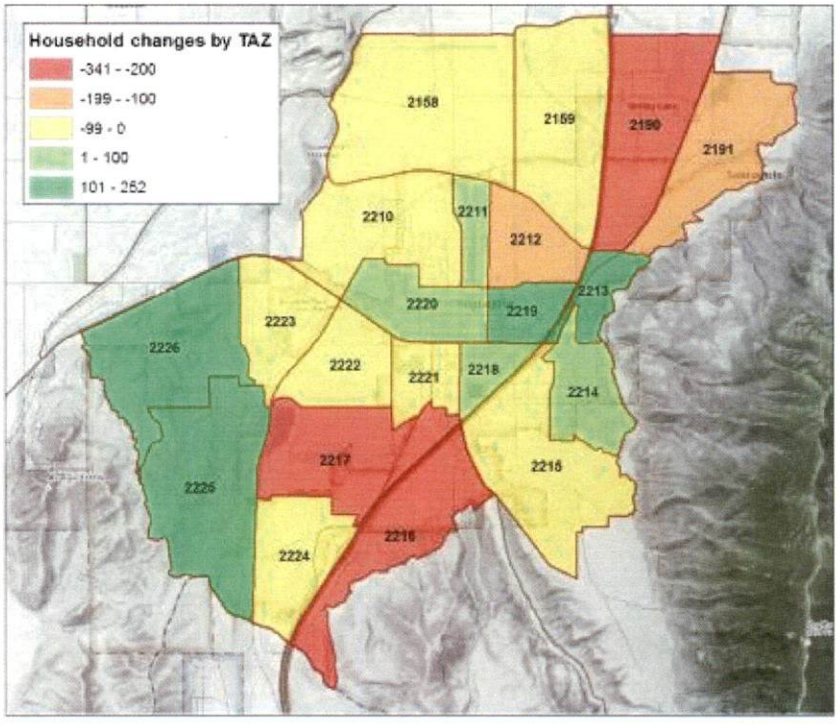


Figure 28: Santaquin Household Discrepancies from MAG



Employment is expected to concentrate along the Main Street corridor and in the south, adjacent to the future FrontRunner station. Figure 29 shows projected 2040 employment by TAZ and Figure 30 shows how these were adjusted from the MAG estimates.

Figure 29: 2040 Employment by TAZ, Santaquin Forecast

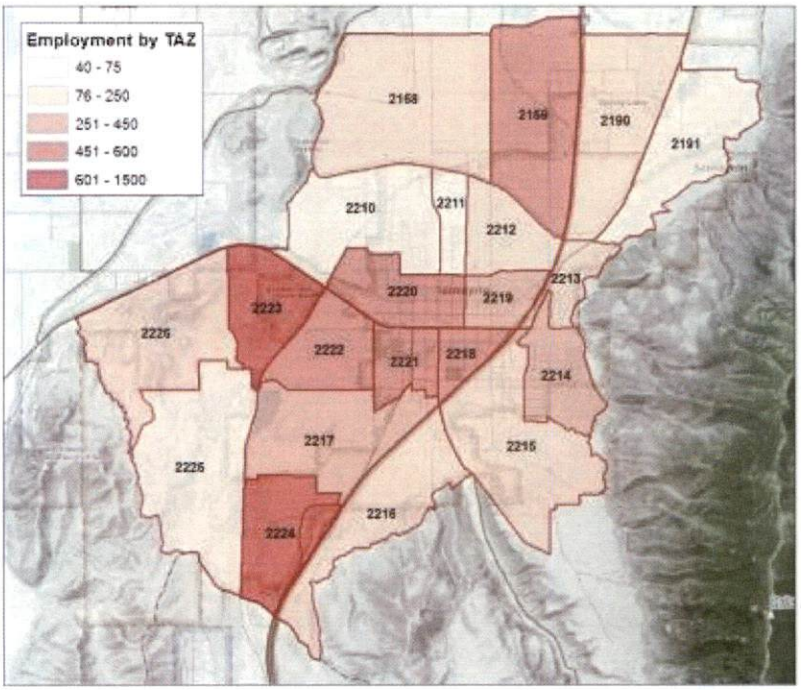
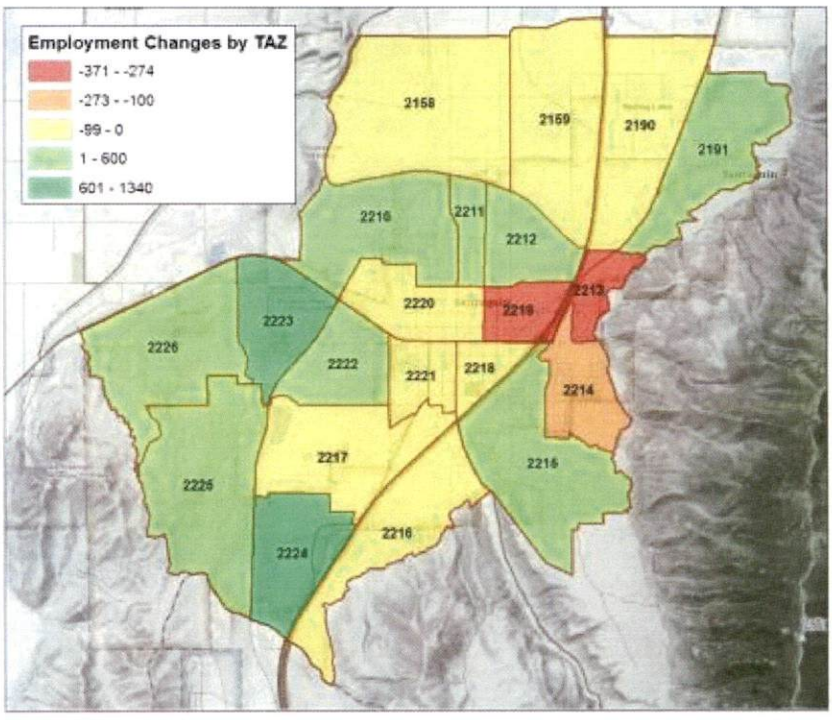
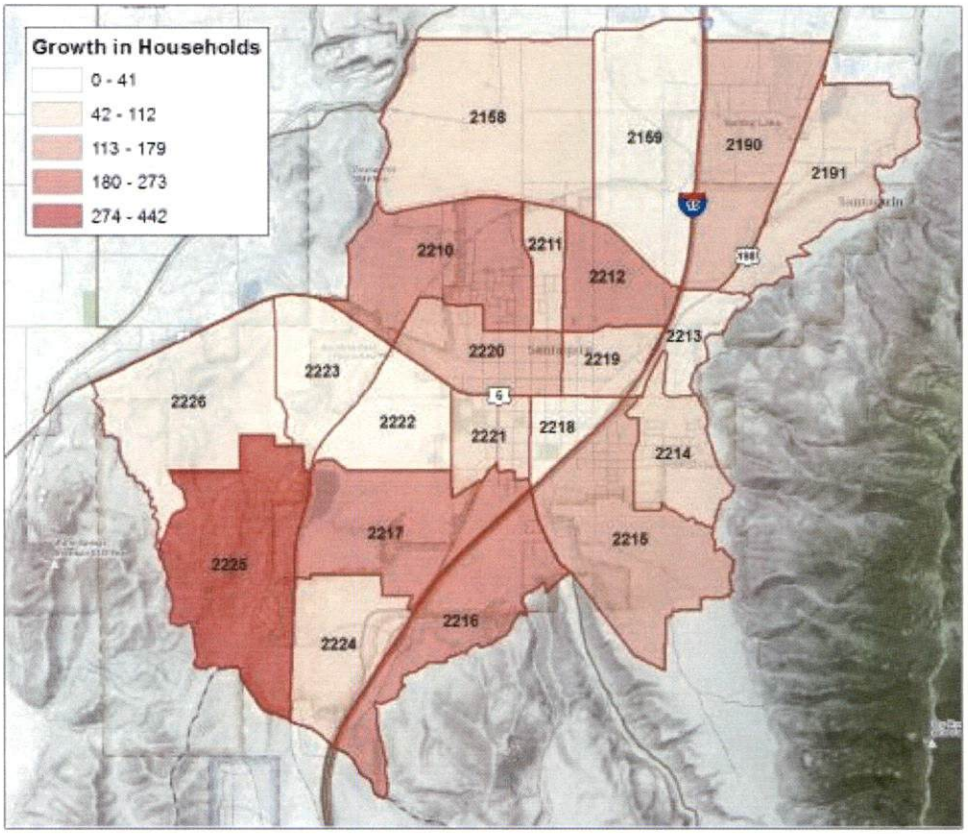


Figure 30: Santaquin Employment Discrepancies from MAG



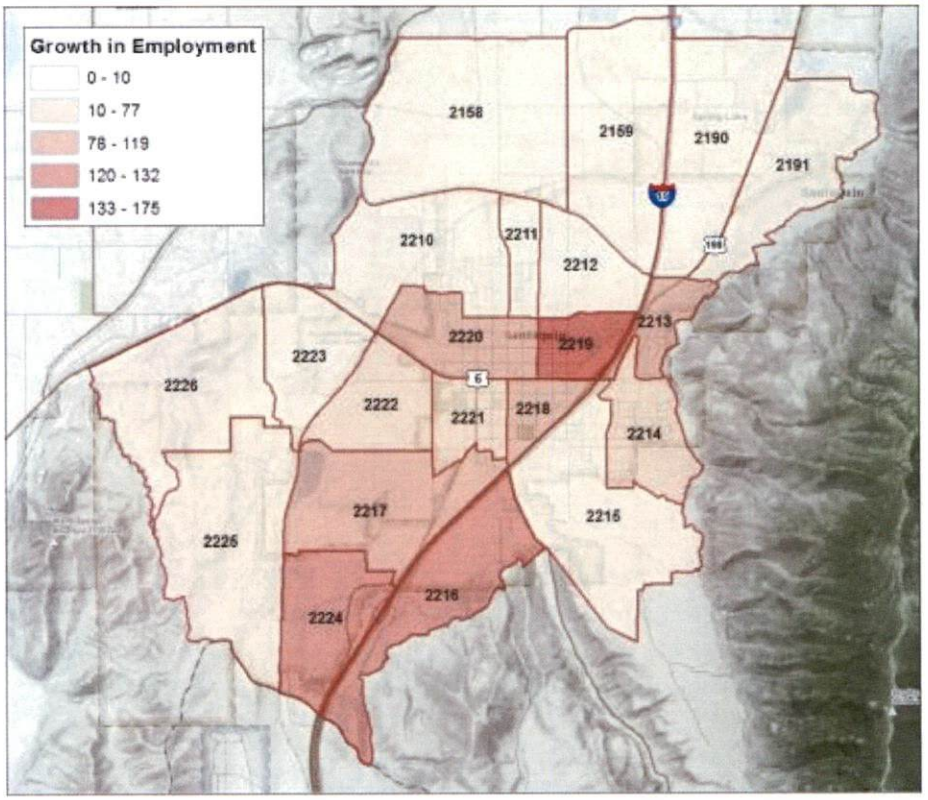
Looking forward at a 10-year future time horizon is also insightful, any impact fee analysis is based on growth and projects within this time frame. Figures 31 and 32 below illustrate the projected growth in households and employment from 2014 to 2024.

Figure 31: 2014 to 2024 Projected Growth Households



The highest growth areas for households in this time period are in the southern portion of the city, particularly in the Summit Ridge development. Other relatively high growth areas are north of 400 North.

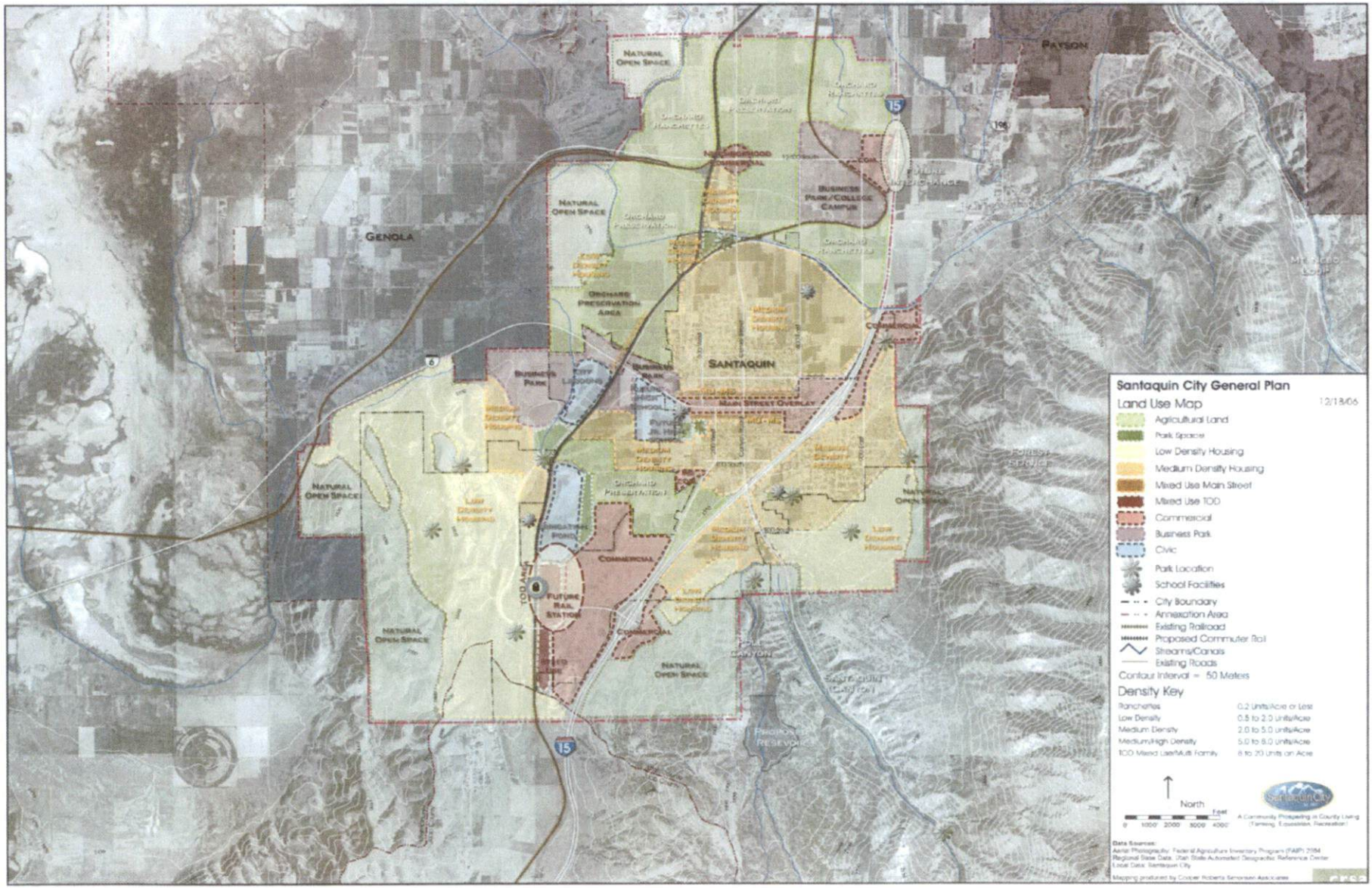
Figure 32: 2014 to 2024 Projected Growth Employment



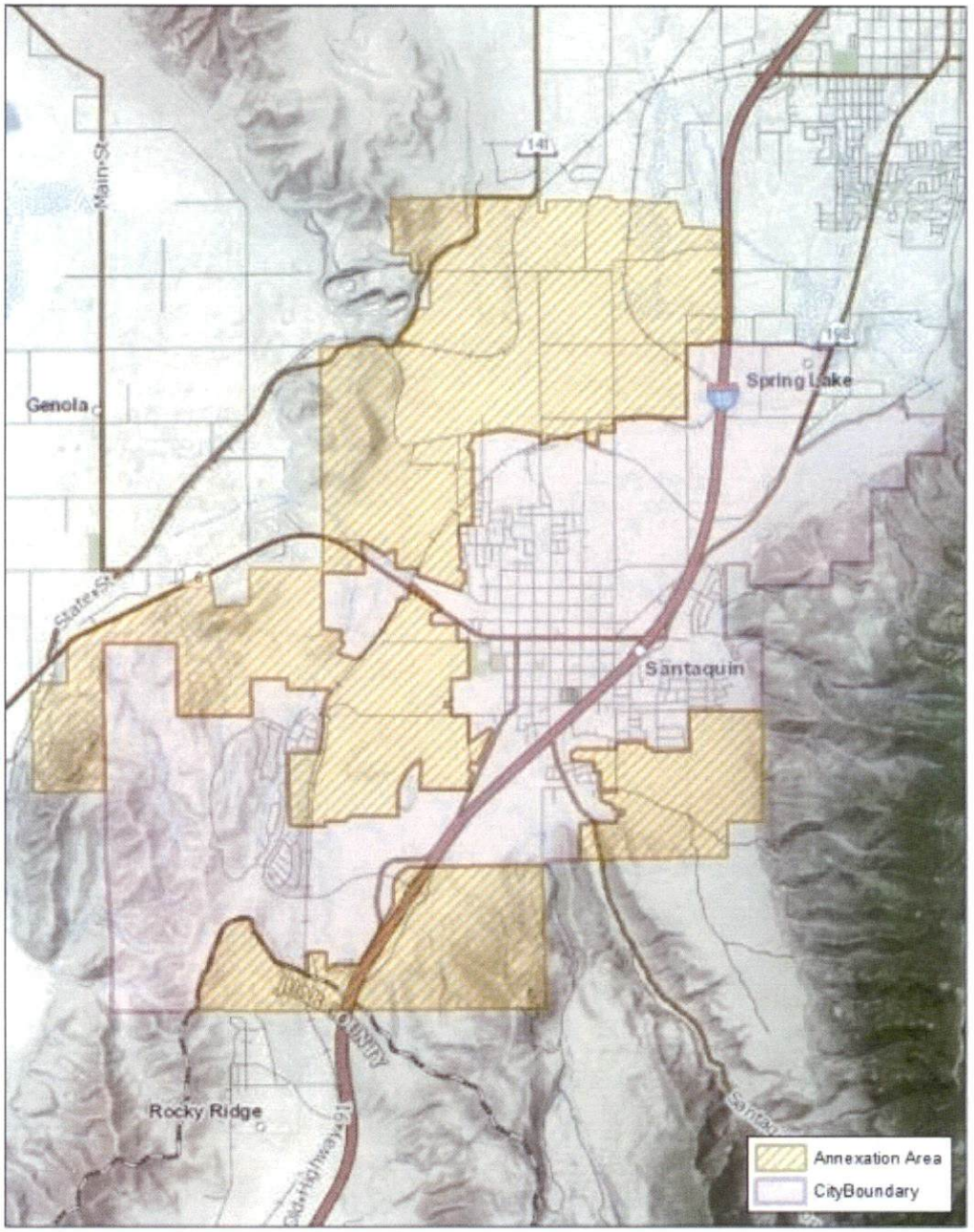
The highest growth in employment occurs just north of Main Street and east of I-15 where a grocery store and a high school will be located. Other relatively high growth areas for employment are in the southern portion of the city along I-15.

Santaquin's future land use plan (see Figure 33), found in their General Plan adopted in 2007, shows preservation of a Main Street commercial core, with medium density housing to the north and south. Agriculture preservation is prevalent in the northern portion of the city, with some additional preservation to the southwest. Business park developments are located along the western portion of the Main Street corridor. A new commercial development is planned adjacent to the future FrontRunner commuter rail station in the south. Low-density residential uses are found in the southwestern and southeastern portions of the city.

Figure 33: Future Land Use Plan



Santaquin currently has plans to make large annexations to the north and south. Covering approximately 6,234 acres, the annexation areas will nearly double Santaquin's existing land area. To the north the annexation area begins at Santaquin's northwestern corner and extends northeast to I-15. To the south the annexation area will append portions of Juab County as well as an area southeast of the Main street corridor.

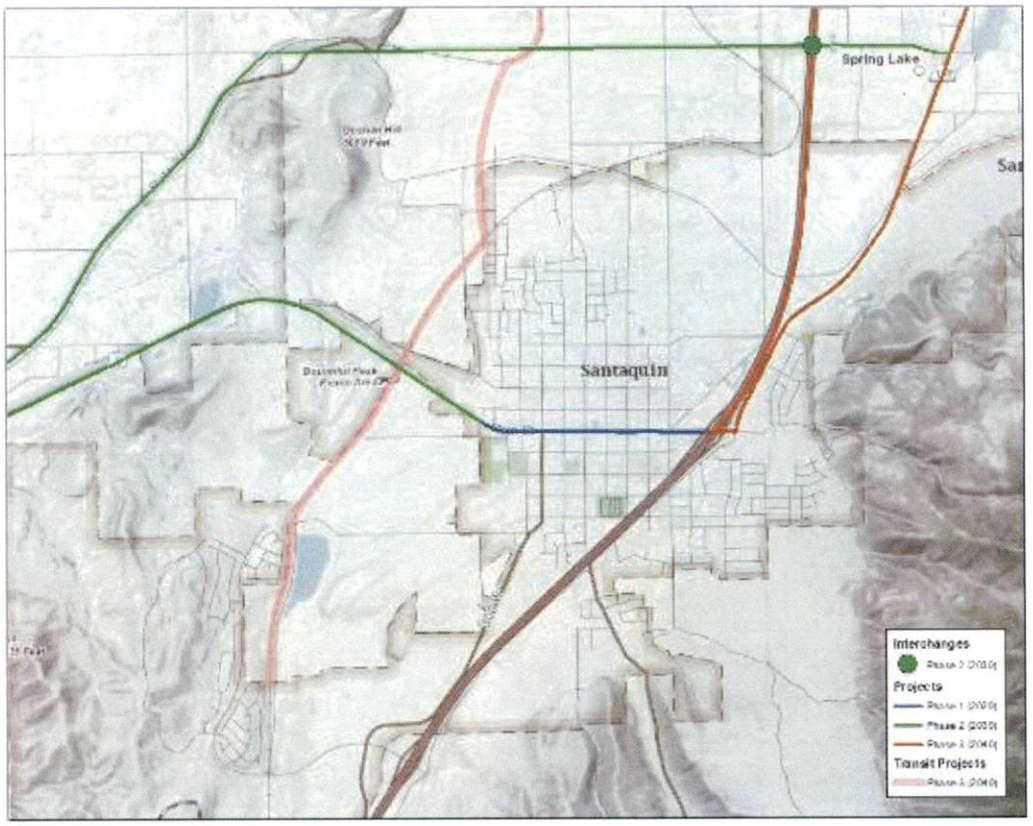


Regional Plans

The forecasting and planning undertaken by Santaquin City is complimented region-wide by agencies which perform regional planning such as the MAG, UDOT, and UTA.

Utah's Unified Transportation Plan is a state-wide conglomeration of the long range (2040) plans and projects of several of the state's transportation planning organizations, including MAG, UDOT, and UTA. Projects listed in the Unified Plan are aimed at increasing the effectiveness of region-wide road and transportation networks in the face of future population growth. Unified Plan projects in Santaquin include: Widening of U.S. 6, S.R. 198 and 12400 South, I-15 improvements, an interchange at 12400 South, and an extension of FrontRunner commuter rail. Figure 34 shows the timeline of these projects, with phase one projects slated for earlier than 2020, phase two for 2020-2030 and phase three for 2030-2040.

Figure 34: Unified Plan Projects in Santaquin



Source: UDOT, Unified Plan

Travel Demand Modeling

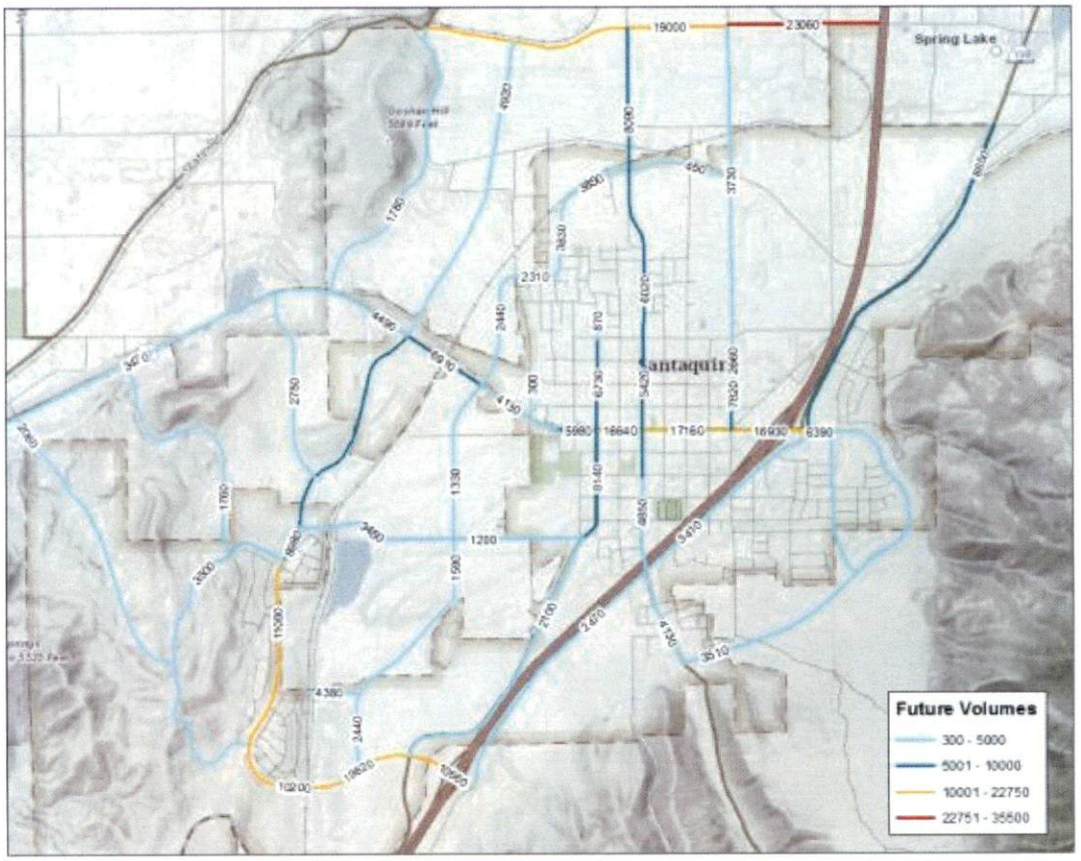
Future traffic conditions were forecasted using the WFRC – MAG regional travel demand model version 7.0. The model base year was 2009 and future conditions were forecast through 2040 with base year and future year socioeconomic data for Santaquin City updated as part of the calibration process. For the 2040 model run, socioeconomic data for Santaquin City generated by city staff was used, while MAG projections were used for the surrounding areas. The existing network in the model accurately reflected the current network; however changes to the socio and economic data were needed. This data was reviewed and updated by city staff. The Travel Demand Modeling Appendix details the travel demand modeling and calibration process.

Socio-economic data for Santaquin City generated by city staff was used.

Future Volumes

Once the base model was calibrated to best reflect current conditions, future 2040 population, household and employment data along with a future roadway network were used to model future 2040 travel volumes on the future proposed Santaquin network. Figure 35 depicts projected 2040 volumes on this proposed future road network.

Figure 35: 2040 Travel Volumes, Daily



Plan Recommendations

Functional Classification

A Functional Classification of streets is used to group roadways into classes according to the character of traffic they are intended to serve. The classes are based upon the degree of mobility (speed and trip length) and land access that they permit. Roadway functional classifications are generally comprised of a mix of arterials, collectors, and local streets. Arterials are designed to serve higher volumes of traffic at higher speeds, while collectors are designed to balance land access with traffic speeds and traffic capacity. Local streets are intended to provide low speed access to individual properties. Figure 31 summarizes the hierarchy of the functional classification of streets based upon mobility and access.

Figure 36: Mobility vs. Access

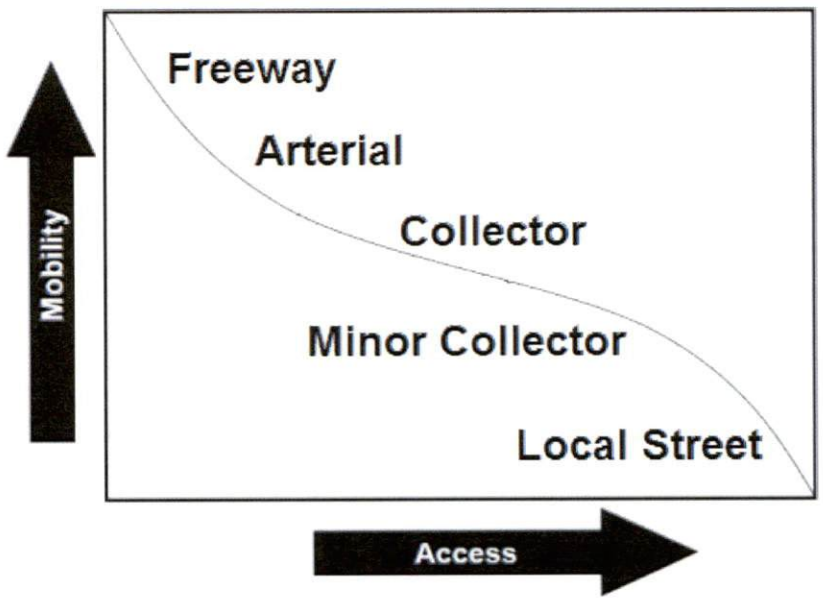


Table 8 provides general characteristics for the traffic operations of each functional classification. The definitions outlined include speed, average trip length, accident rate, and access control. Access control refers to the number of intersections, driveways, etc., interrupting the roadway.

Table 8: Functional Classification Summary

Functional Group	Speed (mph)	Average Trip Length (miles)	Expected Accident Rate (accidents per million vehicle miles)	Access Control
Arterial	45+	3-15	3 to 5	Significant
Collector	25-45	1-5	2 to 4	Moderate
Major Local/Local	<30	<0.5	Varies	None

Local

Local streets are designed to offer access from residences to the roadway network. Local streets serve many driveways and provide a collection point to collector or arterial roadways. Local streets should be designed to minimize speed and cut-through traffic while meeting the requirements of emergency vehicles. Local streets are typically placed with driveways on both sides and have posted speed limits of 25 miles per hour. Generally, no striping is proposed on local streets. However, the City Engineer may provide roadway striping as needed as a traffic calming measure. Parking may be restricted on local streets near intersections, in high density or commercial areas, where snow removal or storage issues arise, or at other locations deemed necessary by the City.

Santaquin plans to allow construction of six possible local standards.

- The two 26 foot Local Private and Rural Local Private are the smallest cross sections. With 10 foot lanes these cross sections do not contain sidewalks or park strips.

- Two 55 foot Local and Rural Local standards contain 29 foot of road width, and include park strips and sidewalks. These two only differ in curb types, with the Local containing a mountable curb and the Rural Local containing a drainage swale.

- The 99 foot Local cross section is designed to accommodate the extra right-of-way found in the historically platted Santaquin grid. This cross section is similar to the 55 foot Local cross section, but contains a meandering trail along one side and extra wide landscaping. The non-paved portion may vary the width of its park strip and landscaping from a minimum of six feet to a maximum of 19 feet within the required 30 plus feet of width on each.

- Finally, a special 132 foot cross section has been developed for 100 South to maximize downtown area parking and curb appeal. Modeled after Provo Center Street, this cross section features three rows of diagonal parking and a planted median/sidewalk.

Figure 37: 26 foot Local Private

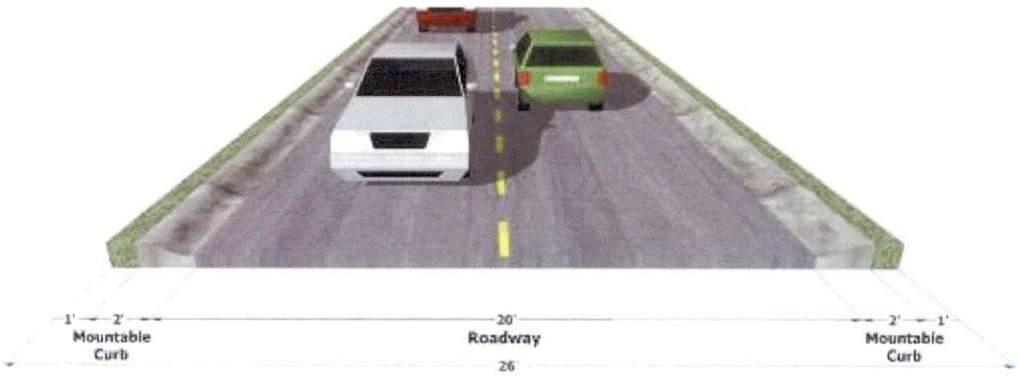


Figure 38: 26 foot Rural Local Private

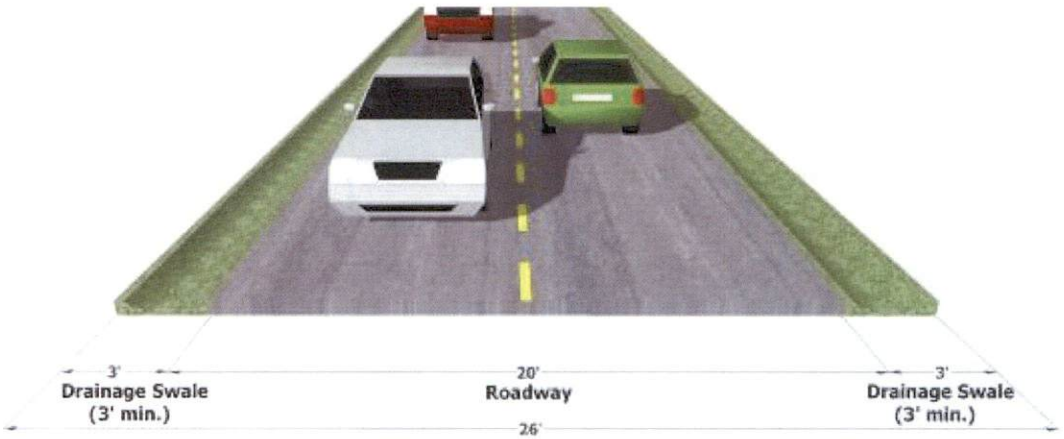


Figure 39: 55 foot Local

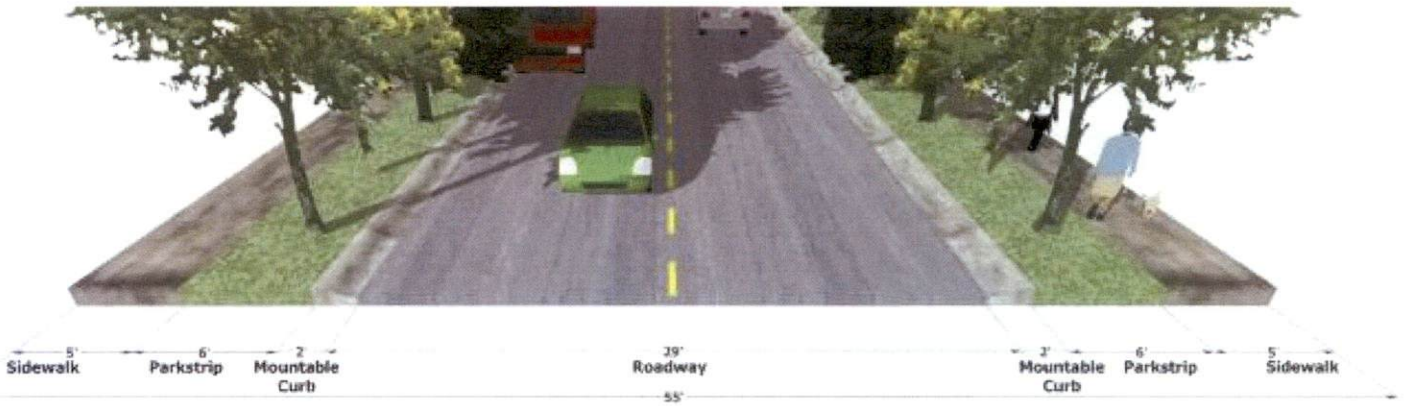


Figure 40: 55 foot Rural Local

Figure 41: 99 foot Local

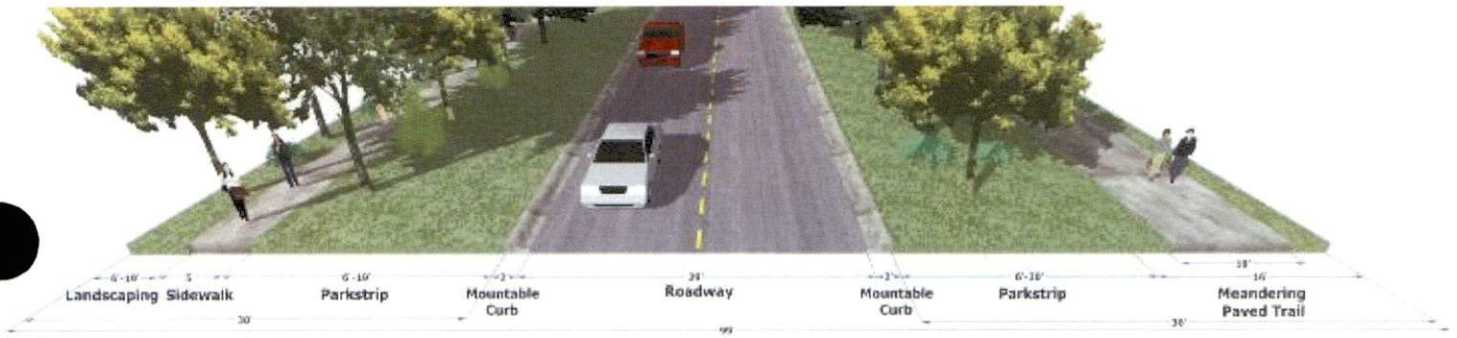
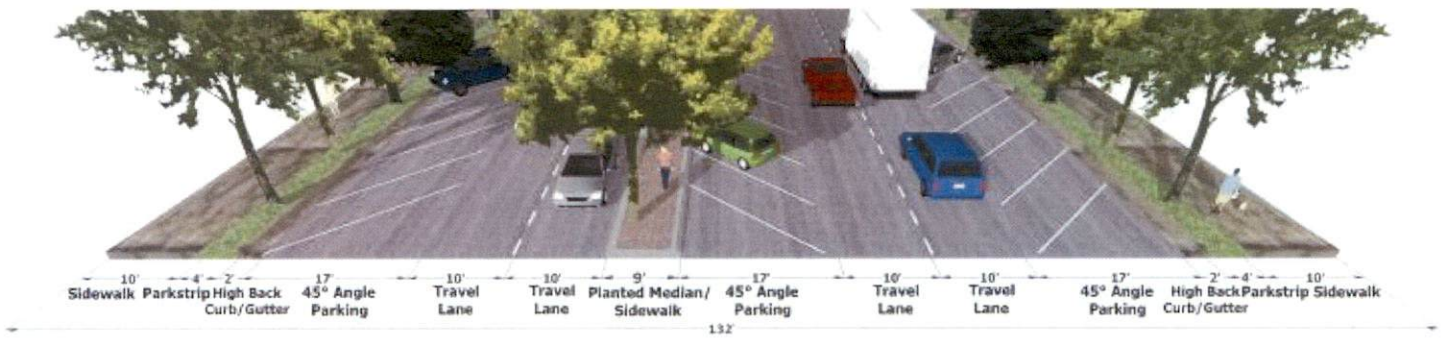


Figure 42: 132 foot 100 South

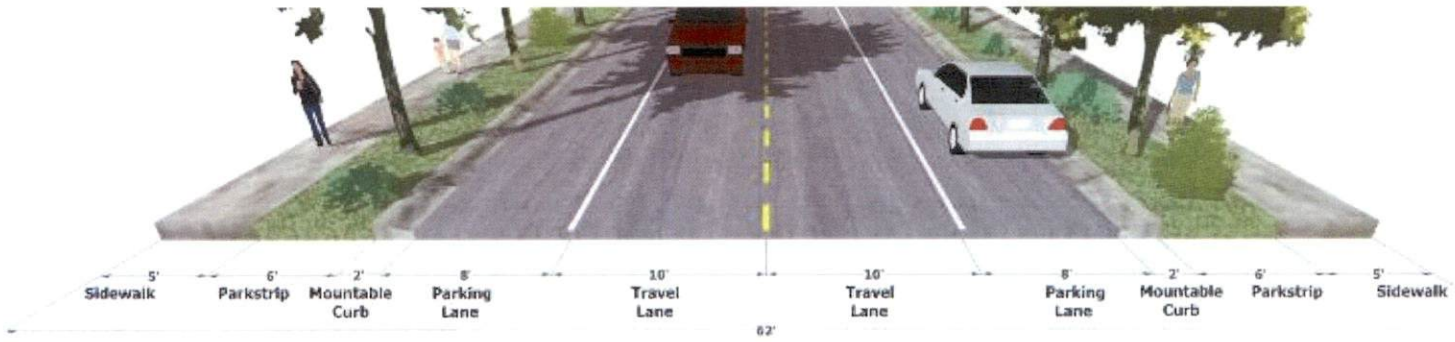


InterPlan

Major Local

The 62 foot Major Local cross section is designed to accommodate slightly higher density residential, neighborhood commercial, school, church and institutional land uses. This cross section features ten foot lanes, eight foot parking lanes, mountable curbs, park strips and sidewalks. The eight foot parking lanes could also be restriped for bike lanes when deemed appropriate by city staff.

Figure 43: 62 foot Major Local



Collector

The Collector cross section has 12 foot travel lanes in each direction and a 12 foot center turn lane within a 62 foot right-of-way. In addition there is a 99 foot Collector cross section, which like the 99 foot Local cross section, is designed for the extra wide right-of-way found in the historically platted Santaquin grid. The non-paved portion may vary the width of its park strip and landscaping from a minimum of six feet to a maximum of 19 feet within the required 27 plus feet of width on each side. Proposed Collector streets are shown in Figures 44 and 45.

Figure 44: 62 foot Collector

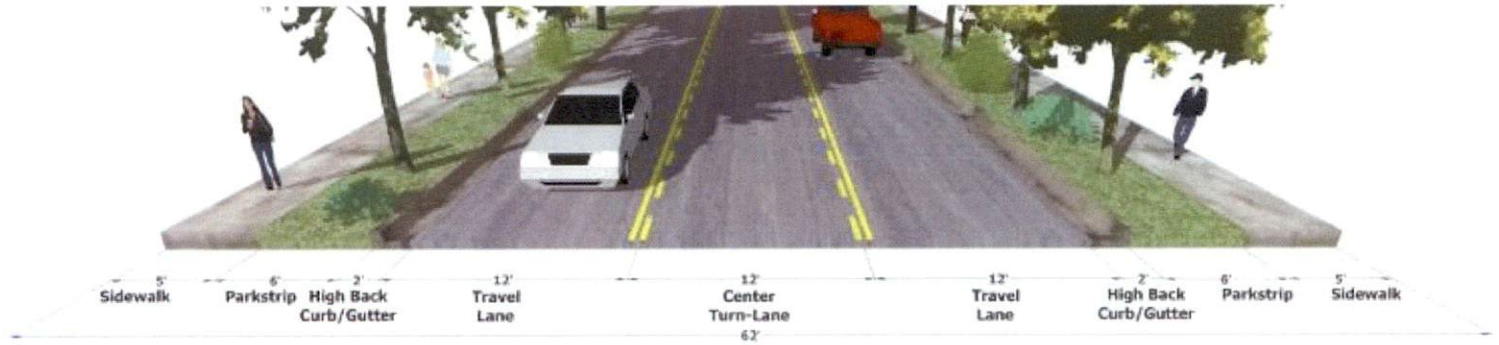


Figure 45: 99 foot Collector

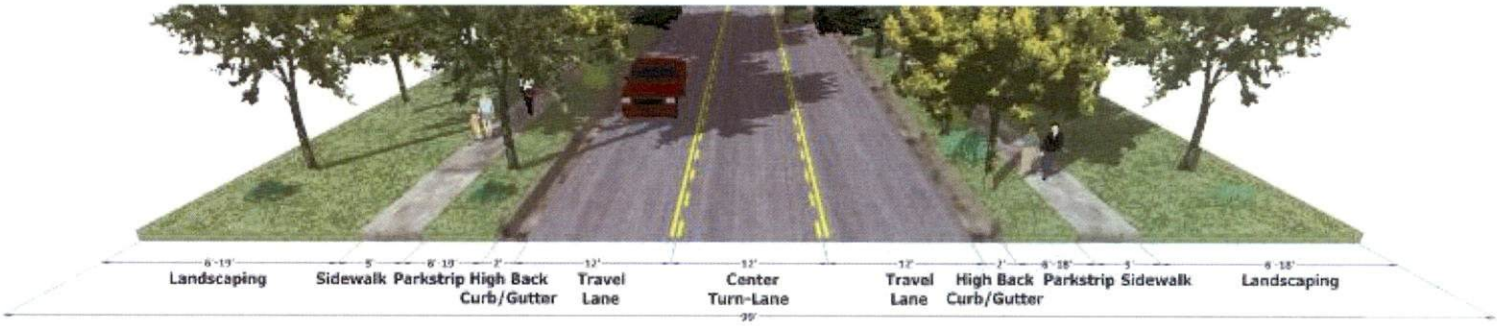
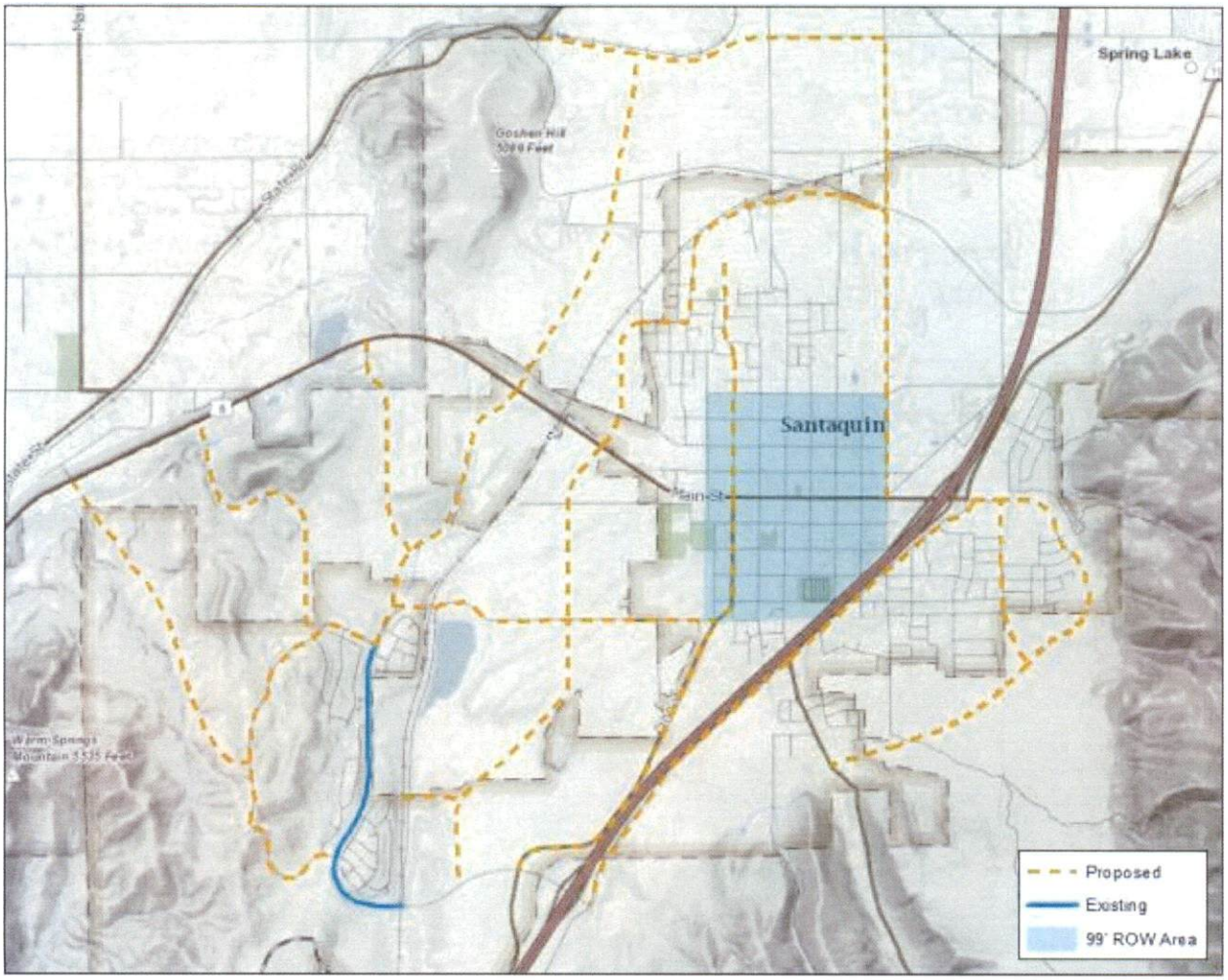


Figure 46: Collector Locations



Arterial

Arterial streets balance regional travel and local access. The 90 foot arterial cross section has two travel lanes in each direction and a center turn lane. The 99 foot arterial cross section also has two travel lanes in each direction and a center turn lane, but also has parking lanes on either side. Figure 47 shows the 90 foot Arterial cross section and Figure 48 shows the 99 foot Arterial cross section. Proposed Arterial streets are shown in Figure 49.

Figure 47: 90 foot Arterial

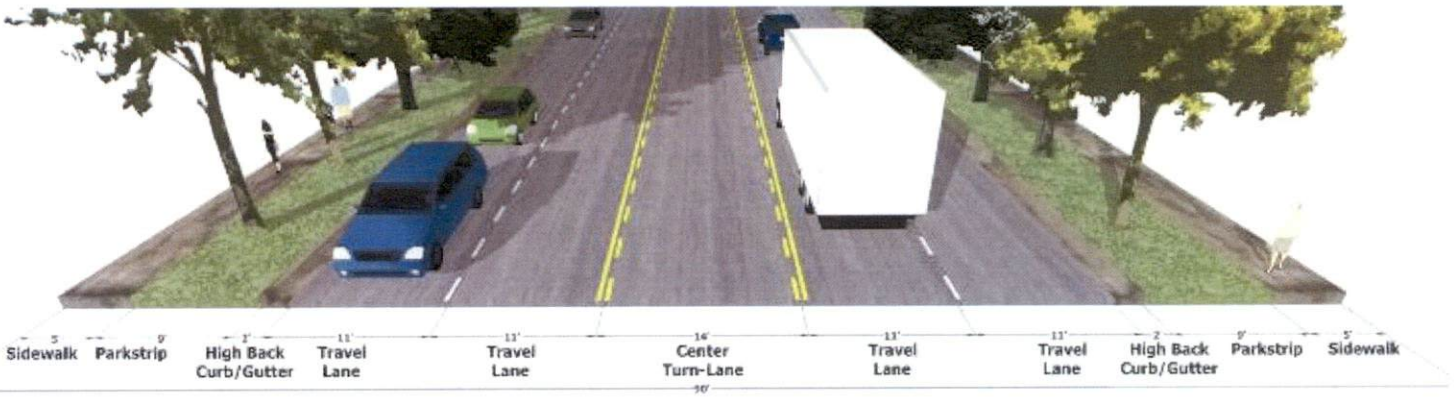


Figure 48: 99 foot Arterial

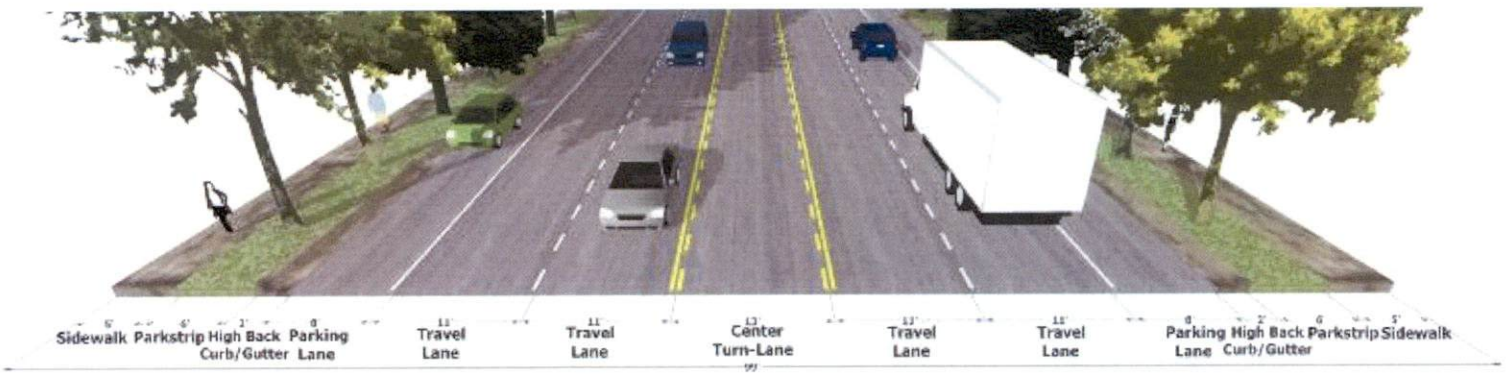
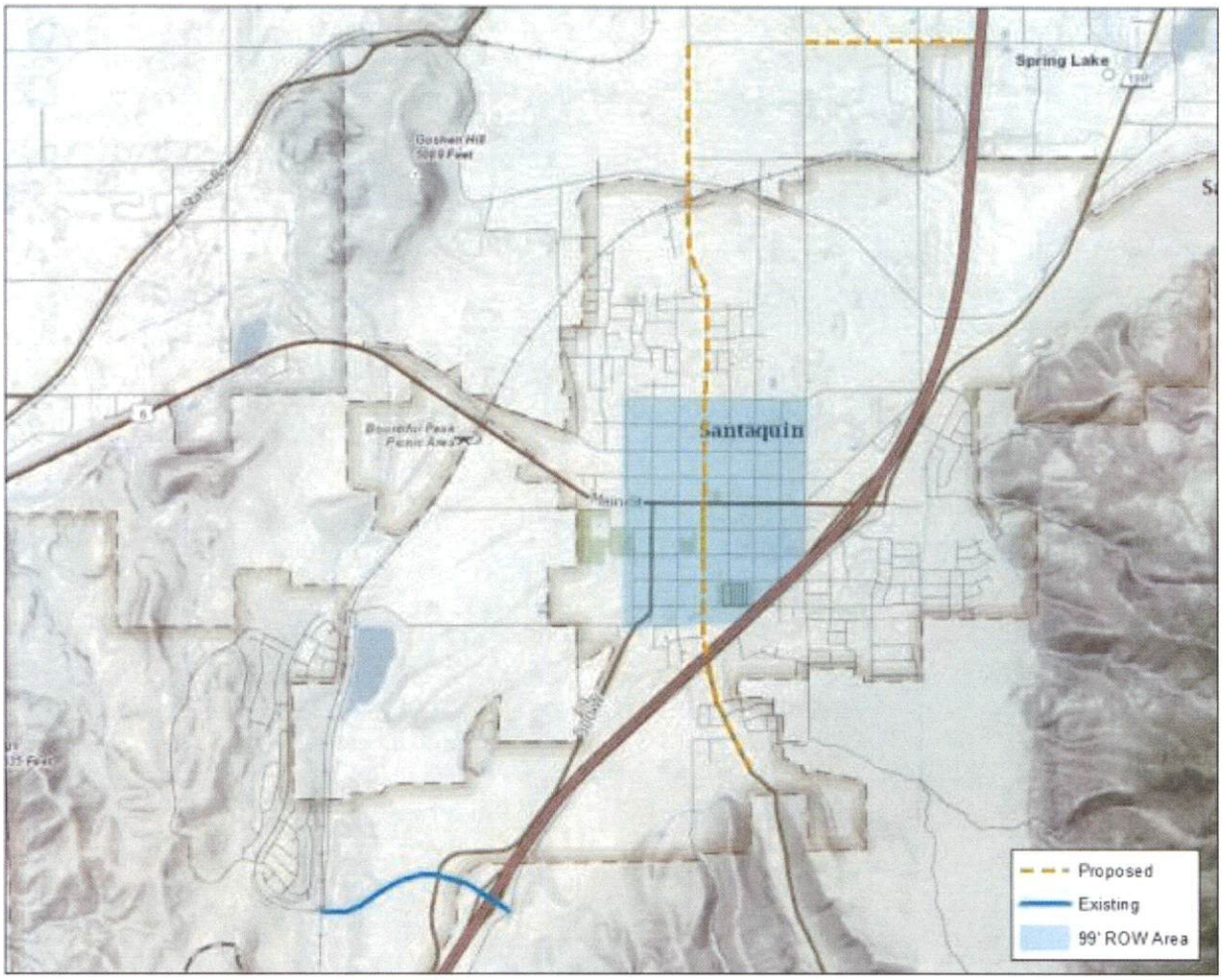


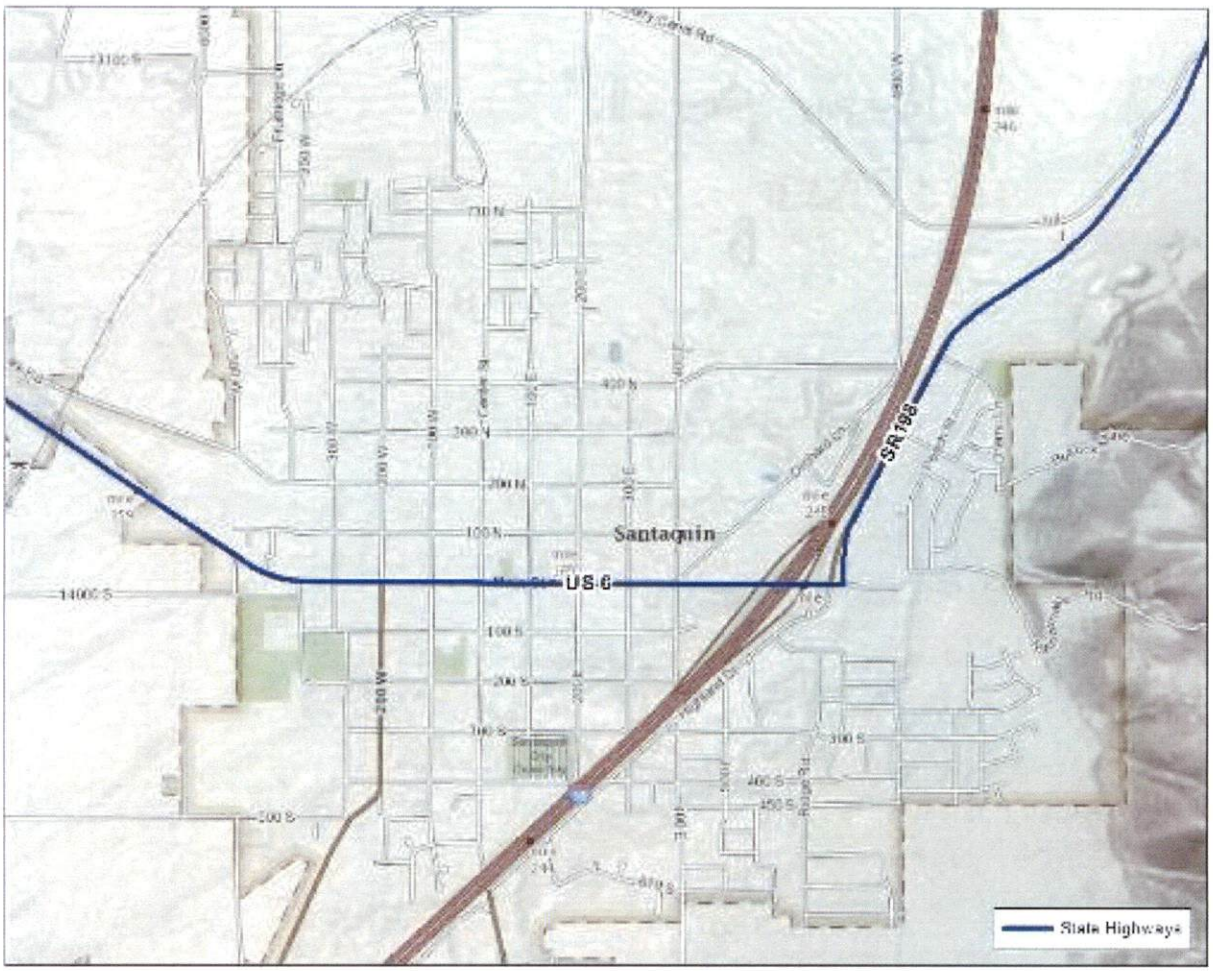
Figure 49: Arterial Locations



State Highways

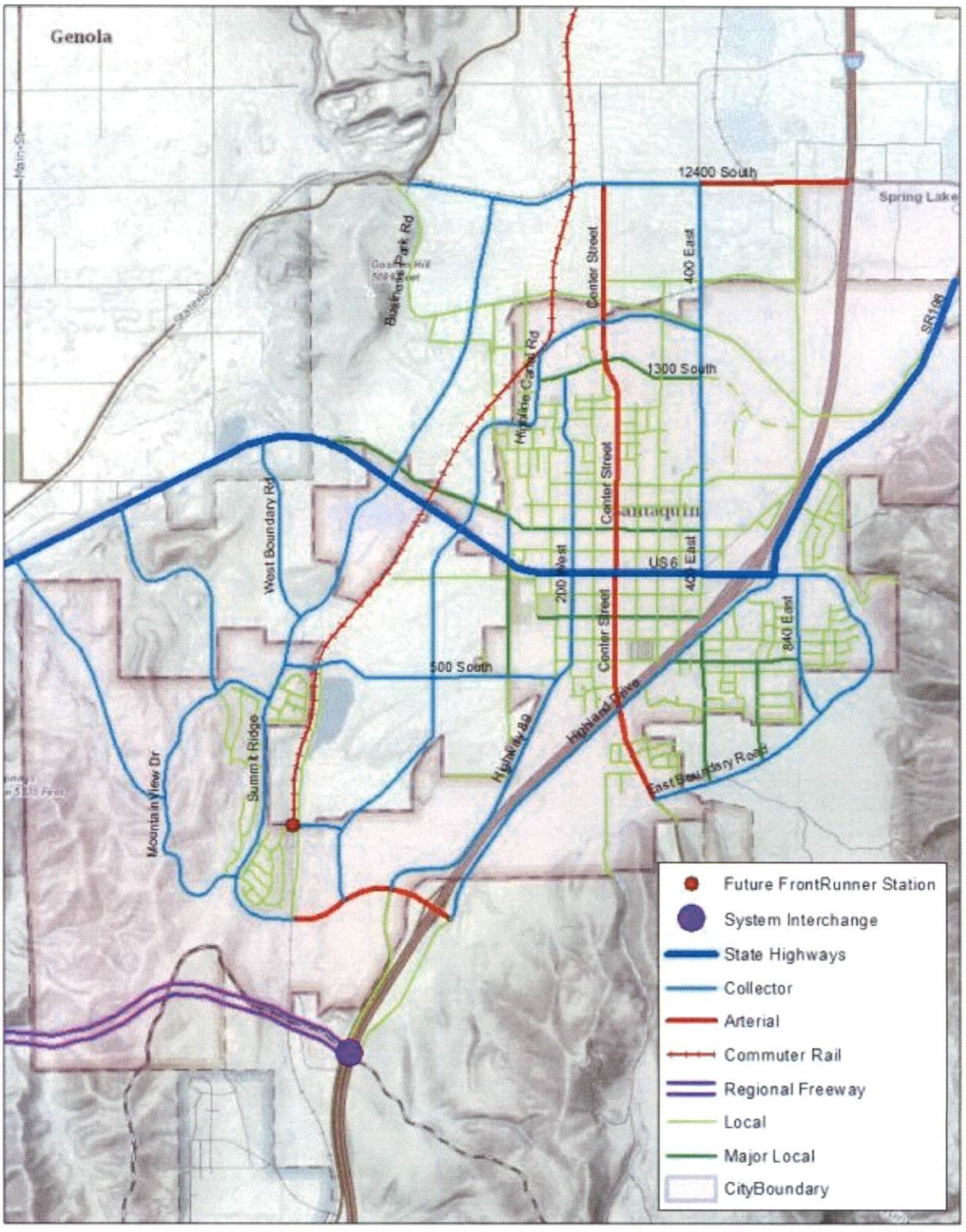
State Highways within Santaquin City boundaries will adhere to UDOTs own design standards and not those described above. However, Santaquin does have an agreement with UDOT pertaining to U.S. 6 that allows for the City's 99 foot arterial cross-section to be utilized between 500 West and I-15. Figure 45 shows the State Highways currently within Santaquin City boundaries, which currently only consist of U.S. 6 and S.R. 198. The future Regional Freeway shown on Figure 51 would also fall under UDOT standards.

Figure 50: State Highway Locations



Proposed Future Network

Figure 51: Map of future network by classification

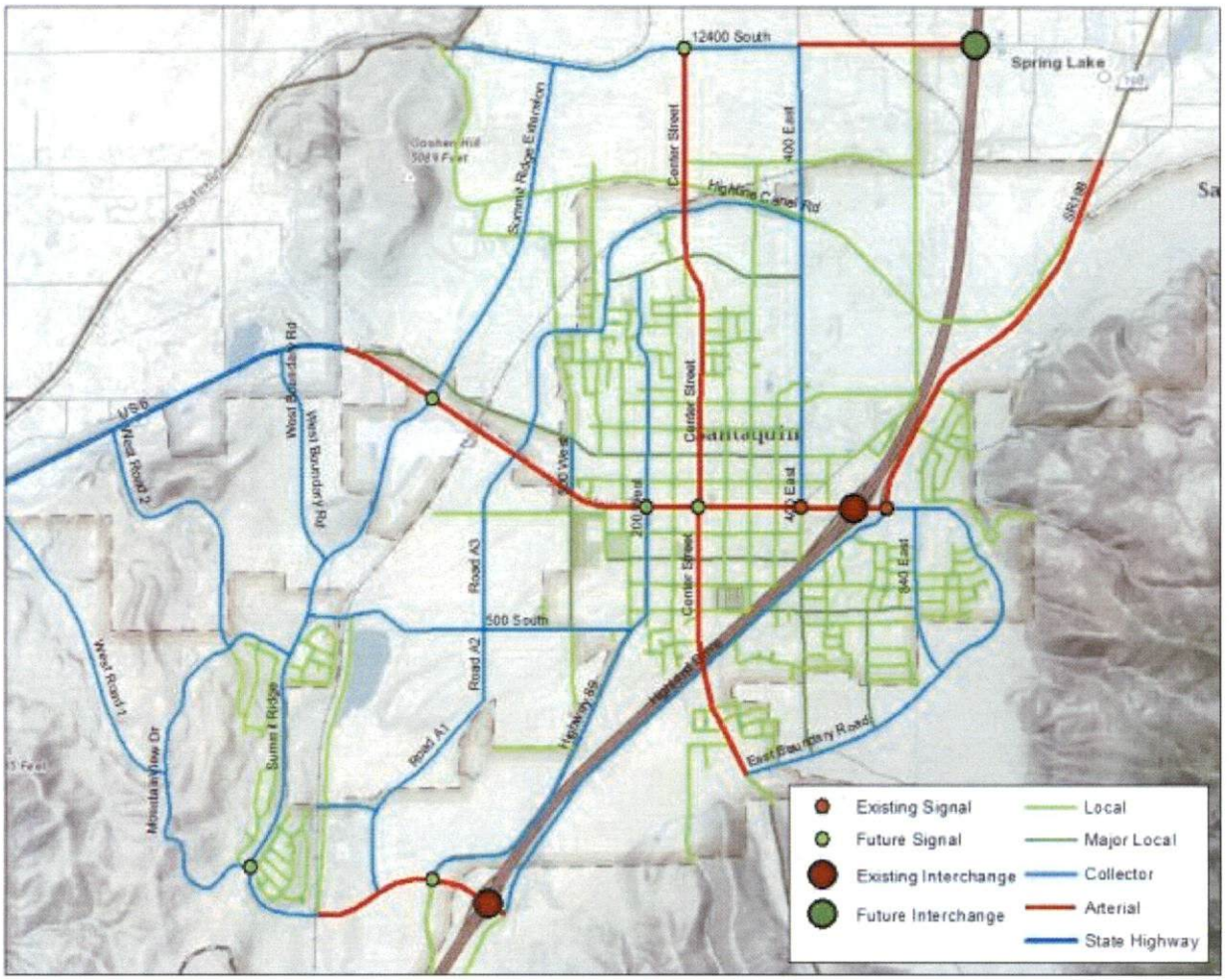


Transportation Guidelines

Traffic Control

The need for traffic signals will increase as traffic volume and the road network throughout Santaquin continues to grow. Per the MUTCD, "an engineering study of traffic conditions, pedestrian characteristics, and physical characteristics of the location shall be performed to determine whether installation of a traffic control signal is justified at a particular location." There are eight different traffic signal warrants the MUTCD states that need to be considered when investigating the need for a traffic control signal. These warrants look at vehicular volumes, pedestrian volumes, school crossings, signal coordination, vehicular crashes, and the adjacent road network. Potential future needed traffic signals based on future 2040 travel forecasts are shown in Figure 52.

Figure 52: Existing & Potential Traffic Signals



Access Spacing

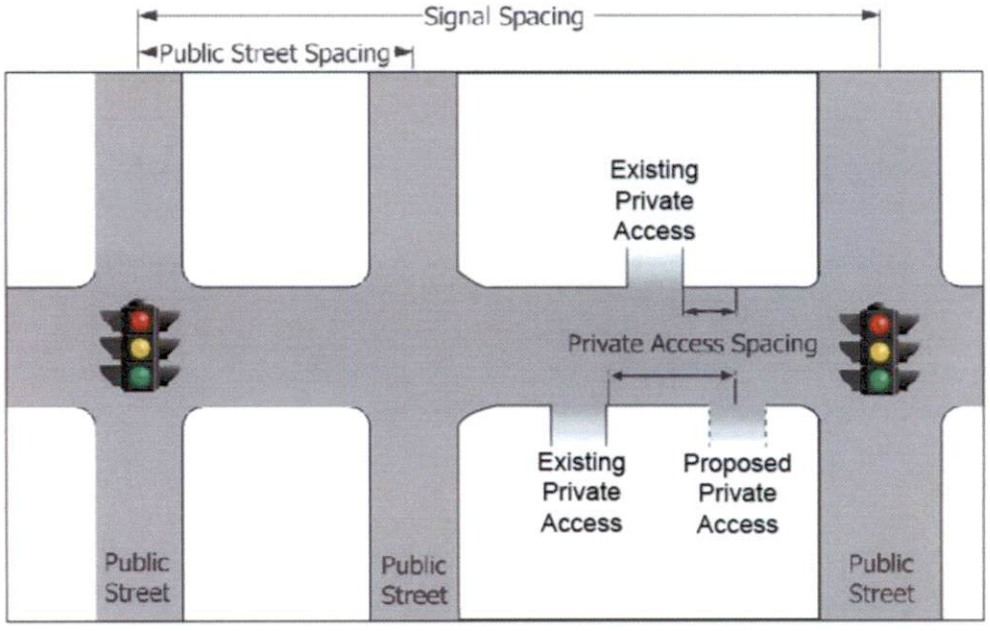
Access spacing standards allow drivers to process one decision at a time. Through proper spacing, drivers may monitor upcoming conflict points and react accordingly to each conflict. Access spacing, also referred to as driveway spacing, is measured from the closest edge (perpendicular tangent section) of the nearest driveway to the center of the proposed driveway. For state highways, UDOT Administrative Rule R930-6 defines the driveway, public street and signal spacing.

The Santaquin Master Transportation Plan has summarized the allowable access spacing on all non-UDOT streets in Santaquin City. On non-state routes, access spacing may be adjusted by the City Engineer based on localized conditions. Requests to decrease access spacing standards may be granted by the City Engineer provided that a traffic impact study is prepared by the developer documenting the preservation of safety, capacity, and speed with reduced access spacing. Table 9 lists the Santaquin City access spacing standards and Figure 53 illustrates spacing categories.

Table 9: Spacing Categories

	Minimum Signal Spacing (feet)	Minimum Public Street Spacing (feet)	Minimum Private Access Spacing (feet)
Arterial Streets	2640	660	250
Collector Streets	1320	300	150
Major Local Streets	1320	300	150
Local Streets	N.A.	150	No Minimum

Figure 53: Spacing Illustration



Corner Radii

The dimensions of curb radii directly affect the speed of turning motor vehicles. Large radii are needed to accommodate large trucks and busses, but may also allow cars to make high speed turns and create increased crossing distances for pedestrians. A network of intersections with short curb radii would be of greatest benefit to pedestrians, but would hinder movement of fire trucks; thus creating a hazardous environment. Therefore, curb radii standards are needed in order to accommodate all types of users. Current Santaquin standards provide for a 26' back of curb corner radii for all streets. Recommended back of curb corner radii for each street classification is shown in Table 10.

Table 10: Back of Curb Radii by Street Intersection

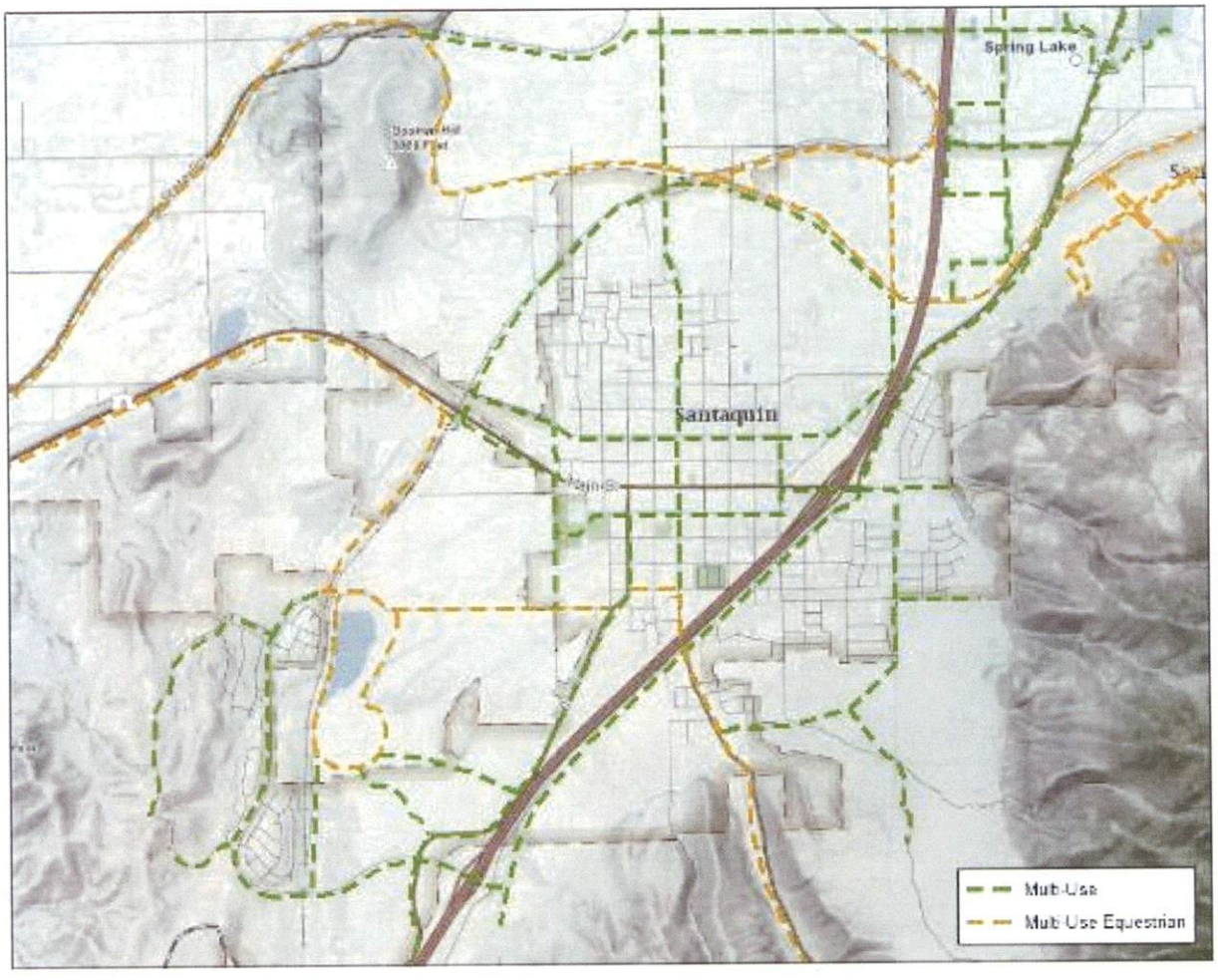
Right-of-Way	Right-of-Way				
		Local	Major Local	Collector	Arterial
	Arterial	30'	30'	40'	40'
	Collector	30'	30'	40'	40'
	Major Local	25'	30'	30'	30'
	Local	25'	25'	30'	30'

The above radii may be adjusted based on traffic volumes, intensity of large vehicle uses and the needs of specific lane uses/truck routing. Changes to curb radii are subject to the discretion of the City Engineer.

Future Bicycle Infrastructure

As described in the Santaquin City Park, Recreation & Open Space Facilities Plan of 2008, "creating interconnected trail systems both within the community and regionally is a key goal for Santaquin." The plan lays out a network of multi-use linked trails "that provide linear recreation for a variety of users such as runners, bicyclists, in-line skaters and pet walkers." This network of trails, which provides excellent access throughout the city, is shown in Figure 54.

Figure 54: Multi-Use Linked Trails



In addition to a trails network, on-road bicycle facilities, such as bike lanes, should also be considered where appropriate and pavement width permits. Although the Trails Plan provides good access throughout the city, the grade separated trails it plans for appeals more to recreational users. For those bicycling as a means for transportation, the existing road network provides the best and quickest routes from point A to B, and so providing on-road facilities is important for this user group. Striping of existing and future roads to include bike lanes is an easy way to provide this important infrastructure.

Future Transit

Given Santaquin's geographic location and low population density, robust public transportation routing in Santaquin does not currently make sense. Current service provides transportation from Santaquin to job centers to the north, but as non-residential land uses develop, transit service that circulates people within the city will begin to be more feasible. In addition, the future will bring FrontRunner commuter transit to Santaquin. Once in place, a circulator service emanating from the future station will make high speed and car-free regional travel possible.

Source: http://www.rideuta.com/blog/wp-content/uploads/2013/12/Trip-Planner-photo-3-1024x682.jpg

As transit is expanded to meet future needs, transit accommodations will also need to be put in place. These accommodations, such as bus pull-outs and shelters, will be important to support implementation and ridership. The figure above shows a recent UTA design of a pull-out with a shelter. When needed, it will be important for the city to research effective designs, as they will increase the usability and efficiency of the future system.

Capital Facilities Plan

The Capital Facilities Plan (CFP) identifies projects that are anticipated to be needed by a particular time and calculate a planning level cost estimate for each improvement. The recommended improvements are separated into Phase I (10 years, 2024), Phase II (20 years, 2034), Phase III (26 years, 2040) and Phase IV (over 26 years). These improvements are for collector streets and above. The CFP only includes projects that increase the capacity of the road network.

Figure 55, located below, is a map of the planned improvements by phase. Table 11 lists the projects by phase.

Figure 55: Capitol Facilities Plan by Phase

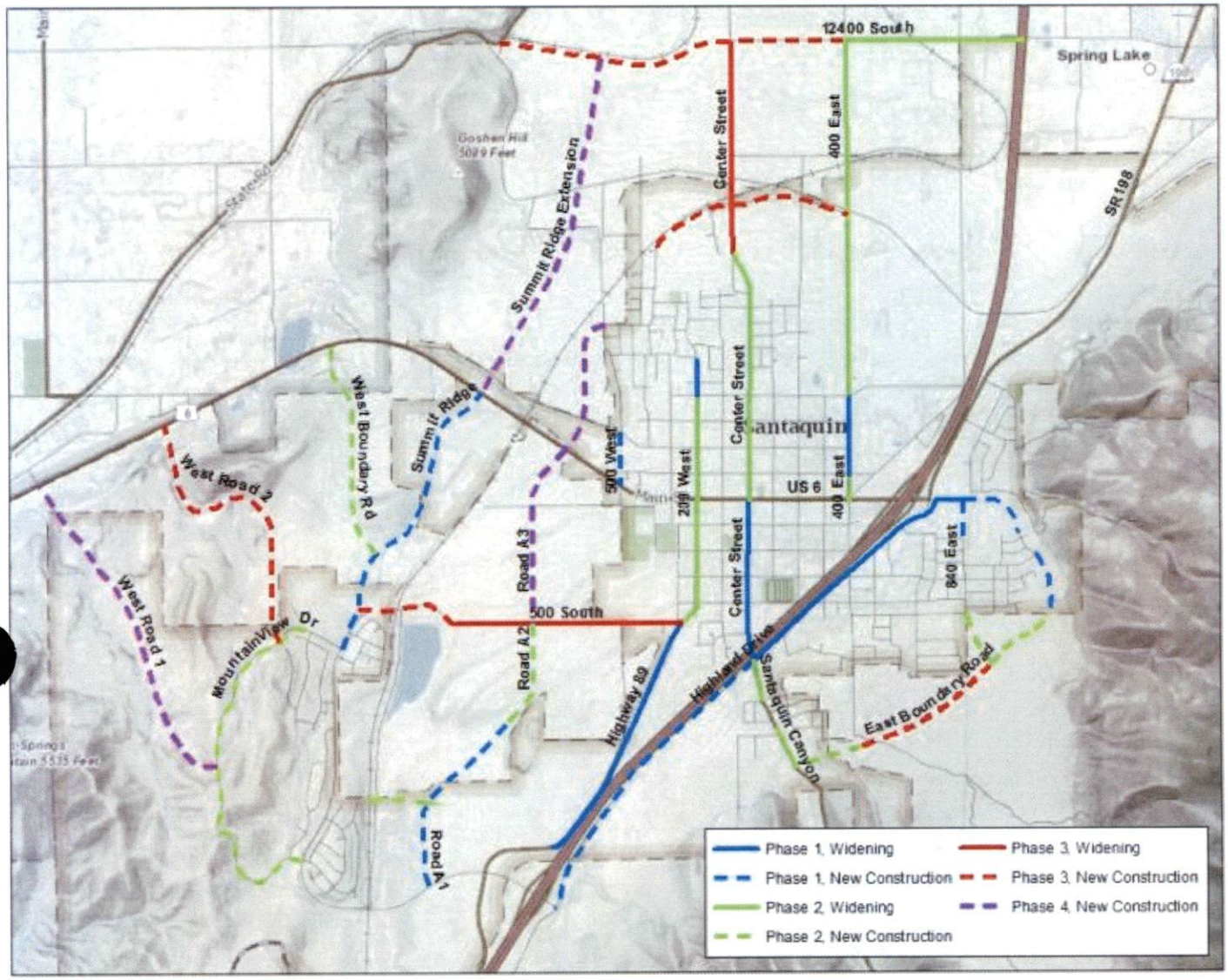


Table 11: Planned Improvements by Phase

Phase	Name	From	To	Length (Mi)	Improvement Type	Total Cost
1	East Boundary Road	250 South	City Boundary	0.28	New Construction	2,018,464
1	Highland Drive	Santaquin Canyon	Summit Ridge	1.41	New Construction	10,043,414
1	Summit Ridge	US 6	Mountain View Dr	1.33	New Construction	9,511,375
1	Road A1	Summit Ridge	900 South	0.86	New Construction	6,132,661
1	840 East	Main Street	150 S	0.17	New Construction	1,213,116
1	East Boundary Road	840 East (No.)	200 South	0.33	New Construction	2,321,990
1	500 West	Lark Rd	US 6	0.23	New Construction	1,673,113
1	Center Street	200 South	I-15	0.47	Widening	2,663,774
1	Center Street	US 6	200 South	0.45	Widening	2,059,810
1	Highway 89	500 South	Summit Ridge	1.15	Widening	3,452,832
1	Highland Drive	Santaquin Canyon	Main Street	1.07	Widening	3,228,286
1	East Boundary Road	Highland	840 East	0.12	New Construction	854,124
1	400 East	400 North	200 North	0.22	Widening	842,282
1	400 East	200 North	100 North	0.12	Widening	369,503
1	200 West	550 North	400 North	0.15	Widening	577,614
					Phase 1 Total	**46,962,357**
2	MountainView Dr	Summit Ridge (No.)	Summit Ridge (So.)	1.67	New Construction	11,895,297
2	West Boundary Rd	US 6	Summit Ridge Extension	0.96	New Construction	6,883,699
2	Commuter Rail Connector	Road A1	Commuter Rail Station	0.26	New Construction	1,845,772
2	Road A2	900 South	500 South	0.49	New Construction	3,485,210
2	East Boundary Road	400 East	Santaquin Canyon	0.31	New Construction	2,182,583
2	840 East	450 South	East South Boundary	0.25	New Construction	1,761,337
2	East Boundary Road	840 East (So.)	City Boundary	0.33	New Construction	2,333,178
2	12400 South	400 East	I-15	0.78	Widening	3,543,384
2	Santaquin Canyon	880 South	East City Boundary	0.19	Widening	1,123,550
2	400 East	12400 South	400 North	1.55	Widening	7,697,653
2	Center Street	13000 South	400 North	0.63	Widening	4,748,629
2	Center Street	400 North	US 6	0.46	Widening	2,083,672
2	Santaquin Canyon	I-15	780 South	0.17	Widening	1,034,471
2	200 West	400 North	US 6	0.45	Widening	1,368,554
2	400 East	100 North	US 6	0.11	Widening	332,077
					Phase 2 Total	**52,319,066**

Continued.....

Phase	Name	From	To	Length (Mi)	Improvement Type	Total Cost
3	12400 South	Highway 141	400 East	1.54	New Construction	10,970,852
3	Highline Canal Rd	13000 South	Center Street	0.40	New Construction	2,827,475
3	Highline Canal Rd	Center Street	400 East	0.52	New Construction	3,725,834
3	East Boundary Road	840 East	400 East	0.68	New Construction	4,880,395
3	500 South	Summit Ridge	Summit Creek Reservoir	0.45	New Construction	3,242,330
3	West Road 2	US 6	Mountain View Rd	1.34	New Construction	9,546,577
3	500 South	Summit Creek Reservoir	Highway 89	0.99	Widening	4,016,519
3	Center Street	12400 South	13000 South	0.92	Widening	4,187,212
					Phase 3 Total	**43,397,194**
4	Road A3	500 South	US 6	0.80	New Construction	5,735,547
4	Summit Ridge Extension	US 6	12400 South	1.57	New Construction	11,229,302
4	Road A3	US 6	680 North	0.61	New Construction	4,345,003
4	West Road 1	US 6	Mountain View Dr	1.50	New Construction	10,679,777
					Phase 4 Total	**31,989,629**

* Total cost is based on planning level cost estimates derived for UDOT, see appendix

Appendix

The following items can be found in the Appendix:

Stakeholder Committee Members
Street Inventory Details
TAZ Projections
Travel Demand Modeling
Roadway Cost Estimates

Stakeholder Committee Members

First	Last	Meeting Attendance	
		22-Jan-14	13-Mar-14
Adam	Beedley	X	
Betsy	Montoya		
Ben	Reeves		X
Bob	Allen	X	X
Boyd	Humpherys	X	X
Caroline	Merrill		
David	Hathaway	X	
Elise	Erler	X	X
Glen	Tanner	X	X
Ken	Anson	X	X
Kurt	Stringham	X	X
Mark	Christensen	X	X
Richard	Neilson		X
Ron	Phillips	X	X
Royce	Peterson		
Scott	Brand		
Scott	Parkin		X
Todd	Rowley		X
Wade	Eva		X
Wes	Quinton	X	X

Street Inventory Details

	From	To	Pavement Width	Lanes Each Direction	Center Lane	Curb & Gutter	Sidewalk	Pavement Quality
	5600 W.	I-15 Overpass	22'	Unstriped	N	N	N	2
anal Rd	5600 W.	5200 W.	n/a	n/a	n/a	n/a	n/a	1
	500 W.	150 W.	25'	Unstriped	N	N	N	4
	150 W.	200 E.	25'	Unstriped	N	N	N	3
	200 E.	400 E.	25'	Unstriped	N	N	N	4

n St.	Cumorah Dr.	Railroad bridge	30'	1	N	N	N	4
Main St.	Railroad bridge	Railroad bridge	55'	1	Y	N	N	4
Main St.	Railroad bridge	UDOT Shed	30'	1	N	N	N	4
Main St.	UDOT Shed	UDOT Shed	45'	1	Y	Y-South	N	4
Main St.	UDOT Shed	500 W.	45'	1	Y	Y-South	Y-South	4
Main St.	500 W.	440 W.	45'	1	Y	N	N	4
Main St.	440 W.	400 W.	65'	1	Y	Y-North	Y-North	4
Main St.	400 W.	300 E.	65'	1	Y	Y	Y	4
Main St.	300 E.	400 E.	70'	2	Y	Y	Y	5
Main St.	400 E.	I-15 NB ramps	40'	1	Y	Y	Y-South	4
Main St.	I-15 NB Ramps	Highland Dr.	40'	1	Y	Y	N	4
200 So.	400 W.	400 E.	20'	Unstriped	N	N	N	3
500 So.	300 W.	End of road	25'	Unstriped	N	N	N	2
Summit Ridge Pkwy.	Eastern end of road	I-15 SB ramps	50'	1	Y	N	N	4
Summit Ridge Pkwy.	I-15 SB ramps	South Ridge Farms Rd.	75'	2	Y	Y	N	4
Summit Ridge Pkwy.	South Ridge Farms Rd.	Quarry driveway	60'	1	Y	Y	N	4
Summit Ridge Pkwy.	Quarry driveway	Railroad bridge	85'	1	Y	Y	N	4
Summit Ridge Pkwy.	Railroad bridge	Railroad bridge	45'	1	Y	Y	Y	4
Summit Ridge Pkwy.	Sageberry Dr.	Stone Way	45'	1	N	Y	Y-West	5
Mountain View Dr.	Summit Ridge Pkwy.	Crest Dale Ln.	30'	Unstriped	N	Y	N	5
Mountain View Dr.	Crest Dale Ln.	Vista Ridge Dr.	n/a	n/a	n/a	n/a	n/a	1
Cypress Point Dr.	Vista Ridge Dr.	Summit Ridge Pkwy.	60'	Unstriped	N	Y	Y	5
Orchard Ln.	100 N.	180 N.	30'	Unstriped	N	N	N	2
Orchard Ln.	180 N.	700 E.	30'	Unstriped	N	Y-East	Y-East	4
Orchard Ln.	700 E.	450 N.	30'	Unstriped	N	N	N	1

TAZ Projections

	MAG Projections						Santaquin Adjusted Values					
	Households			Employment			Households			Employment		
TAZID	2014	2024	2040	2014	2024	2040	2014	2024	2040	2014	2024	2040
2158	26	97	244	0	0	150	1	21	224	15	21	150
2159	36	46	67	2	2	538	32	37	67	2	2	538
2190	45	184	578	0	0	227	32	40	350	2	0	227
2191	151	242	432	5	5	5	112	242	319	5	0	40
2210	388	594	861	2	2	2	395	550	861	17	17	58
2211	142	233	348	30	40	55	108	167	415	16	65	75
2212	68	309	826	12	22	50	44	150	700	25	80	130
2213	115	146	191	54	164	546	118	149	380	57	98	175
2214	238	350	468	136	204	462	245	360	565	82	155	340
2215	335	514	700	50	60	100	305	515	700	51	65	150
2216	91	308	672	0	128	345	61	210	450	2	52	250
2217	107	380	871	17	136	380	67	85	530	17	142	380
2218	233	274	322	100	210	555	237	277	376	106	217	555
2219	208	301	408	88	263	699	175	185	525	94	200	425
2220	459	599	862	110	226	556	434	515	877	116	233	556
2221	254	329	394	229	306	479	262	337	394	237	313	479
2222	6	25	161	0	51	58	5	29	161	10	16	500
2223	1	1	38	0	0	160	1	1	38	0	55	1500
2224	10	69	934	25	157	882	0	85	934	25	168	1500
2225	283	725	1848	1	1	1	227	420	2100	1	35	50
2226	6	11	117	0	0	0	4	20	350	17	0	200

Travel Demand Modeling

The base WFRC - MAG model network was updated to more accurately reflect existing conditions. The model was developed for a 2009 base year and so required updating to bring it up to year 2014. The existing model network accurately reflected the current road network, but the 2009 socio-economic inputs required updating. Santaquin City Staff provided revised Total Household, Total Population, and Total Employment information for each Traffic Analysis Zone (TAZ) in Santaquin. The Table below is a detailed summary table of the changes made to account for the growth the area has seen in the last 5 years.

	2009 Base Model Inputs			2014 Adjusted Values		
TAZ ID	Population	Households	Employment	Population	Households	Employment
2158	93	24	0	111	1	15
2159	134	35	0	115	32	2
2190	146	42	0	166	32	2
2191	406	118	0	508	112	5
2210	1536	357	0	1773	395	17
2211	587	179	2	636	108	16
2212	286	87	15	301	44	25
2213	399	116	0	460	118	57
2214	897	232	60	1062	245	82
2215	1266	327	37	1456	305	51
2216	336	88	0	432	61	2
2217	106	30	9	475	67	17
2218	652	199	182	851	237	106
2219	720	220	100	737	175	94
2220	1416	433	164	1687	434	116
2221	857	235	149	900	262	237
2222	14	4	0	25	5	10
2223	110	31	0	4	1	0
2224	0	0	6	60	0	25
2225	810	226	1	1273	227	1
2226	8	2	0	18	4	17

Roadway Cost Estimates

99' Arterial

ITEM	COST	UNIT	Quantity	COST
Roadway Excavation (28" depth)	$0.29	ft³	77 x 1 x 2.3 = 177.1 ft³	$51.36
Clearing and Grubbing	$1,036.00	Acres	99 x 1)/43,560 = 0.00227 f	$2.35
Subgrade Finishing	$0.18	ft²	77 x 1 = 77 ft²	$13.86
Untreated Base Course (16" thick)	$0.79	ft³	77 x 1 x 0.67 = 51.59 ft³	$40.76
Bituminous Surface Course (12" thick)*	$4.72	ft³	77 x 1 x 0.5 = 38.5 ft³	$181.72
Concrete Curb and Gutter Type B1	$6.23	ft	2 ft	$12.46
Pavement Marking Paint	$1.83	ft	2 ft	$3.66
Parkstrip	$6.00	ft²	12 ft	$72.00
Clearing and Grubbing for Sidewalk	$0.22	ft²	10 ft	$2.20
Excavation	$0.29	ft³	10 x 1 x 0.67 = 6.7 ft³	$1.94
Concrete Base Course, 4" inch thick.	$2.06	ft²	10 ft	$20.60
5' Concrete Sidewalk, 4" Thick	$4.47	ft²	10 ft	$44.70
			Subtotal	$447.61
Signage	calculated @ 5% of subtotal			$22.38
Drainage (Inc. Structures)	calculated @ 15% of subtotal			$67.14
Environmental & Design	calculated @ 20% of subtotal			$89.52
			Subtotal	$626.66
Mobilization and Traffic Control	calculated @ 10% of subtotal			$62.67
Contingency	calculated @ 20% of subtotal			$125.33
			Subtotal	$814.66
Contingency for Price Increases	calculated @ 20% of subtotal			$162.93
TOTAL COST / FOOT				$977.59
* Assumes UDOT Bid of $69.90 per ton and in place density of 135 lbs per ft³				

90' Arterial

ITEM	COST	UNIT	Quantity	COST
Roadway Excavation (28" depth)	$0.29	ft³	62 x 1 x 2.3 = 142.6 ft³	$41.35
Clearing and Grubbing	$1,036.00	Acres	90 x 1)/43,560 = 0.00227 f	$2.14
Subgrade Finishing	$0.18	ft²	62 x 1 = 62 ft²	$11.16
Untreated Base Course (16" thick)	$0.79	ft³	62 x 1 x 0.67 = 41.54 ft³	$32.82
Bituminous Surface Course (12" thick)*	$4.72	ft³	62 x 1 x 0.5 = 31 ft³	$146.32
Concrete Curb and Gutter Type B1	$6.23	ft	2 ft	$12.46
Pavement Marking Paint	$1.83	ft	2 ft	$3.66
Parkstrip	$6.00	ft²	18 ft	$108.00
Clearing and Grubbing for Sidewalk	$0.22	ft²	10 ft	$2.20
Excavation	$0.29	ft³	10 x 1 x 0.67 = 6.7 ft³	$1.94
Concrete Base Course, 4" inch thick.	$2.06	ft²	10 ft	$20.60
5' Concrete Sidewalk, 4" Thick	$4.47	ft²	10 ft	$44.70
			Subtotal	$427.35
Signage	calculated @ 5% of subtotal			$21.37
Drainage (Inc. Structures)	calculated @ 15% of subtotal			$64.10
Environmental & Design	calculated @ 20% of subtotal			$85.47
			Subtotal	$598.29
Mobilization and Traffic Control	calculated @ 10% of subtotal			$59.83
Contingency	calculated @ 20% of subtotal			$119.66
			Subtotal	$777.78
Contingency for Price Increases	calculated @ 20% of subtotal			$155.56
TOTAL COST / FOOT				$933.33
* Assumes UDOT Bid of $69.90 per ton and in place density of 135 lbs per ft³				

99'/62' Collector

ITEM	COST	UNIT	Quantity	COST
Roadway Excavation (14" depth)	$0.29	ft³	40 x 1 x 1.167 = 46.68 ft³	$13.54
Clearing and Grubbing	$1,036.00	Acres	99 x 1)/43,560 = 0.00156 f	$2.35
Subgrade Finishing	$0.18	ft²	40 x 1 = 40 ft²	$7.20
Untreated Base Course (8" thick)	$0.79	ft³	40 x 1 x 0.67 = 26.8 ft³	$21.17
Bituminous Surface Course (6" thick)*	$4.72	ft³	40 x 1 x 0.5 = 20 ft ³	$94.40
Concrete Curb and Gutter Type B1	$6.23	ft	2 ft	$12.46
Pavement Marking Paint	$1.83	ft	1 ft	$1.83
Parkstrip	$6.00	ft²	12 ft	$72.00
Clearing and Grubbing for Sidewalk	$0.22	ft²	10 ft	$2.20
Excavation	$0.29	ft³	10 x 1 x 0.67 = 6.7 ft³	$1.94
Concrete Base Course, 4" inch thick.	$2.06	ft²	10 ft	$20.60
5' Concrete Sidewalk, 4" Thick	$4.47	ft²	10 ft	$44.70
			Subtotal	$294.39
Signage	calculated @ 5% of subtotal			$14.72
Drainage (Inc. Structures)	calculated @ 15% of subtotal			$44.16
Environmental & Design	calculated @ 20% of subtotal			$58.88
			Subtotal	$412.15
Mobilization and Traffic Control	calculated @ 10% of subtotal			$41.21
Contingency	calculated @ 20% of subtotal			$82.43
			Subtotal	$535.79
Contingency for Price Increases	calculated @ 20% of subtotal			$107.16
TOTAL COST / FOOT				$642.95
* Assumes UDOT Bid of $69.90 per ton and in place density of 135 lbs per ft³				

55' Local

ITEM	COST	UNIT	Quantity	COST
Roadway Excavation (10" depth)	$0.29	ft³	29 x 1 x 0.83 = 24.1 ft³	$6.98
Clearing and Grubbing	$1,036.00	Acres	55 x 1)/43,560 = 0.00126 f	$1.31
Subgrade Finishing	$0.18	ft²	29 x 1 = 29 ft²	$5.22
Untreated Base Course (6" thick)	$0.79	ft³	29 x 1 x 0.5 = 14.5 ft³	$11.46
Bituminous Surface Course (4" thick)*	$4.72	ft³	29 x 1 x 0.33 = 9.6 ³	$45.17
Concrete Curb and Gutter Type B1	$6.23	ft	2 ft	$12.46
Parkstrip	$6.00	ft²	12 ft	$72.00
Clearing and Grubbing for Sidewalk	$0.22	ft²	10 ft	$2.20
Excavation	$0.29	ft³	10 x 1 x 0.67 = 6.7 ft³	$1.94
Concrete Base Course, 4" inch thick.	$2.06	ft²	10 ft	$20.60
5' Concrete Sidewalk, 4" Thick	$4.47	ft²	10 ft	$44.70
			Subtotal	$224.04
Signage	calculated @ 5% of subtotal			$11.20
Drainage (Inc. Structures)	calculated @ 10% of subtotal			$22.40
Environmental & Design	calculated @ 15% of subtotal			$33.61
			Subtotal	$291.25
Mobilization and Traffic Control	calculated @ 5% of subtotal			$14.56
Contingency	calculated @ 15% of subtotal			$43.69
			Subtotal	$349.50
Contingency for Price Increases	calculated @ 15% of subtotal			$52.43
TOTAL COST / FOOT				$401.93
* Assumes UDOT Bid of $69.90 per ton and in place density of 135 lbs per ft³				