City of Santa Rosa
Bicycle & Pedestrian Master Plan

Existing Conditions Memo

March 2018

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2. Santa Rosa Today

This chapter describes the active transportation landscape in Santa Rosa today, including a discussion of related themes that will inform the development of recommended infrastructure projects and programs in the community.

Local Context

Santa Rosa is well poised to increase walking and bicycling for transportation. It has a mild climate most of the year, is relatively flat, and has a large network of existing sidewalks and growing network of on-street bikeways and off-street shared use paths. The City has installed bicycle parking in much of the downtown, and transit services connect destinations in the region and beyond.

These investments and natural assets provide a foundation upon which the City can continue to build a high-quality citywide network for bicycling and walking—one that is safe and comfortable for everyday use by people of all ages and abilities.

Land Use & Major Destinations

This Bicycle & Pedestrian Master Plan will support Santa Rosa's Priority Development Areas (PDAs), the areas where the City plans to focus development in denser, mixed-use areas along transit routes shown in Figure 2-2. In conjunction with this development and transit service, high-quality bicycling and walking infrastructure within PDAs is intended to offer improved alternatives to driving. The existing and planned land uses in Santa Rosa will inform the recommendations in this Plan in an effort to maximize the number of people who will have access to walking and bicycling networks.

Major destinations in Santa Rosa include schools, parks, healthcare facilities, shopping centers, city hall, and transit stations, mapped in Figure 2-3. These destinations are dispersed throughout the four quadrants of the city, and will require a comprehensive network of active transportation facilities to allow people to walk or bicycle instead of driving. Employment density is highest in the downtown area and in northern Santa Rosa along Highway 101 where Kaiser Permanente Medical Center and several federal and county offices are located.

Demographics

Santa Rosa is home to 173,165 residents, according to 2016 American Community Survey 5-year estimates. This represents more than one third of the Sonoma County population of 497,776. When compared to the county population, Santa Rosa is slightly younger, with more residents under 10 years old and between 20-34 years old, as shown in Figure 2-1.

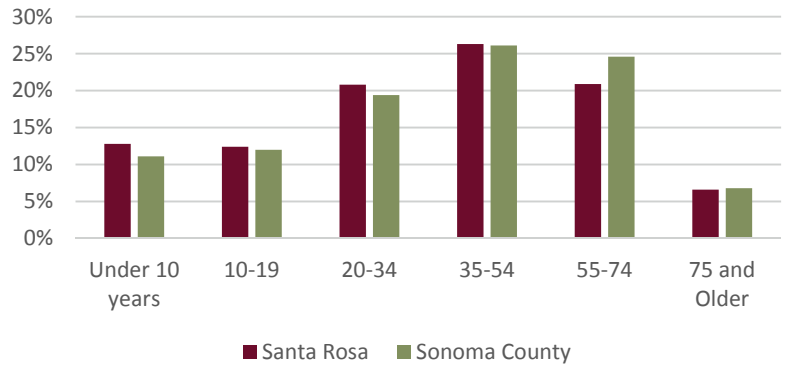

Figure 2-1: Population by Age in Santa Rosa and Sonoma County

Transit Access

Santa Rosa is served by several transit providers and routes that offer connections to local and regional destinations. Santa Rosa CityBus and Sonoma County Transit both offer local bus service, and the Sonoma-Marin Area Rail Transit (SMART) station downtown has service to the Sonoma County Airport as well as Rohnert Park, Petaluma, Novato, and San Rafael. See Figure 2-4 for a map of frequently used transit routes in the City.

PRIORITY DEVELOPMENT AREAS

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Figure 2-2

Priority Development Area

LAND USE INTENSITY

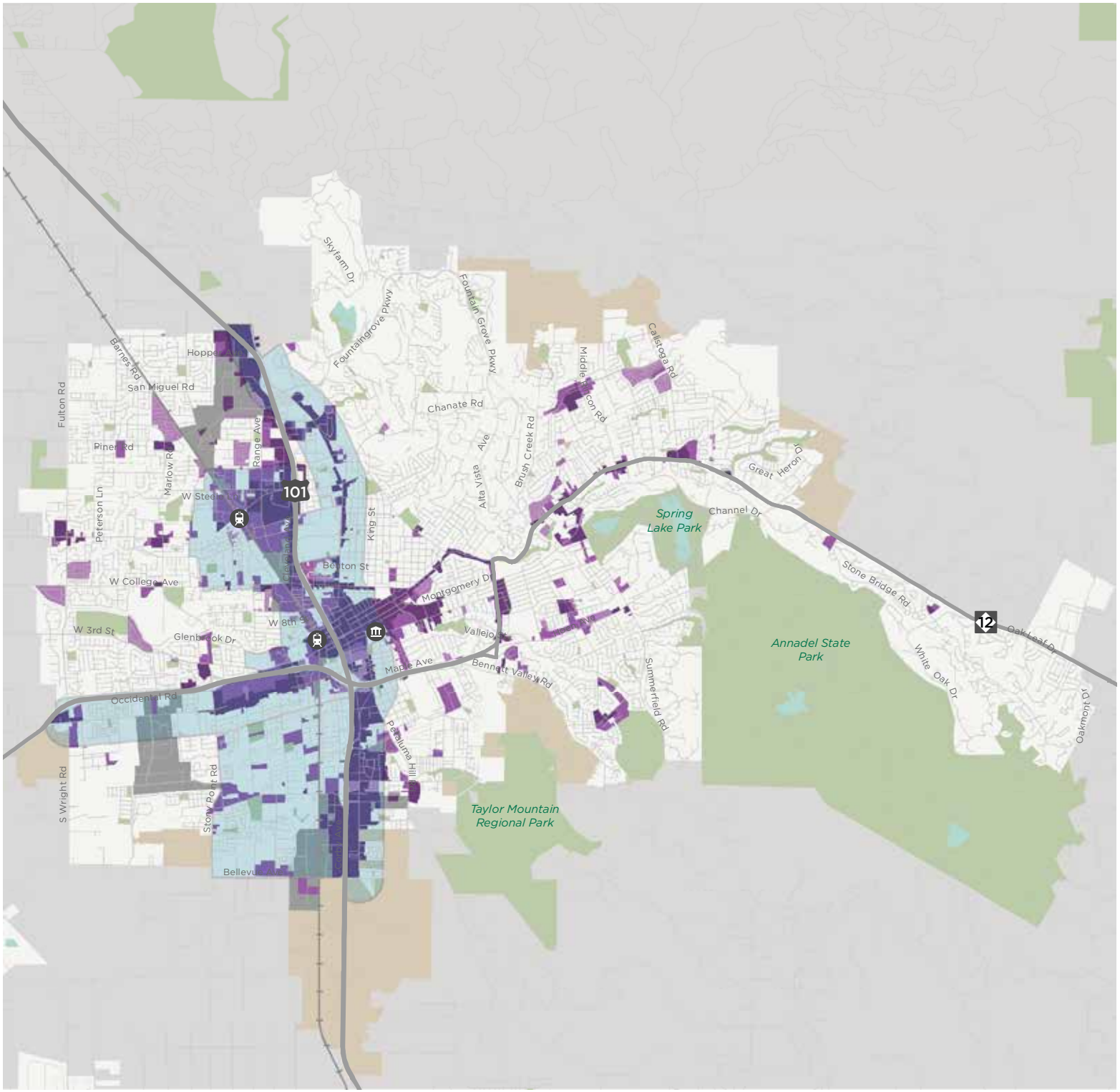
- Low Density
- Medium Density
- High Density
- Commercial + High Mix Use
- Industrial

DESTINATIONS + BOUNDARIES

- City Hall
- SMART Station
- Park
- Urban Growth Boundary

0 1 2 MILES

N



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MAJOR DESTINATIONS

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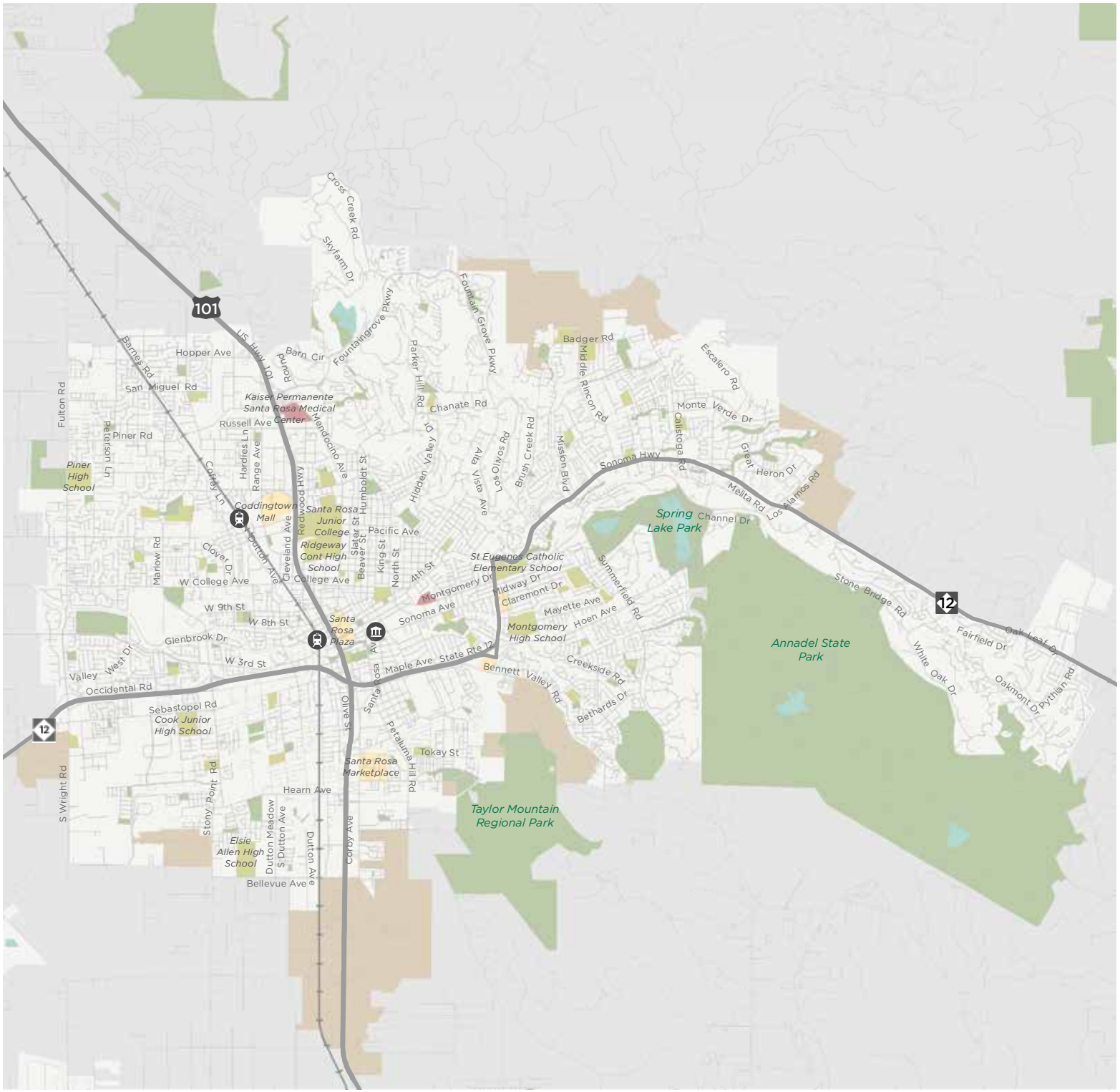
Figure 2-3



DESTINATIONS + BOUNDARIES

- City Hall
- SMART Station
- Shopping Center
- School
- Hospital
- Park
- Urban Growth Boundary

0 1 2 MILES

N

Map produced February 2018.

TRANSIT CONNECTIONS

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Figure 2-4

CONNECTIONS + SUPPORT FACILITIES

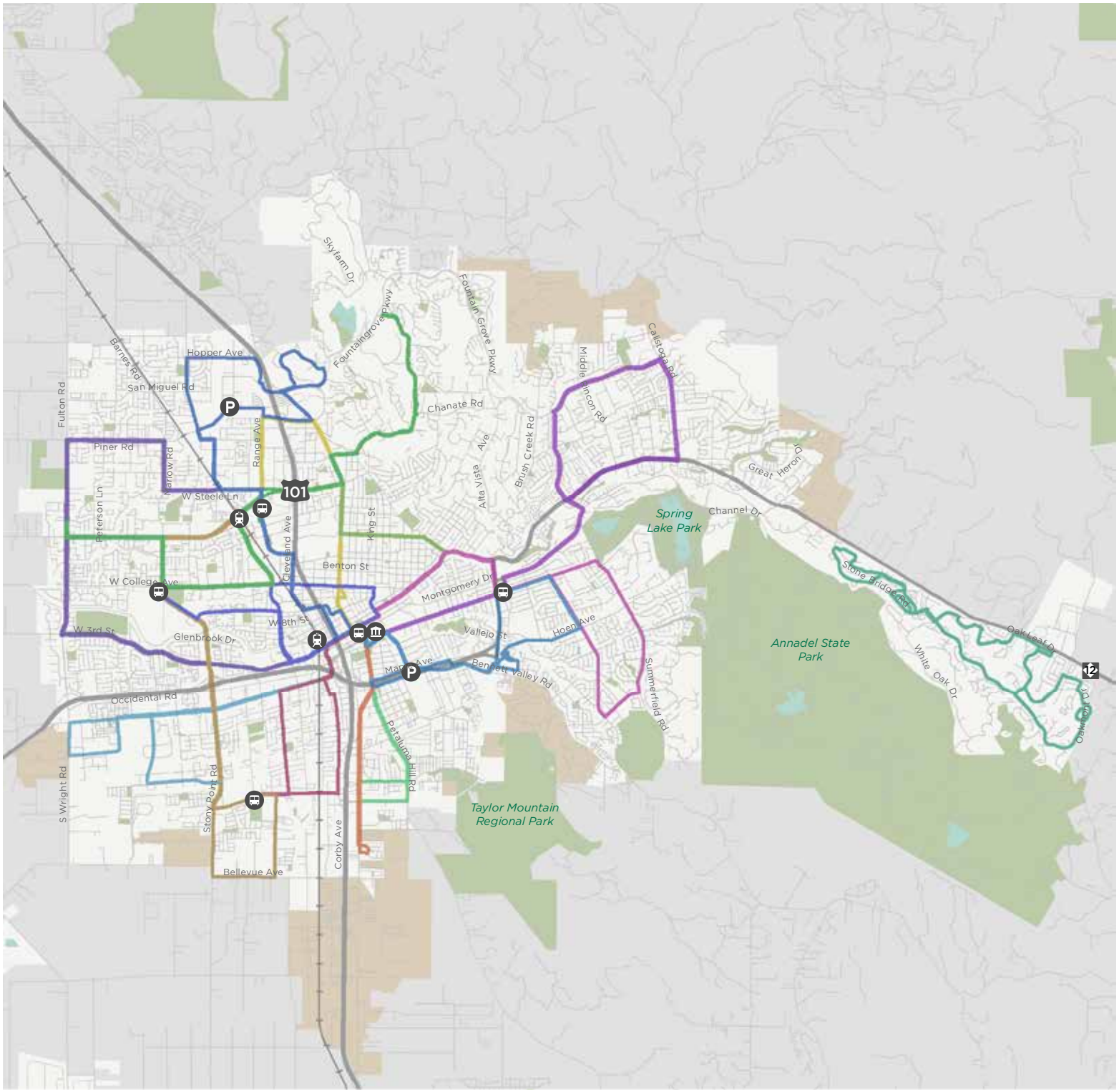
- SMART Station
- Park and Ride
- Transfer Station

CITYBUS ROUTES

- 1
- 2, 2B
- 3
- 4, 4B
- 5
- 6
- 7
- 8
- 9, 9E
- 10, 10W
- 12
- 15
- 16
- 18
- 19

DESTINATIONS + BOUNDARIES

- City Hall
- Park
- Urban Growth Boundary



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Equity

Equity issues are an important part of all planning processes, including development of this Bicycle & Pedestrian Master Plan. Historically, communities with large populations of people non-white races or ethnicities and low income households have received less investment from their local governments, including an uneven spatial distribution of facilities and safety improvements for people walking and bicycling. An equity analysis of Santa Rosa evaluated citywide factors related to walking and bicycling in addition to identifying neighborhoods that are disproportionately burdened by pollution or other negative impacts. These and other considerations will inform the projects and prioritization recommended in this Plan.

Income and Vehicle Access

While Sonoma County has a higher median household income at $66,833 than the state of California at $63,783, Santa Rosa is slightly less affluent than the county overall with a median household income of $62,705. Median income varies widely between cities in Sonoma County, as shown in Figure 2-5. The other two large cities—Rohnert Park and Petaluma—have median household incomes of $60,333 and $80,907 respectively.

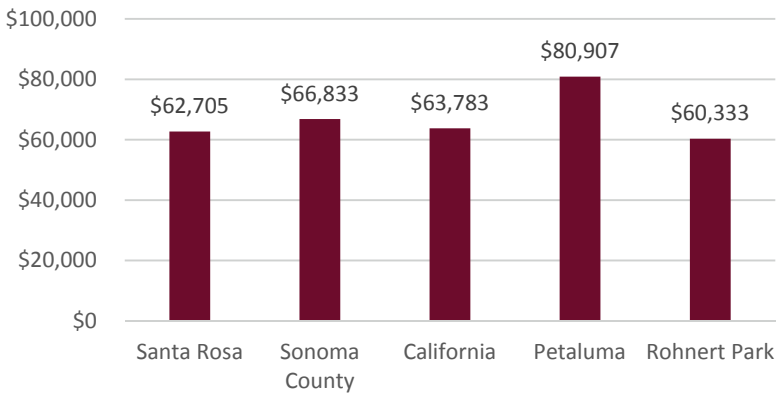

Figure 2-5: Median Household Income

Just two percent of households in Santa Rosa lack access to a vehicle, as shown in Figure 2-6. Nearly 80 percent of households have access to two or more vehicles. These rates are nearly identical to countywide vehicle access.

With such widespread vehicle access, few households rely on walking or bicycling out of necessity. To create significant shifts in trips away from driving, walking and bicycling must be convenient and comfortable options to attract more people.

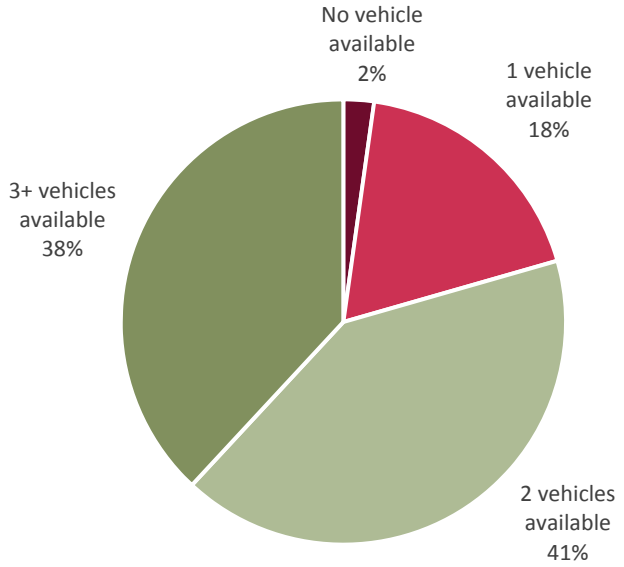

Figure 2-6: Vehicles Available

Communities of Concern

As part of the San Francisco Bay Area's long-range integrated transportation and land use/housing strategy, Plan Bay Area, the Association of Bay Area Governments (ABAG), and the Metropolitan Transportation Commission (MTC) analyzed the distribution of benefits and burdens that would result from implementation of the region's preferred planning scenario. To conduct this analysis, ABAG and MTC, along with extensive input from an Equity Working Group and other stakeholders, identified "Communities of Concern" throughout the Bay Area region that meet at least four thresholds listed in Table 2-1.

Table 2-1: Community of Concern Factors and Thresholds

Factor	% of Regional Population	Community of Concern Threshold
Minority Population	54%	70%
Low Income (<200% of poverty) Population	23%	30%
Limited English Proficiency Population	9%	20%
Zero-Vehicle Households	9%	10%
Seniors 75 and Older	6%	10%
Population with a Disability	18%	25%
Single-Parent Families	14%	20%
Cost-Burdened Renters	10%	15%

Source: Appendix A: Detailed Methodology, Plan Bay Area (2013).
http://planbayarea.org/pdf/Draft_Plan_Bay_Area/Appendices_to_Draft_Equity_Analysis_Report.pdf

In the City of Santa Rosa, the three Communities of Concern include the Roseland neighborhood southwest of the Highway 101 and SR 12 interchange, an area north of College Avenue and west of Highway 101, and the downtown area east of Highway 101 between College Avenue and Sonoma Drive. See Figure 2-7 for a map of Communities of Concern. The walking and bicycling improvements recommended in this Plan will consider the benefits and burdens of those projects on these communities.

CalEnviroScreen

The California Office of Environmental Health Hazard Assessment developed the CalEnviroScreen tool to help identify communities that are disproportionately burdened by multiple sources of pollution. It combines pollution data (such as ozone concentrations and drinking water contaminants) with population indicators (such as birth weight and educational attainment).

This is also a tool used in California's Active Transportation Program grant application scoring. Communities that score in the highest 25 percent of the state are considered to be disadvantaged and receive a small advantage in the competitive funding process. Areas in Santa Rosa that meet this threshold are mapped in Figure 2-8.

COMMUNITIES OF CONCERN

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Figure 2-7

DESTINATIONS + BOUNDARIES

- City Hall
- SMART Station
- Park
- Urban Growth Boundary

Community of Concern

0 1 2 MILES

N

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CalEnviroScreen 3.0

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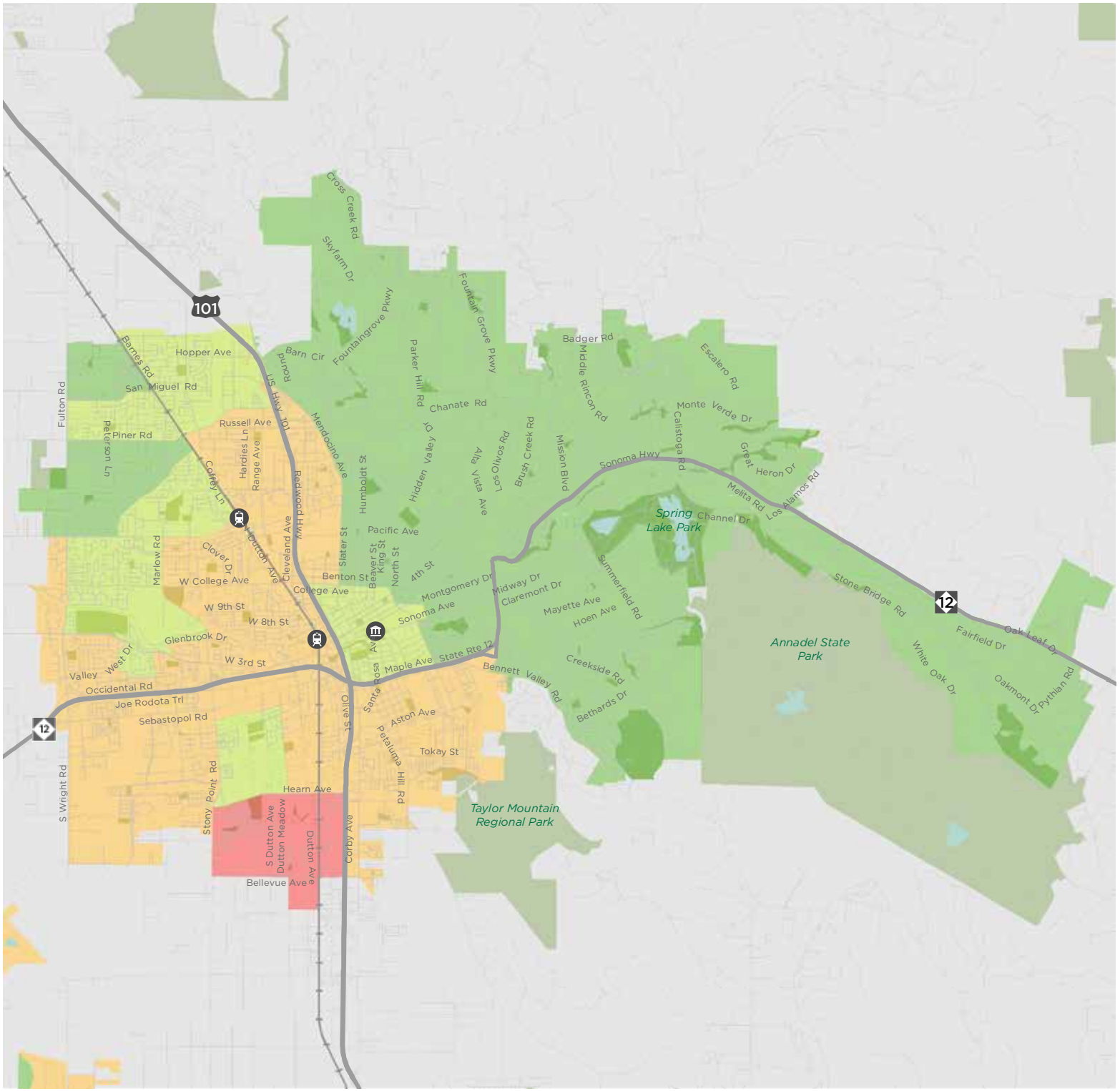
Figure 2-8

SCORE (PERCENTILE)

- 1 - 25% (Lowest Scores)
- 26 - 50%
- 51 - 75%
- 76 - 100% (Highest Scores)

***Scoring is based on environmental, health, and socioeconomic conditions. Areas with higher scores are faced with more adverse conditions and areas with lower scores are faced with less adverse conditions.**



DESTINATIONS + BOUNDARIES

- City Hall
- SMART Station
- Park

0 1 2 MILES

N

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City of Santa Rosa

Map produced February 2018.

Biking and Walking Today

Existing Bicycle Network

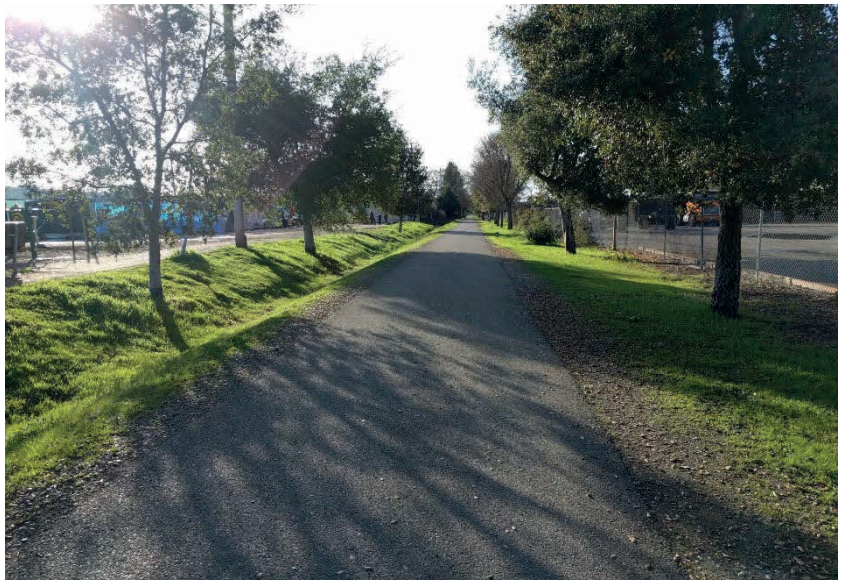
The California Department of Transportation (Caltrans) designates four classes of bicycle facilities: Class I shared use paths, Class II bicycle lanes, Class III bicycle routes, and Class IV separated bikeways. The City's current bicycle network has approximately 108 miles of bikeways, and has grown by 40 percent since the last Bicycle and Pedestrian Master Plan Update in 2011. Descriptions of each bikeway class are included in the following section, and bikeways are mapped in Figure 2-9 through Figure 2-14 to show where they currently exist in Santa Rosa.

Table 2-2: Bikeway Mileage in 2011 and 2018

Bikeway Type	2011 Miles	2018 Miles
Class I Shared Use Paths	13	27
Class II Bicycle Lanes	46	68
Class III Bicycle Routes	18	13*
Class IV Separated Bikeways	0	0
Total	77	108

**Several miles of Class III bicycle routes were upgraded to Class II bicycle lanes*

Class I Shared Use Paths



Class I shared use paths are paved trails completely separated from the street. They allow two-way travel by people bicycling and walking, and are often considered the most comfortable facilities for children and inexperienced riders as there are few potential conflicts between people bicycling and people driving.

There are currently 27 miles of Class I shared use paths in Santa Rosa.

Class II Bicycle Lanes

Class II bicycle lanes are striped preferential lanes on the roadway for one-way bicycle travel. Some bicycle lanes include a striped buffer on one or both sides to increase separation from the traffic lane or from parked cars, where people may open doors into the bicycle lane. Buffered Class II bicycle lanes were recently installed on 3rd Street from A Street to B Street, where 3rd Street passes underneath Santa Rosa Plaza.

There are currently 68 miles of Class II bicycle lanes in Santa Rosa.

Class III Bicycle Routes

Class III bicycle routes are signed routes where people bicycling share a travel lane with people driving. Because they are shared facilities, bicycle routes are only appropriate on quiet, low-speed streets with relatively low traffic volumes. Some Class III bicycle routes include shared lane markings or "sharrows" that recommend proper bicycle positioning in the center of the travel lane and alert drivers that bicyclists may be present.

There are currently 13 miles of Class III bicycle routes in Santa Rosa.

Class IV Separated Bikeways

Class IV separated bikeways are on-street bicycle facilities that are physically separated from motor vehicle traffic by a vertical element or barrier, such as a curb, bollards, or vehicle parking aisle. They can allow for one- or two-way travel on one or both sides of the roadway.

No Class IV separated bikeways exist in Santa Rosa.

Existing Support Facilities

Support facilities are also needed to attract and maintain bicyclists by considering their needs throughout their journey. People are less likely to ride their bicycles to destinations without secure bicycle parking. Other support facilities include showers or lockers at destinations, repair stations with basic tools, and wayfinding or guide signs to help bicyclists navigate along the way.

A complete bicycle network must include secure bicycle parking at each end of every trip. Bicycle parking can generally be divided into two categories: short-term bicycle racks and long-term higher-security parking.

The City has installed short-term bicycle parking throughout downtown on sidewalks, plazas, and in parking garages. These racks have been funded primarily through the Transportation Fund for Clean Air, provided by the Bay Area Air Quality Management District. Currently, 62 bicycle racks are installed through downtown Santa Rosa, as shown in Figure 2-15.

Long-term bicycle parking is available in the form of on-demand bike lockers. BikeLink, a private vendor, has installed 80 lockers at 12 locations across the city shown in Table 2-3. To use the lockers, bicyclists purchase a BikeLink card online or at one of three vendors in the city. Once activated, the card can be loaded with funds to purchase time at 3-5 cents per hour.

Table 2-3: Bicycle Locker Locations

Locker Location	Spaces
Santa Rosa Junior College	36
Bailey Field	4
Tauzer Gym	4
Pioneer Hall	4
Quinn Swim Center	4
Doyle Library	8
Plover Hall	8
Analy Village	4
SMART – Santa Rosa Downtown	12
SMART – Santa Rosa North	4
Sonoma County Permit Resource Management	12
Sonoma County La Plaza	8
Sonoma County Hall of Justice	8

BICYCLE INFRASTRUCTURE

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Figure 2-9

EXISTING BIKEWAYS

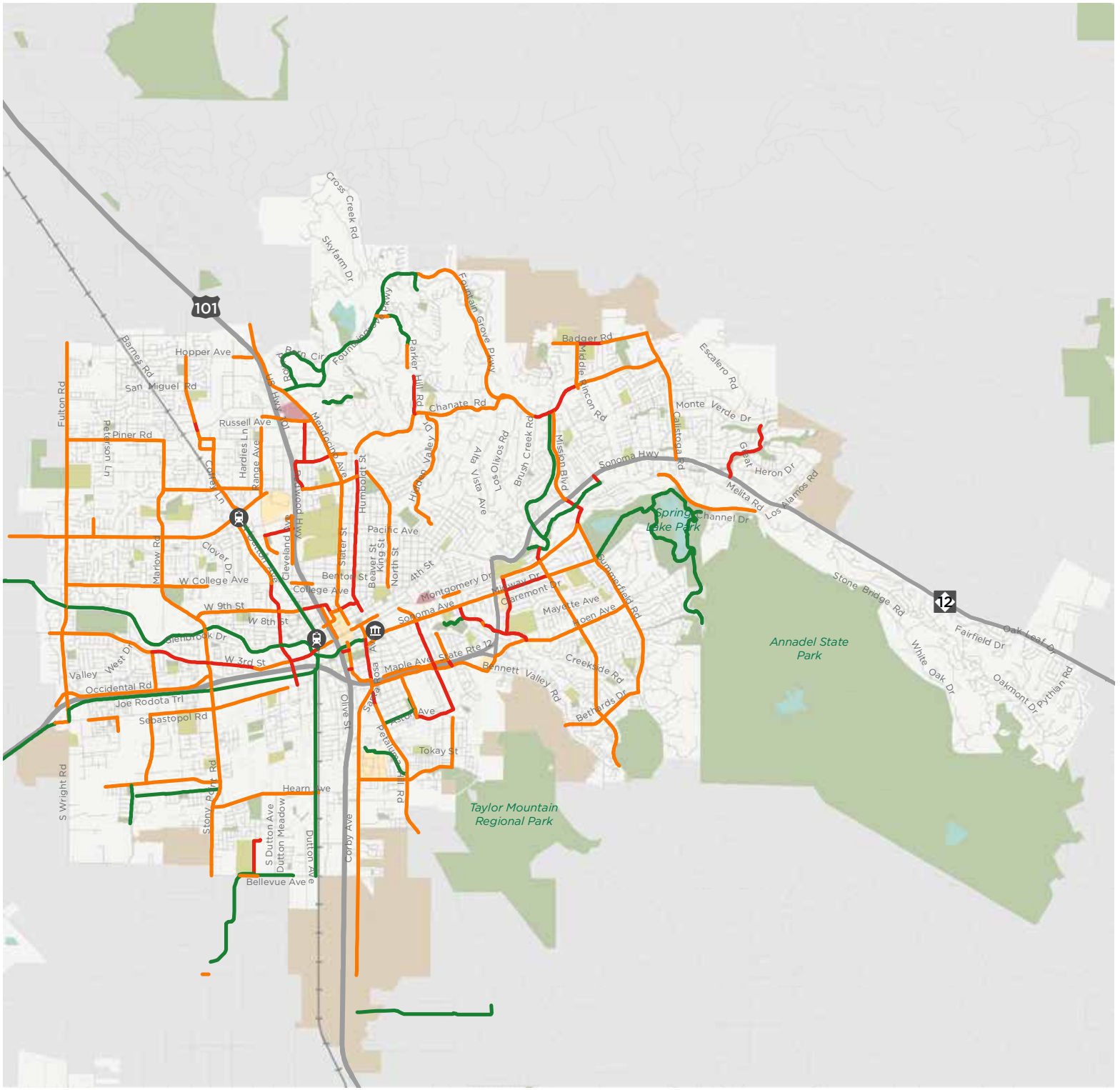
- Class I Shared-Use Path
- Class II Bike Lane
- Class III Bike Route

DESTINATIONS + BOUNDARIES

- City Hall
- SMART Station
- Hospital
- Shopping Center
- School
- Park
- Urban Growth Boundary

0 1 2 MILES

N



Map produced February 2018.

DOWNTOWN AREA

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Figure 2-10

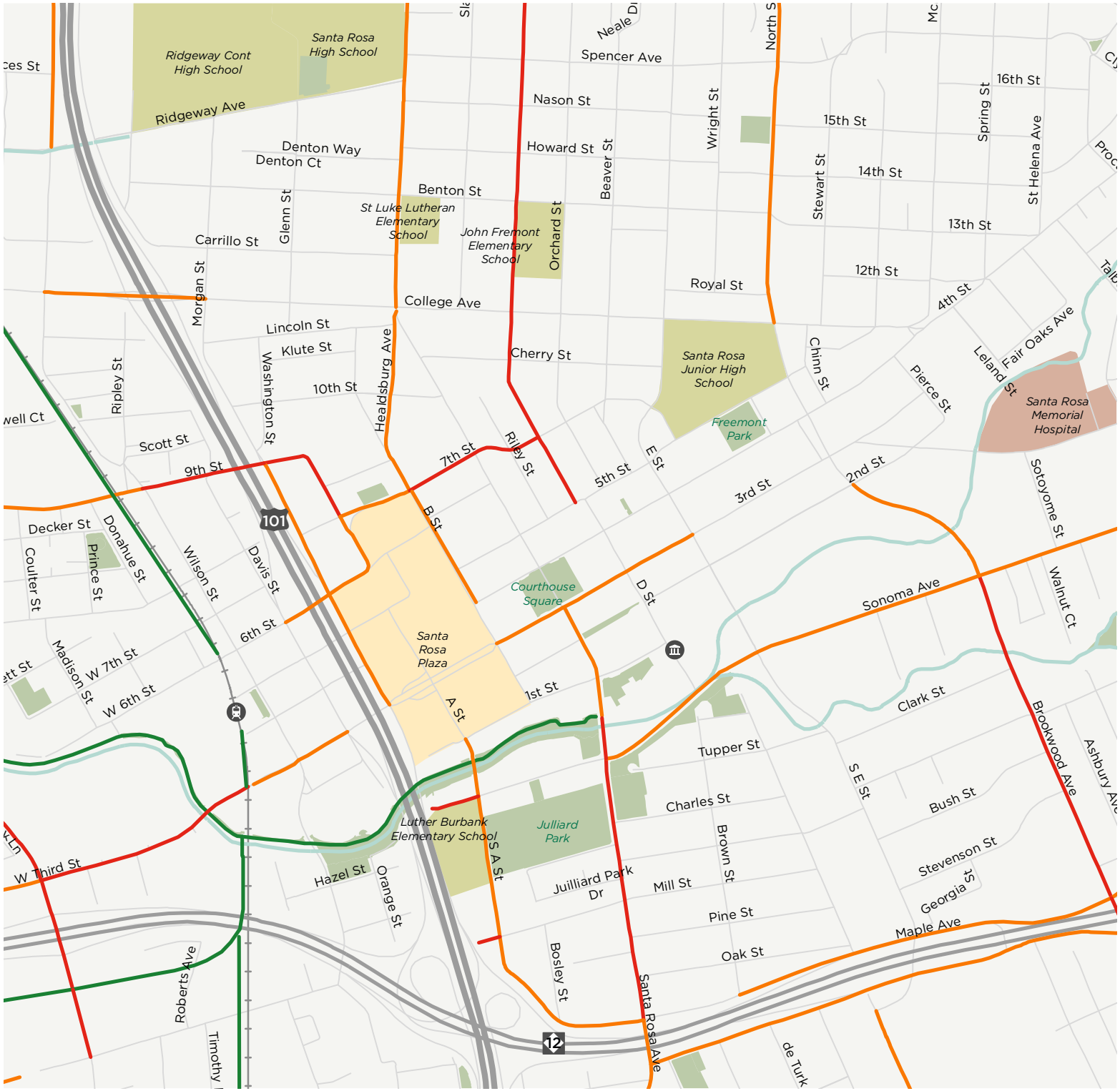
EXISTING BIKEWAYS

- Class I Shared-Use Path
- Class II Bike Lane
- Class III Bike Route

DESTINATIONS + BOUNDARIES

- City Hall
- SMART Station
- Shopping Center
- School
- Hospital
- Park

0 0.1 0.2 MILES



Map produced February 2018.

NORTHWEST QUADRANT

SANTA ROSA BICYCLE & PEDESTRIAN MASTER PLAN UPDATE 2018

Figure 2-11

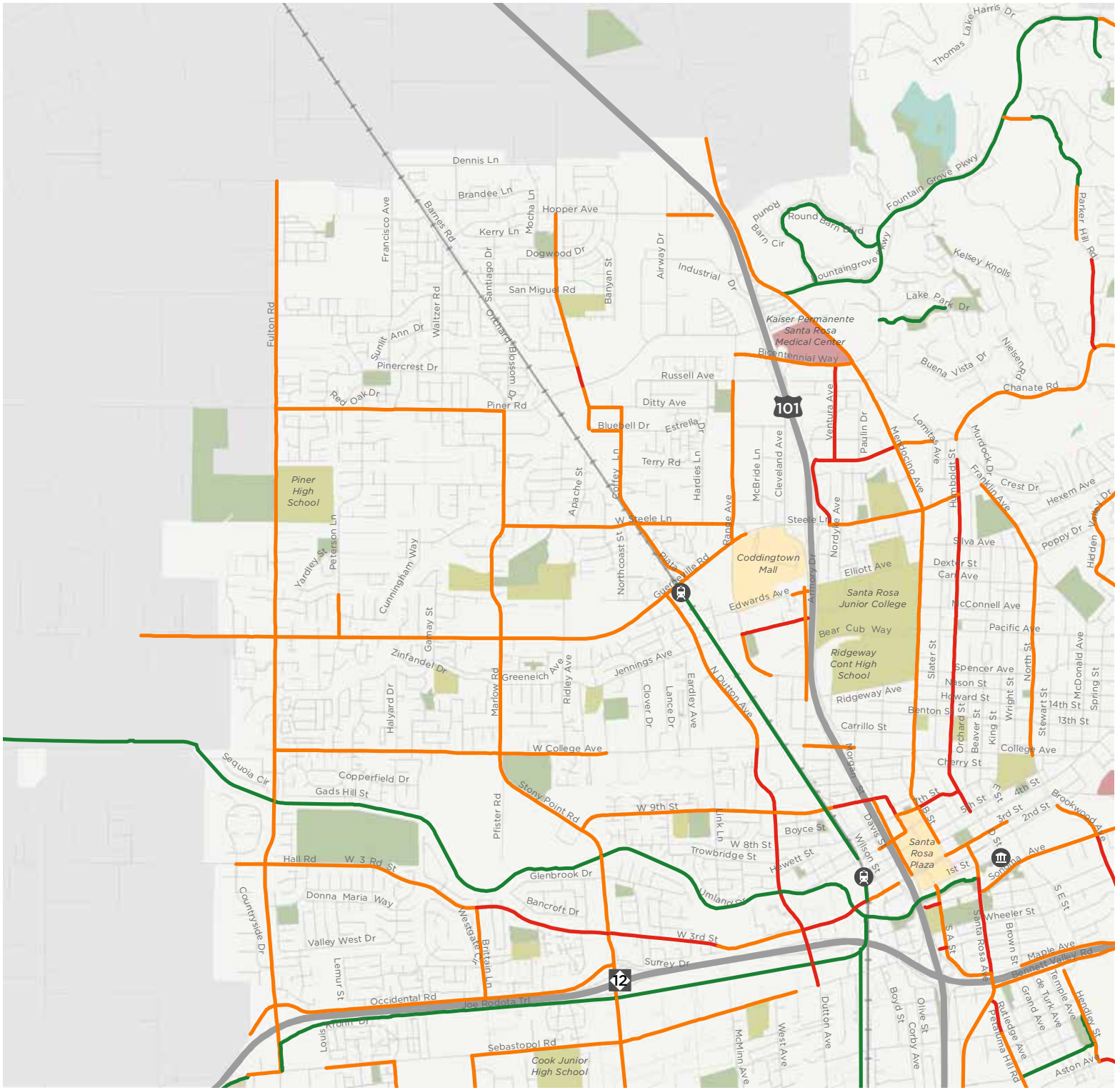
EXISTING BIKEWAYS

- Class I Shared-Use Path
- Class II Bike Lane
- Class III Bike Route

DESTINATIONS + BOUNDARIES

- City Hall
- SMART Station
- Shopping Center
- School
- Hospital
- Park
- Urban Growth Boundary

0 0.5 1 MILES



Map produced February 2018.

NORTHEAST QUADRANT

SANTA ROSA BICYCLE & PEDESTRIAN MASTER PLAN UPDATE 2018

Figure 2-12

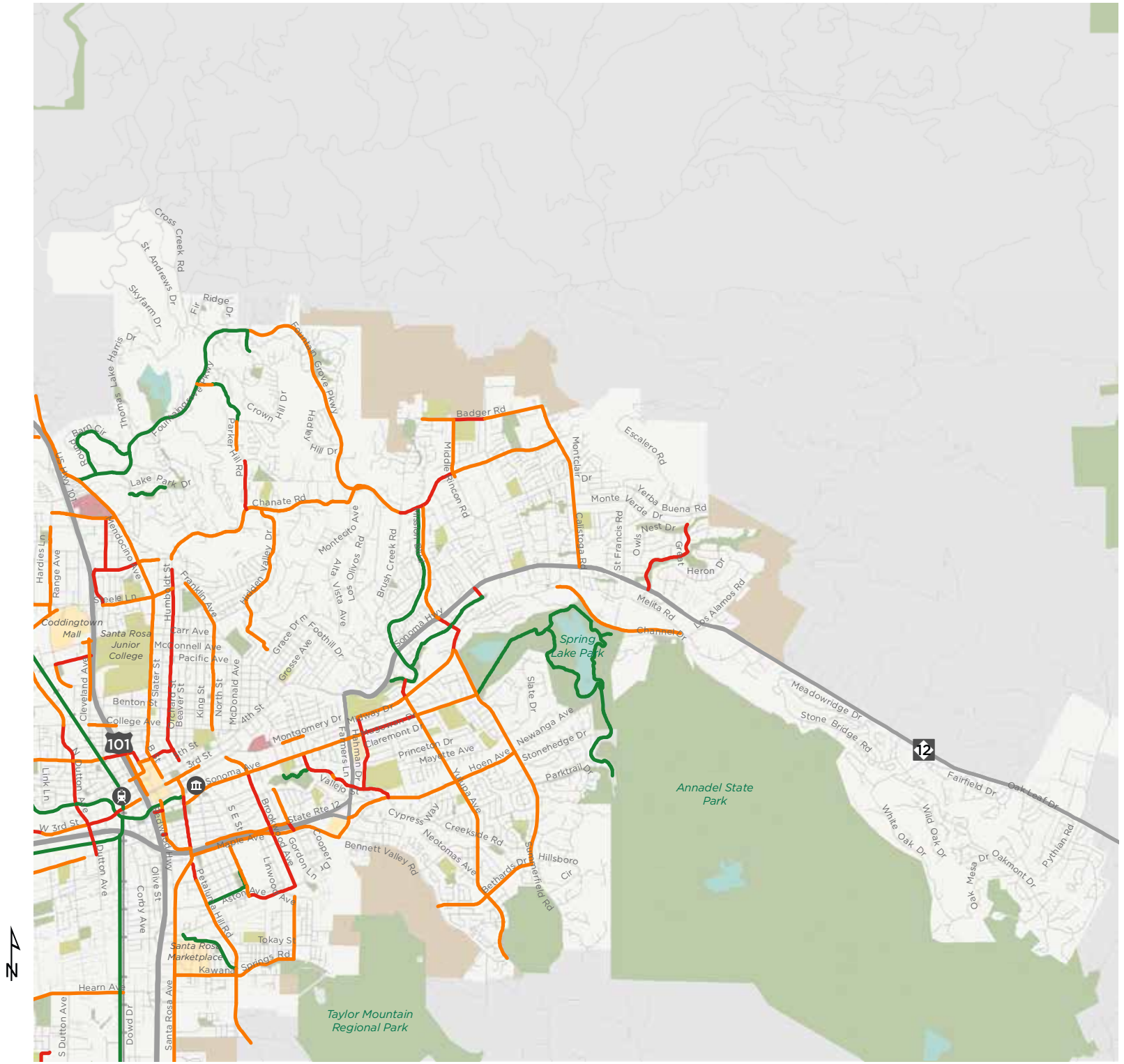
EXISTING BIKEWAYS

- Class I Shared-Use Path
- Class II Bike Lane
- Class III Bike Route

DESTINATIONS + BOUNDARIES

- City Hall
- SMART Station
- Shopping Center
- School
- Hospital
- Park
- Urban Growth Boundary

0 0.5 1 MILES



Map produced February 2018.

SOUTHWEST QUADRANT

SANTA ROSA BICYCLE & PEDESTRIAN MASTER PLAN UPDATE 2018

Figure 2-13

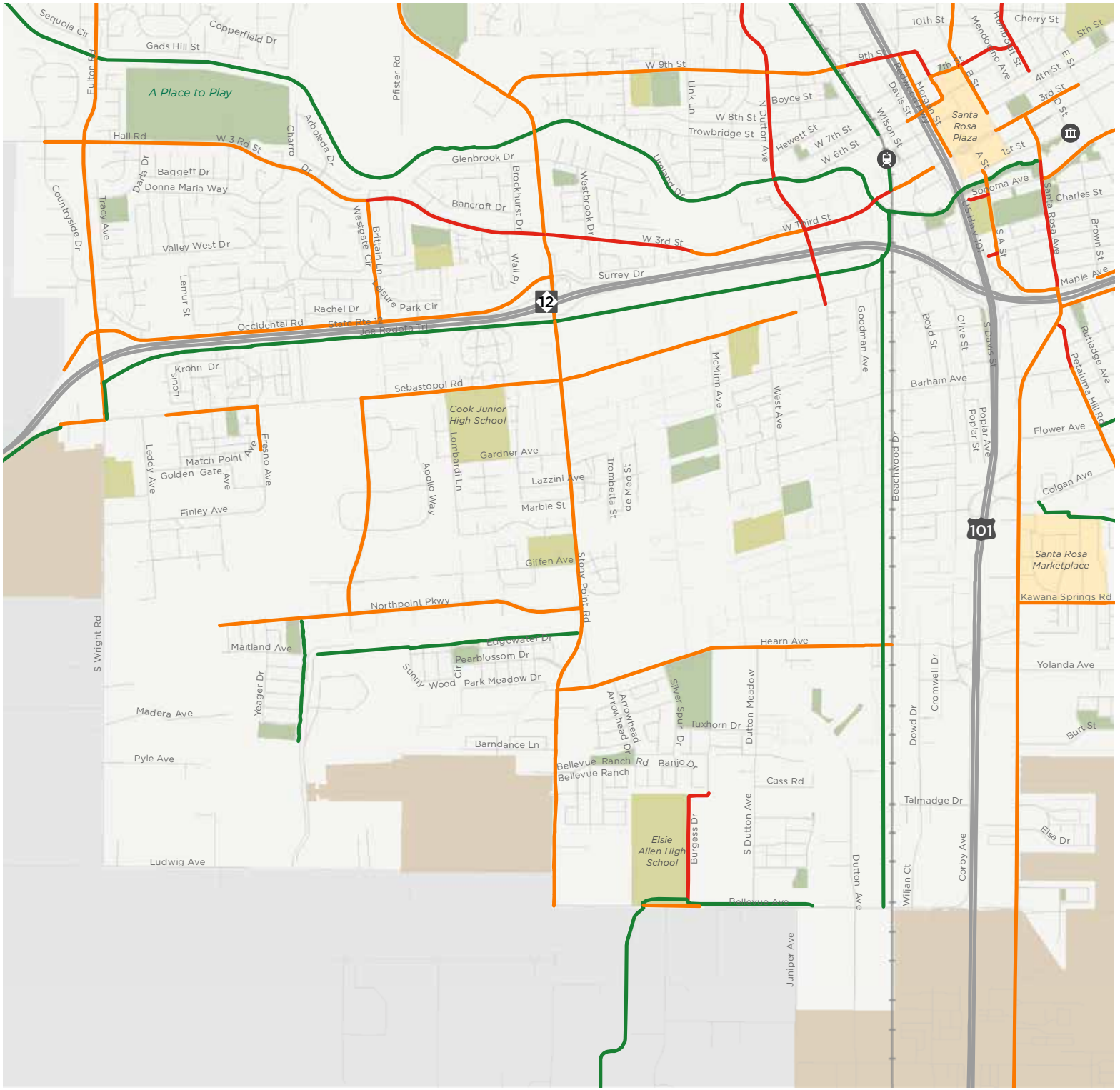
EXISTING BIKEWAYS

- Class I Shared-Use Path
- Class II Bike Lane
- Class III Bike Route

DESTINATIONS + BOUNDARIES

- City Hall
- SMART Station
- Shopping Center
- School
- Hospital
- Park
- Urban Growth Boundary

0 0.25 0.5 MILES



Map produced February 2018.

SOUTHEAST QUADRANT

SANTA ROSA BICYCLE & PEDESTRIAN MASTER PLAN UPDATE 2018

Figure 2-14

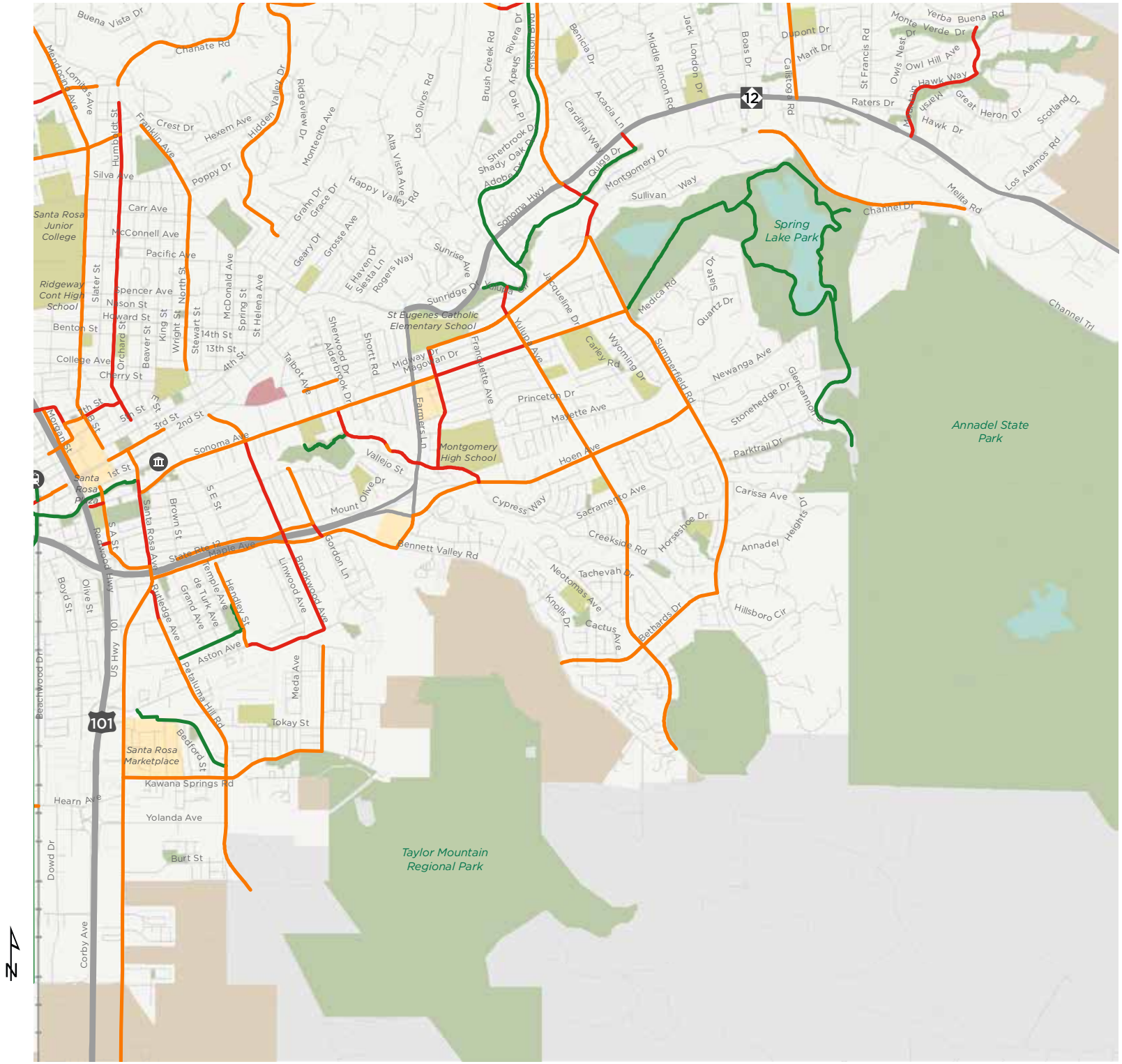
EXISTING BIKEWAYS

- Class I Shared-Use Path
- Class II Bike Lane
- Class III Bike Route

DESTINATIONS + BOUNDARIES

- City Hall
- SMART Station
- Shopping Center
- School
- Hospital
- Park
- Urban Growth Boundary

0 0.5 1 MILES



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Map produced February 2018.

BICYCLE PARKING

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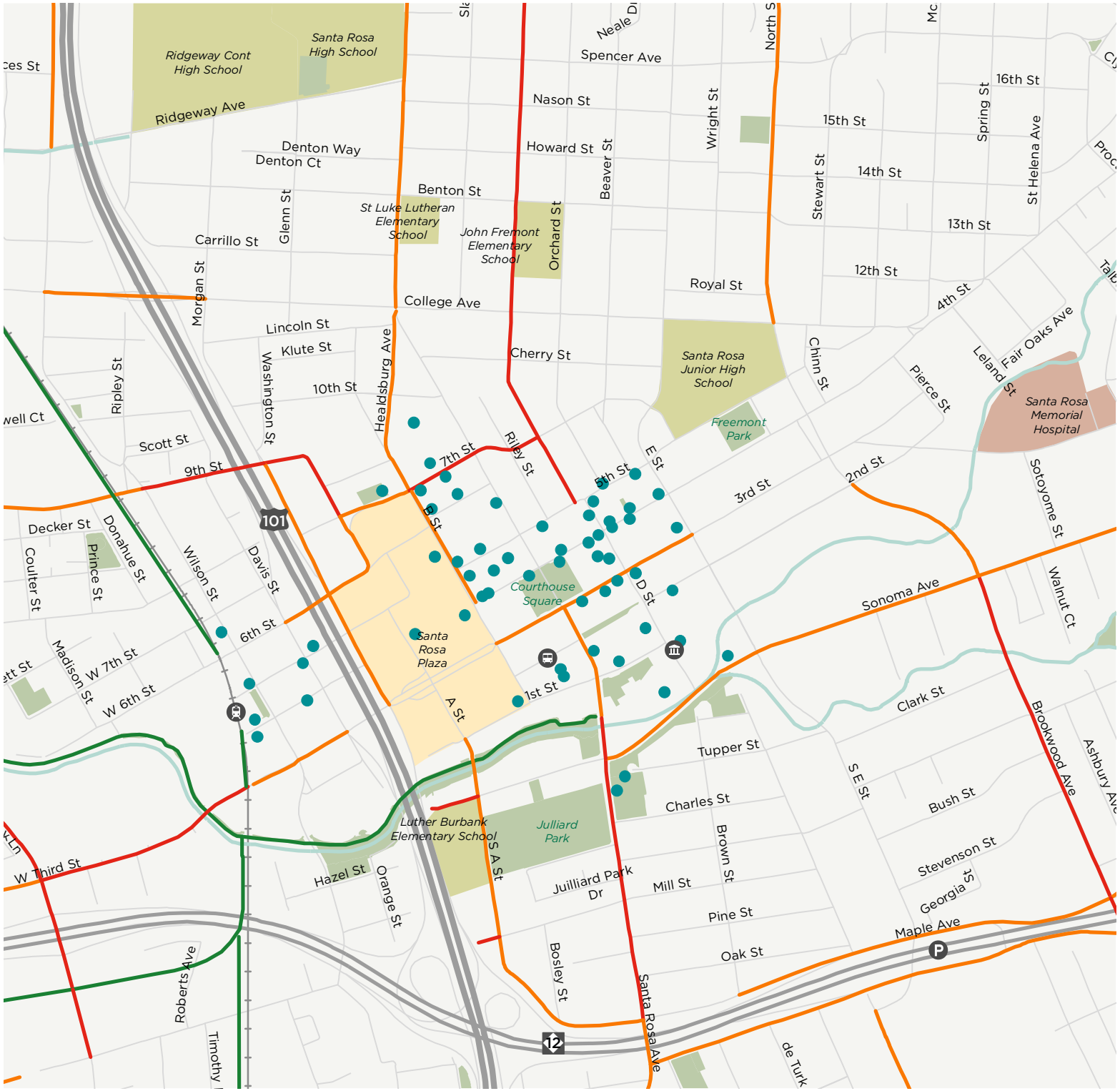
Figure 2-15



- Bicycle Rack

EXISTING BIKEWAYS

- Class I Shared-Use Path
- Class II Bike Lane
- Class III Bike Route

DESTINATIONS + BOUNDARIES

- City Hall
- SMART Station
- Park and Ride
- Transfer Station
- Shopping Center
- School
- Hospital
- Park

0 0.1 0.2 MILES

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City of Santa Rosa

Map produced February 2018.

Existing Pedestrian Network

There are many features that contribute to a safe and comfortable walking environment. Significant investments and commitments to future improvements have been made that continue to enhance the pedestrian experience in Santa Rosa.

Funding Commitments

In the 2017-2018 Capital Improvement Program (CIP), Traffic Safety and Transportation projects focus on street rehabilitation, traffic safety, bicycle and pedestrian safety, and street lighting. Projects related to improving circulation and safety for all road users were funded at almost $3 million, representing approximately 24 percent of the total budget request for transportation projects. These projects include traffic signal improvements, sidewalk installations, pedestrian signal installations, traffic calming, and bikeway improvements.

$600,000 has been committed for LED streetlight replacements, which last longer and require less maintenance than alternatives. This will allow the city to improve and expand lighting, creating a more comfortable walking environment.

The City has also committed $1.2 million from the General Fund in an ongoing effort to implement facility improvements for people with disabilities, in compliance with the Americans with Disabilities Act (ADA). These improvements often include sidewalk gap closures or repairs, curb ramps, and other projects that address accessibility.

Sidewalks

Sidewalks form the backbone of the pedestrian transportation network. Most streets in the City have sidewalks on at least one side. Within the City limits, sidewalk maintenance is the responsibility of the property owner. Some parts of the City are not required to provide sidewalks. These include rural hillside developments, such as portions of the Fountaingrove area, or areas previously built out while under County jurisdiction and subsequently annexed into the City, such as the Castlerock subdivision and Roseland community. Complete data on existing sidewalks was not available.

High Visibility Crosswalks

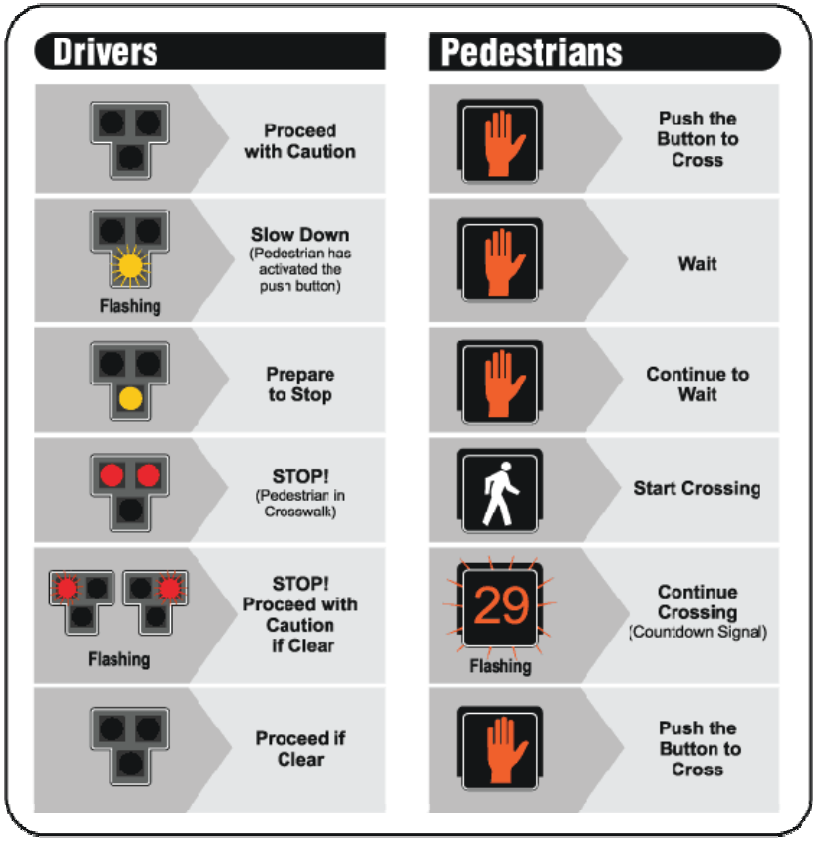
Crosswalks are a legal extension of the sidewalk and provide guidance for pedestrians who are crossing roadways by defining and delineating their path of travel. Crosswalks are not required to be marked, however marked crosswalks alert drivers of a pedestrian crossing point and increase yielding to pedestrians. Markings can be standard parallel lines or the “continental” high visibility pattern shown in the image above, which enhances visibility of the crossing and is becoming best practice. Crosswalks in school zones are yellow.

The City conducted a review of uncontrolled crossings in 2014, which evaluated 185 crossing locations. The study included a robust data collection effort, and made detailed recommendations for each location to improve safety and comfort, including additional pavement markings for visibility, beacons or traffic controls, and visibility improvements such as parking removal or vegetation maintenance. The City was recently awarded a Highway Safety Improvement Program (HSIP) grant to implement the recommended improvements at 114 of the uncontrolled crossings. Unfunded locations will be carried forward in this Bicycle & Pedestrian Master Plan Update.

Pedestrian Hybrid Beacons

Pedestrian hybrid beacons are used to enforce motorist yielding to pedestrians at uncontrolled crosswalk locations. The beacon, when activated by a person wishing to cross, flashes yellow before displaying a solid red signal to motorists, requiring them to stop. Pedestrians are then shown a WALK signal, and may cross the road. When the WALK phase is complete, the beacon flashes yellow before returning to a dark inactive state. Operation of the beacon is illustrated in the graphic below.

Santa Rosa recently installed a hybrid beacon at this uncontrolled crossing on Montgomery Drive at Spring Lake Village.



Graphic from Caltrans District 1, "Pedestrian Hybrid Beacon" http://www.dot.ca.gov/dist1/beacon

Barriers to Active Transportation

Two freeways cross the City, dividing it into four quadrants. Highway 101 runs north-south through Santa Rosa, and State Route (SR) 12 runs east-west. The SMART rail line also runs north-south through the City, west of Highway 101. These transportation features create challenges for people walking and bicycling in some places, as crossings are limited.

Bicycle and Pedestrian Trips

The most consistent bicycling and walking data comes from American Community Survey 5-year estimates, which record the mode of transportation people use to commute to work. Over the most recent five years of available data, shown in Table 2-4, bicycling has remained steady just above one percent while walking has decreased slightly from 3.3 percent to 2.6 percent.

Table 2-4: Bicycling and Walking to Work Mode Share

Year	Bicycle Mode Share	Walking Mode Share
2012	1.2%	3.3%
2013	1.0%	3.0%
2014	1.0%	2.7%
2015	1.2%	2.8%
2016	1.3%	2.6%

Hourly counts of people walking and bicycling were also gathered from multiple agencies in Santa Rosa that collect this data, including the City, Sonoma County Transit Authority, and the Metropolitan Transportation Commission (MTC). From these hourly counts, average daily walking and bicycling trips were extrapolated and compared to identify cross streets that currently have the most people walking and bicycling in the City. Locations with high bicycling activity are listed in Table 2-5 and locations with high walking activity are listed in Table 2-6. Four locations are popular for both bicycling and walking:

- Mendocino Avenue and Pacific Avenue
- Sonoma Avenue and Brookwood Avenue
- Mendocino Avenue and Steele Lane
- Santa Rosa Avenue and 2nd Street

Table 2-5: Top Ten Bicycle Count Locations

Street	Cross Street	Daily Bicycle Trips
Humboldt Street	College Avenue	561
Joe Rodota Trail	Prince Memorial Greenway	711
Joe Rodota Trail	South Wright Road	386
Mendocino Avenue	Pacific Avenue	546
Sonoma Avenue	Brookwood Avenue	546
Stony Point Road	Santa Rosa Creek	807
Stony Point Road	Sebastopol Road	307
Joe Rodota Trail	Dutton Avenue	629
Mendocino Avenue	Steele Lane	350
Santa Rosa Avenue	2nd Street	379

Table 2-6: Top Ten Pedestrian Count Locations

Street	Cross Street	Daily Walking Trips
Mendocino Avenue	Pacific Avenue	2,432
Sonoma Avenue	Brookwood Avenue	825
Yulupa Avenue	Bethards Drive	639
Mendocino Avenue	Steele Lane	679
Santa Rosa Avenue	2nd Street	2,511
B Street	4th Street	1,964
Morgan Street	4th Street	767
Davis Street	4th Street	1071
Davis Street	6th Street	567
Middle Rincon Road	Badger Road	1032

Programs

Programs help support walking and bicycling by sharing information, promoting safety, and creating a vibrant active transportation culture. Communities that have the highest rates of walking and bicycling consistently use a "5Es" approach, with four types of programs complementing Engineering improvements:

- Education – providing safety education for people walking, riding bicycles, and driving, as well as education about the environmental and health benefits of active transportation and the facilities available in the community
- Encouragement – promoting bicycling and walking as fun and efficient modes of transportation and recreation
- Enforcement – enforcing laws and good behavior for people walking, bicycling, and driving
- Evaluation – monitoring the success of the effort through counts, surveys, and review of relevant data

The City and its partners have been carrying out the following programs in recent years to support bicycling and walking.

Safe Routes to School

The City participates in the Sonoma County Safe Routes to School (SRTS) program, lead by the Sonoma County Bicycle Coalition with support from Sonoma County Department of Health Services and MTC. Many schools participate in program activities, including in-school bicycling and walking safety education, student and family bicycle rodeos, Walk and Bike to School Days, and more. The SRTS program also includes evaluation components to measure changes in walking and bicycling rates along with program activity effectiveness.

Bike to Work Day

Bike to Work Day, celebrated in May each year, is a day when people are encouraged to try bicycling to work. Coordinated by the Sonoma County Bicycle Coalition, civic organizations and local business partners host "energizer stations" along popular commute routes to offer snacks and other giveaways to people who participate. In 2017, nearly 1,000 people visited 12 energizer stations in Santa Rosa as part of Bike to Work Day. The City participates by staffing a downtown Energizer station in front of City Hall.

Free Ride Trip Reduction Incentive Program

The City sponsors a "Free Ride – Trip Reduction Incentive Program" for employers in the city to encourage commute alternatives such as bicycling, walking, transit, and carpooling. Incentives include discounted transit passes and a chance to win a $50 gift card. Approximately X people are signed up for the program. To date, more than X one-way bicycle commute trips and more than X one-way walking commute trips have been recorded.

There is also a guaranteed ride home component, where a registered participant may get a free taxi ride home in an emergency. This reduces the need to commute by car because a person is worried they might need to pick up a sick child from school or for some other emergency.

These incentives are part of the City's Transportation Demand Management (TDM) program and administered by the Transit Department through a Transportation Fund for Clean Air grant.

Safety

Collisions

Data on bicycle- and pedestrian-related collisions can provide insight into locations or roadway features that tend to have higher collision rates, as well as behaviors and other factors that contribute to collisions. These insights will inform the recommendations in this Plan to address safety challenges facing people bicycling and walking.

Collision data involving people walking and bicycling was acquired from the Statewide Integrated Traffic Records System (SWITRS), where the California Highway Patrol and local law enforcement agencies upload collision reports. Ten years of data were evaluated, from September 1, 2007 through August 31, 2017.

A total of 9,706 collisions occurred in Santa Rosa during the study period, 6.5 percent of which involved people bicycling and 5.9 percent of which involved people walking.

Bicycle-Related Collisions

During the study period, 628 collisions in Santa Rosa involved a person riding a bicycle. Only four of these were fatal, but nearly 600 resulted in an injury. See Table 2-7 and Figure 2-17.

Table 2-7: Annual Bicycle Collisions

Year	Bicycle Collisions	Injuries	Fatalities
2007*	18	17	
2008	65	55	2
2009	76	71	
2010	70	67	
2011	64	62	1
2012	75	71	1
2013	59	58	
2014	47	44	
2015	63	62	
2016	56	54	
2017*	35	30	
Total	**628**	**591**	**4**

**2007 data reflects September 1 through December 31. 2017 data reflects January 1 through August 31.*

Overall during the study period, fewer than one percent of bicycle collisions were fatal. Over seven percent resulted in severe injury, and approximately five percent did not result in any injury. Figure 2-16 shows collision severity for the study period.

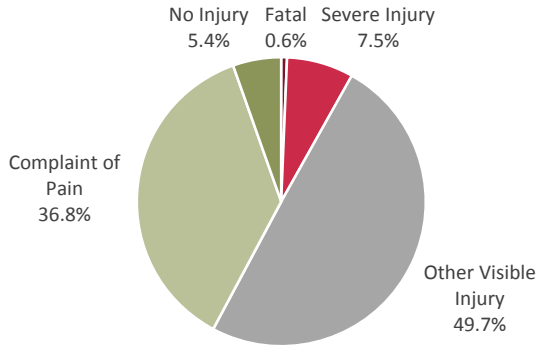


Figure 2-16: Bicycle Collision Severity

BICYCLE SAFETY

SANTA ROSA BICYCLE & PEDESTRIAN MASTER PLAN UPDATE 2018

Figure 2-17

BICYCLE COLLISIONS

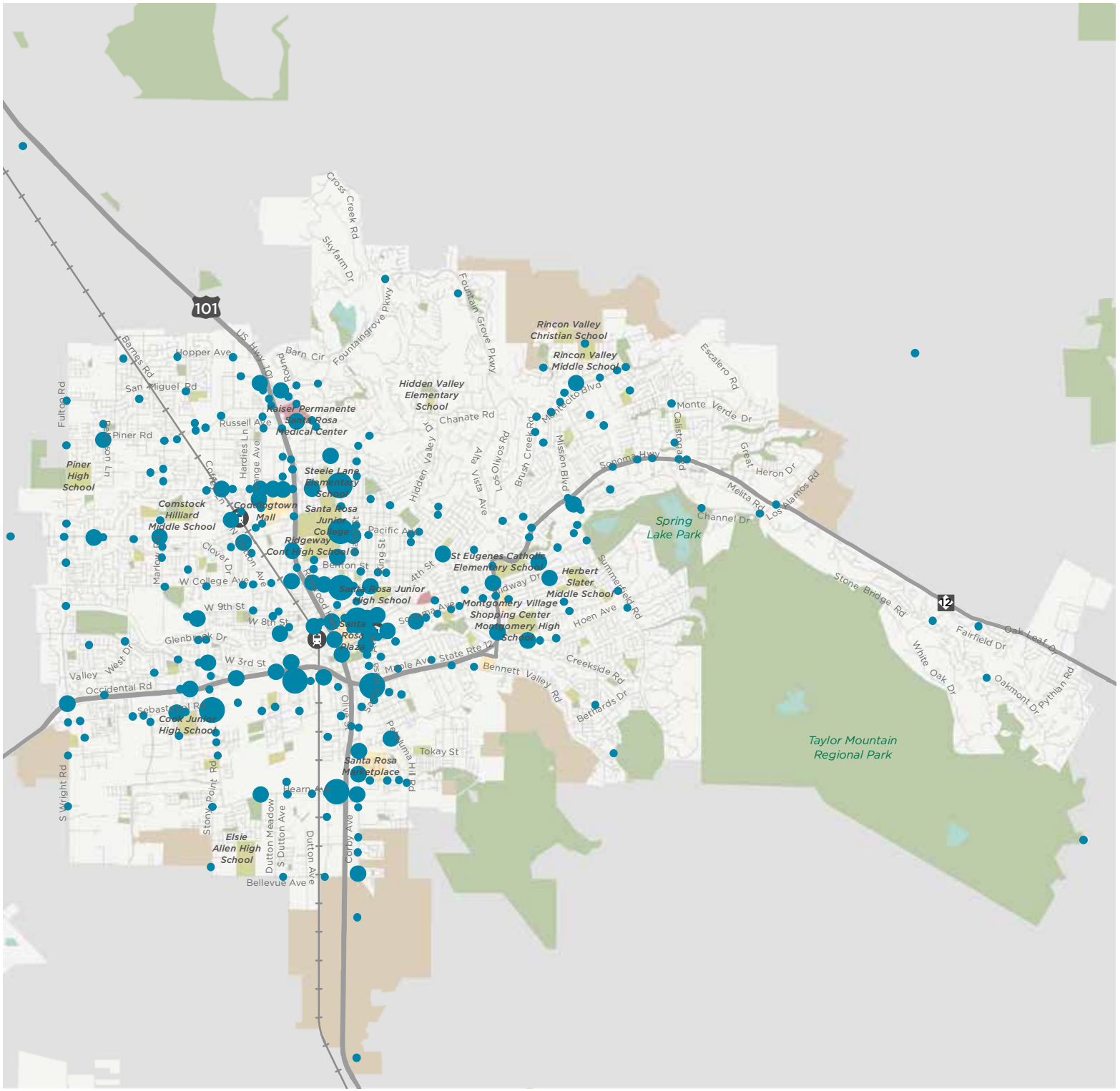
from January 2007 to December 2016

- 1 - 2
- 3 - 8
- 9 - 25
- 26 - 47

DESTINATIONS + BOUNDARIES

- City Hall
- SMART Station
- Shopping
- School
- Hospital
- Park
- Urban Growth Boundary

0 1 2 MILES



Map produced February 2018.
Source: TIMS.

As shown in Figure 2-18, no bicyclists under 10 years old were involved in collisions during the study period. Bicyclists between 10 and 54 years old are overrepresented among collision victims compared to the general population, with 10-19 showing the largest discrepancy.

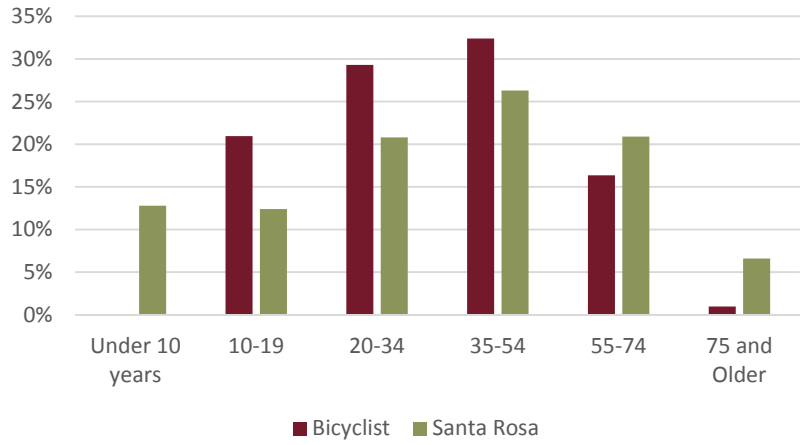


Figure 2-18: Collisions by Bicyclist Age Range

Nearly 80 percent of collisions occurred during daylight hours, and an additional 15 percent occurred at night where street lights were present and functioning.

The majority of the bicycle-involved collisions during the study period were attributed to three violations that lend insight into behaviors that contribute to collisions:

- Violating the right of way of a driver (25 percent)
- Wrong side of the road (24 percent)
- Improper turning (18 percent)

When evaluating the locations where bicycle-involved collisions are more likely to occur, six locations approach an average of one collision every two years, as shown in Table 2-8.

Table 2-8: Top Bicycle Collision Intersections

Location	Bicycle-Involved Collisions
Corby Ave & Hearn Ave	12
College Ave & Mendocino Ave	8
Mendocino Ave & Pacific Ave	6
Sonoma Ave & South E St	6
1st St & Santa Rosa Ave	5
3rd St & Santa Rosa Ave	5

Pedestrian-Involved Collisions

During the study period, 573 collisions in Santa Rosa involved a person walking. Thirty-three of these were fatal collisions, and over 500 resulted in an injury. See Table 2-9 and Figure 2-21.

Table 2-9: Annual Pedestrian Collisions

Year	Pedestrian Collisions	Injuries	Fatalities
2007*	23	22	
2008	45	43	1
2009	54	49	4
2010	49	46	1
2011	66	56	8
2012	74	69	4
2013	51	47	3
2014	48	45	3
2015	49	44	4
2016	69	66	4
2017*	45	41	1
Total	**573**	**528**	**33**

**2007 data reflects September 1 through December 31. 2017 data reflects January 1 through August 31.*

Overall during the study period, just under six percent of pedestrian collisions were fatal. Nearly 15 percent resulted in severe injury, and only about three percent did not result in any injury. Figure 2-19 shows collision severity for the study period.

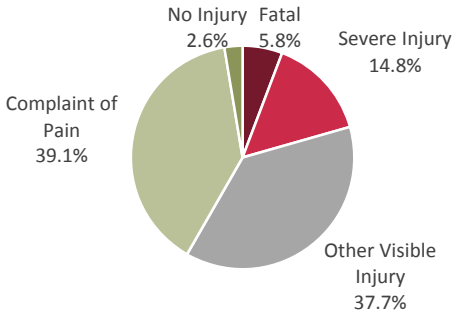


Figure 2-19: Pedestrian Collision Severity

As shown in Figure 2-20, pedestrians between 10 and 54 years old are overrepresented among collision victims compared to the general population.

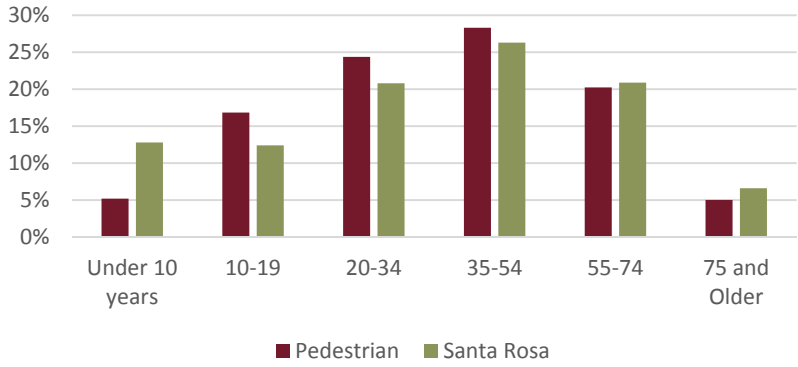


Figure 2-20: Collisions by Pedestrian Age Range

Just under 60 percent of collisions occurred during daylight hours, and an additional 38 percent occurred at night where street lights were present and functioning. This may suggest existing street lighting does not provide sufficient illumination to make people walking visible to drivers.

Over 80 percent of the pedestrian-involved collisions during the study period were attributed to two violations that lend insight into behaviors that contribute to collisions:

- Violating the right-of-way of a pedestrian (44 percent)
- Pedestrian violation (37 percent)

When evaluating the locations where pedestrian-involved collisions are more likely to occur, two locations average more than one collision every two years, as shown in Table 2-10.

Table 2-10: Top Pedestrian Collision Intersections

Location	Pedestrian-Involved Collisions
3rd St & D St	10
McConnell Ave & Mendocino Ave	7

PEDESTRIAN SAFETY

SANTA ROSA BICYCLE & PEDESTRIAN MASTER PLAN UPDATE 2018

Figure 2-21

PEDESTRIAN COLLISIONS

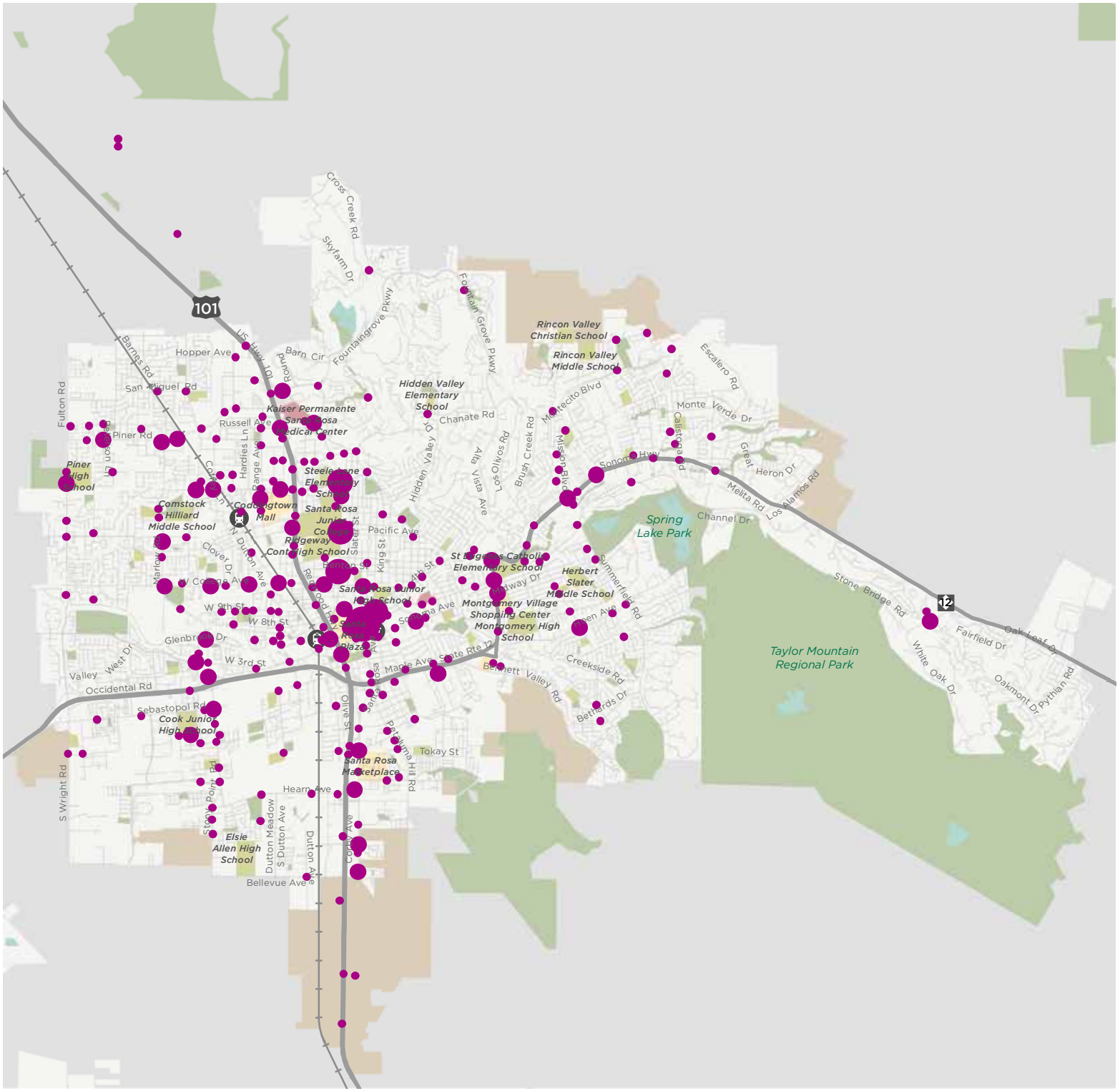
from January 2007 to December 2016

- 1 - 2
- 3 - 7
- 8 - 17
- 18 - 47

DESTINATIONS + BOUNDARIES

- City Hall
- SMART Station
- Shopping
- School
- Hospital
- Park
- Urban Growth Boundary

0 1 2 MILES



Map produced February 2018.
Source: TIMS.

High-Injury Network

To identify street segments in the City where serious collisions are occurring at a greater frequency, a high-injury network was developed based on the number and proximity of collisions that resulted either in death or severe injury to a person bicycling or walking. The City's street network was evaluated for segments where three or more fatal or severe injury collisions occurred that met a threshold for concentration.

For bicycle-involved collisions, this threshold was set at 0.5 fatal or severe-injury collisions per 1,000 feet. For pedestrian-involved collisions, the threshold is one fatal or severe-injury collision per 1,000 feet. These high-injury network segments are listed in Table 2-11 and Table 2-12, and mapped in Figure 2-22.

Table 2-11: High Injury Bicycle Corridors

Street	Start/End	Fatal & Severe Injury Collisions	Collisions per 1K ft
Mendocino Ave	Elliott Ave to 10th St	5	1.0
Santa Rosa Ave	Petaluma Hill Rd to Colgan Ave	3	0.9
Guerneville Rd/ Steele Ln	Dutton Ave to Rowe Dr	5	0.8
Sebastopol Rd	Mattson Rd to Dutton Ave	6	0.6
Stony Point Rd	College Ave to Campbell Dr	5	0.5
Montgomery Dr	Farmers Ln to Mission Blvd	3	0.5

Table 2-12: High Injury Pedestrian Corridors

Street	Start/End	Fatal & Severe Injury Collisions	Collisions per 1K ft
Santa Rosa Ave	Charles St to Mill St	3	4.7
3rd St	Gate Way to Stony Point Rd	3	2.6
Santa Rosa Ave	Court Rd to Bellevue Ave	4	2.2
Piner Rd	Bay Village Cir to Coffey Ln	3	2.1
Mendocino Ave	McConnell Ave to 4th St	9	1.6
Farmers Ln	Long Dr to Sonoma Ave	3	1.4
Guerneville Rd/ Steele Ln	Coffey Ln to Mendocino Ave	8	1.3
Stony Point Rd	Glenbrook Dr to Sebastopol Rd	5	1.3
4th St	Mendocino Ave to College Ave	4	1.2
3rd St	Hwy 101 to E St	3	1.2
Range Ave	Bicentennial Way to Guerneville Rd	5	1.1
College Ave	Link Ln to Mendocino Ave	5	1.0

HIGH INJURY NETWORK

SANTA ROSA BICYCLE & PEDESTRIAN MASTER PLAN UPDATE 2018

Figure 2-22

COLLISION CORRIDORS

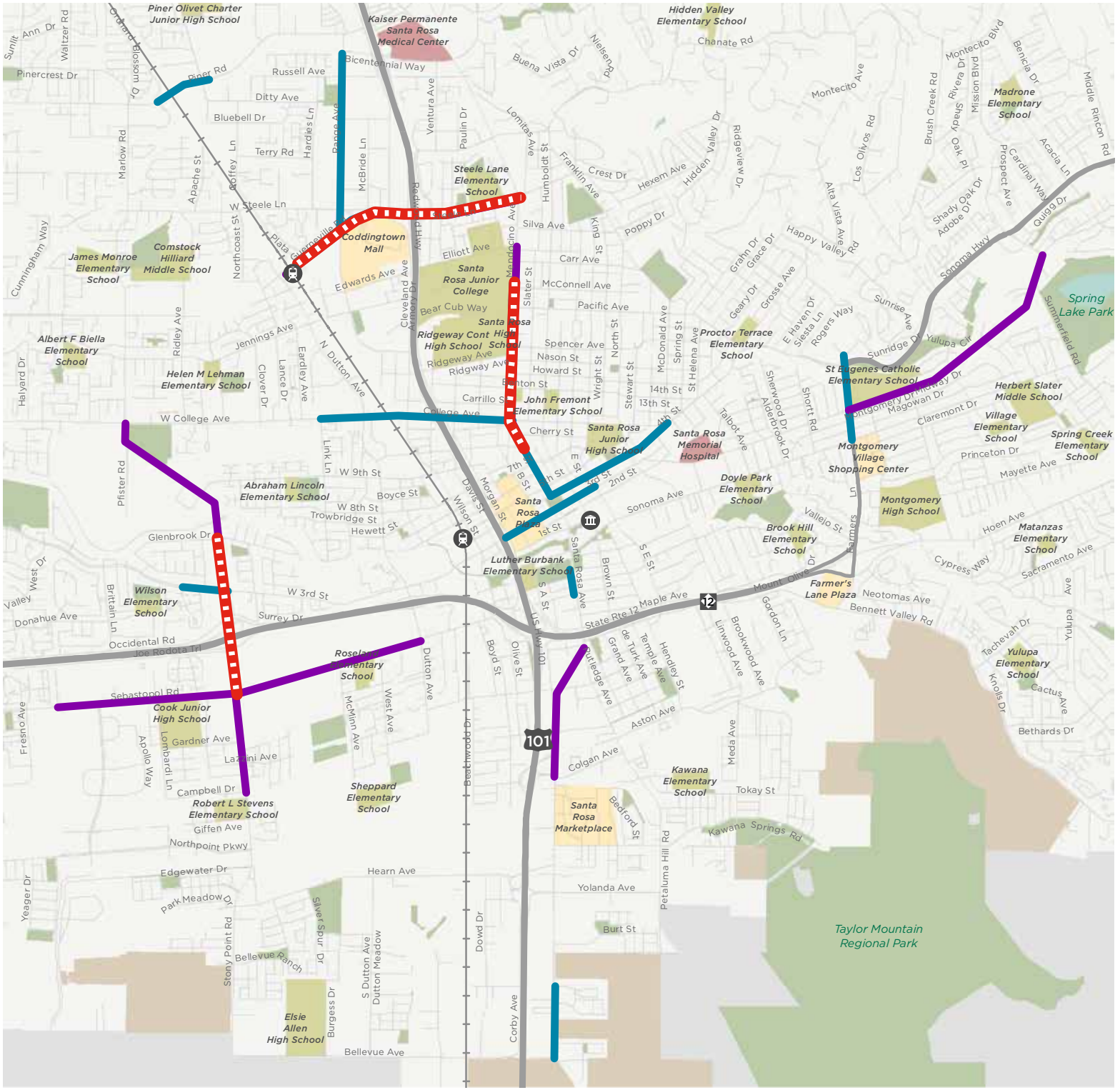
As determined by the rate of roadway collisions resulting in severe injury or death between 2007 and 2017

- Bicycle
- Pedestrian
- Bicycle and Pedestrian

DESTINATIONS + BOUNDARIES

- City Hall
- SMART Station
- Shopping
- School
- Hospital
- Park
- Urban Growth Boundary

0 0.5 1 MILES



Map produced February 2018.
Source: SWITRS.

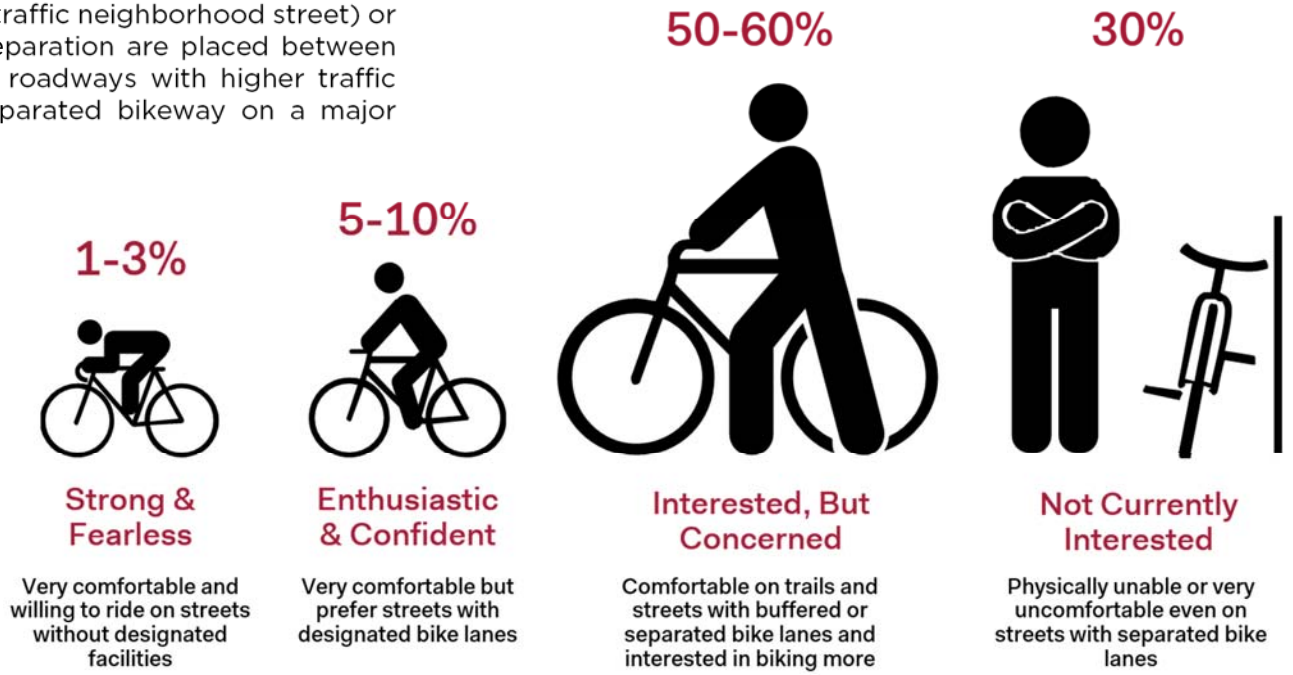
User Experience and Perceived Comfort

Traffic stress is the perceived sense of danger associated with riding in or adjacent to vehicle traffic. Studies have shown that traffic stress is one of the greatest deterrents to bicycling. The less stressful—and therefore more comfortable—a bicycle facility is, the wider its appeal to a broader segment of the population. A bicycle network will attract a large portion of the population if it is designed to reduce stress associated with potential motor vehicle conflicts and if it connects people bicycling with where they want to go.

Bikeways are considered low stress if they involve very little traffic interaction by nature of the roadway's vehicle speeds and volumes (e.g., a shared, low-traffic neighborhood street) or if greater degrees of physical separation are placed between the bikeway and traffic lane on roadways with higher traffic volumes and speeds (e.g., a separated bikeway on a major street).

Types of Bicyclists

Research indicates that the majority of people in the United States (56-73 percent) would bicycle if dedicated bicycle facilities were provided. However, only a small percentage of Americans (1-3 percent) are willing to ride if no facilities are provided.[1] This research into how people perceive bicycling as a transportation choice has indicated that most people fall into one of four categories, illustrated below.



[1] *Roger Geller, City of Portland Bureau of Transportation. Four Types of Cyclists. http://www.portlandonline.com/transportation/ index.cfm?&a=237507. 2009; 2 Dill, J., McNeil, N. Four Types of Cyclists? Testing a Typology to Better Understand Bicycling Behavior and Potential. 2012.*

Bicycle Level of Traffic Stress

To better meet the needs of the "Interested, But Concerned" cyclist, planners developed the Bicycle Level of Traffic Stress (Bicycle LTS) analysis as an objective, data-driven evaluation model to help identify streets with high levels of traffic stress.[2] The analysis uses roadway network data (i.e. posted speed limit, street width, number of travel lanes, intersection conditions, presence and character of bikeway facilities, and land use context) to determine bicyclist comfort level.

The combination of these criteria creates four levels of traffic stress for the existing roadway network. The lower the number, the lower the stress and the higher the level of comfort for people on bicycles. LTS 1 & 2 roads are typically the roadways that appeal to the "Interested, but Concerned" cyclists.

Level 1: All Ages and Abilities

Level 1 includes low-stress roadways suitable for all ages and abilities, as well as paved shared use paths.

Jennings Avenue from Dutton Ave to Marlow Road is an example of a Level 1 street

Level 1 makes up 65 percent of the entire roadway network in Santa Rosa and 22 percent of arterial streets.

Level 2: Average Adult

Level 2 includes roadways that are comfortable enough that the mainstream adult population would ride a bicycle on them.

Humboldt Street from College Ave to Lewis Road is an example of a Level 2 street.

Level 2 makes up 7 percent of the entire roadway network in Santa Rosa and 9 percent of arterial streets.

[2] *The Level of Traffic Stress (LTS) analysis used for Santa Rosa is adapted from the 2012 Mineta Transportation Institute (MTI) Report 11-19: Low-Stress Bicycling and Network Connectivity.*

Level 3: Confident Adult

Level 3 includes roadways that are probably only comfortable for an experienced, confident bicyclist.

Yulupa Avenue from Creekside Road to Montgomery Drive is an example of a Level 3 street. Note that having standard Class II bicycle lanes does not outweigh other factors such as traffic volume and speeds for this road to be considered low-stress.

Level 3 makes up 12 percent of the entire roadway network in Santa Rosa and 18 percent of arterial streets.

Level 4: Fearless Adult

Level 4 includes roadways ridden only by strong or fearless bicyclists.

Santa Rosa Avenue from Maple Ave to W Third Street is an example of a Level 4 street

Level 4 makes up 16 percent of the entire roadway network and 51 percent of arterial streets.

Results

The level of traffic stress scores shown in Figure 2-24 illustrate the low stress connections and gaps throughout Santa Rosa. The Bicycle LTS results map approximates the user experience for the majority of Santa Rosa residents, however people may have differing opinions of traffic stress depending on their own experiences. While a majority of Santa Rosa's entire road network scored a Level 1 and 2 (72 percent total), most of these roads are minor local roads typically surrounded by high stress Level 4 arterials where most average adults would not feel comfortable riding. When only arterial roadways are examined, which serve as the direct connections to most destinations, only 31 percent are Level 1 and 2. Over half of the arterial roadway mileage (51 percent) is Level 4.

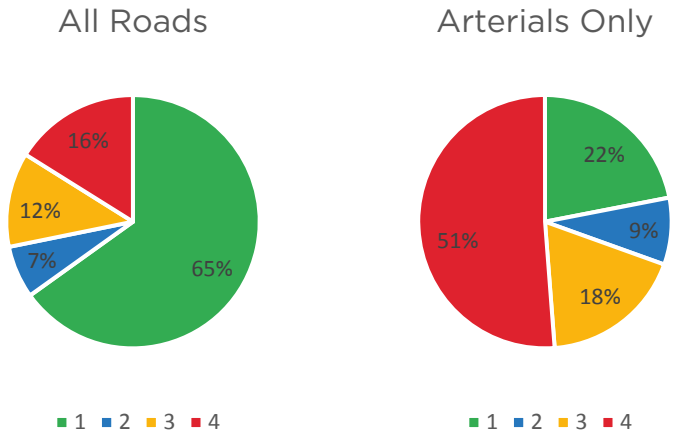


Figure 2-23: Bicyclist Level of Traffic Stress on All Roads vs Arterials

Multi-use trails offer a low stress route that helps cut across these barriers, however the majority of residents may not feel comfortable bicycling outside their immediate neighborhood using local streets. This means that getting from residential areas to major destinations may not be possible given most people's tolerance for mixing with traffic—even on streets that have bicycle lanes.

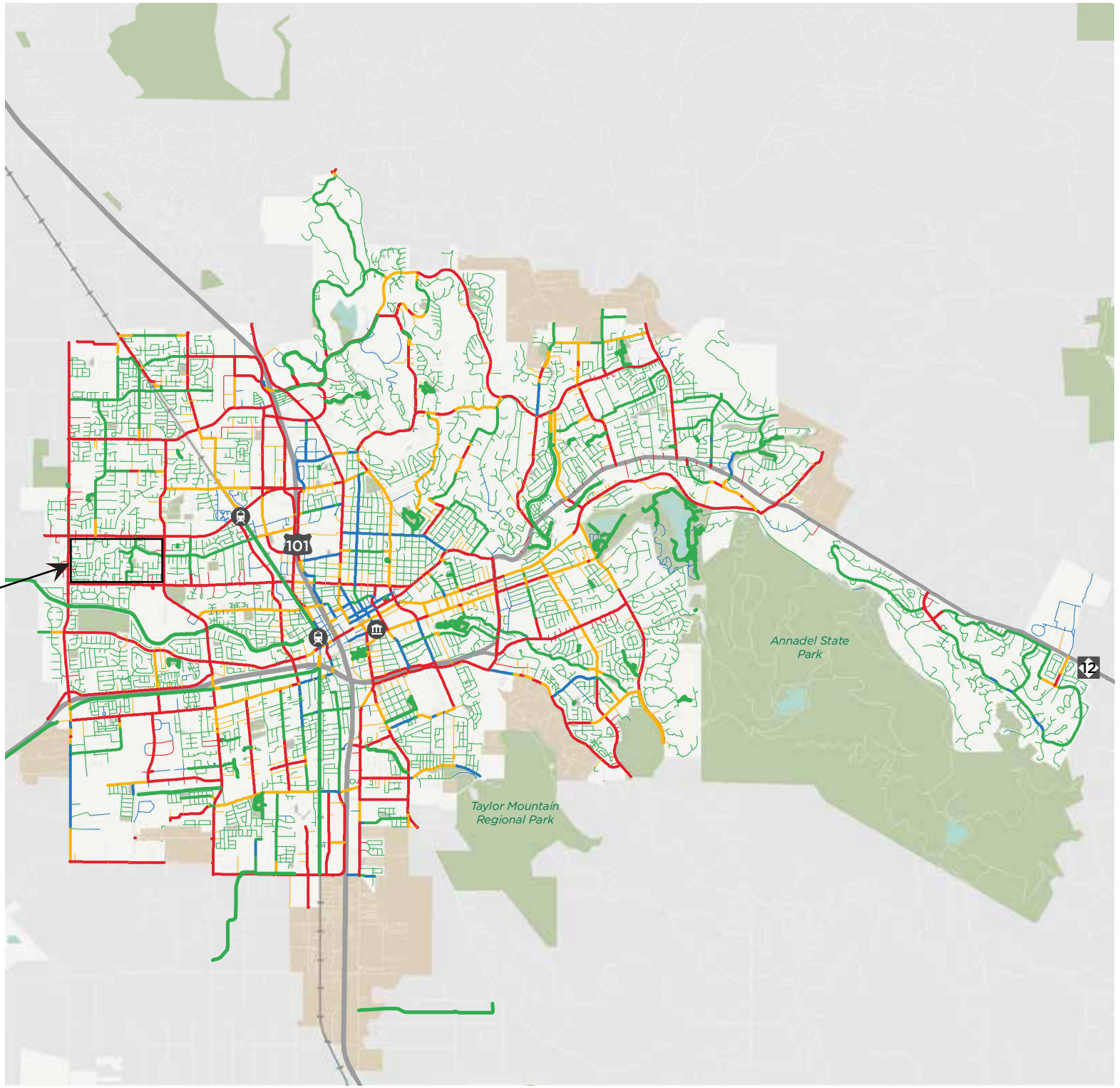
LEVEL OF TRAFFIC STRESS

SANTA ROSA BICYCLE & PEDESTRIAN MASTER PLAN UPDATE 2018

Figure 2-24

ROADWAYS AND PAVED TRAILS

- Level 1 All Ages and Abilities
- Level 2 Average Adult
- Level 3 Confident Adult
- Level 4 Fearless Adult



DESTINATIONS + BOUNDARIES

- City Hall
- SMART Station
- Park
- Urban Growth Boundary

0 1 2 MILES

N

alta PLANNING + DESIGN

City of Santa Rosa

Map produced February 2018.

LEVEL OF TRAFFIC STRESS

SANTA ROSA BICYCLE & PEDESTRIAN MASTER PLAN UPDATE 2018

Figure 2-25

ARTERIAL ROADWAYS AND PAVED TRAILS

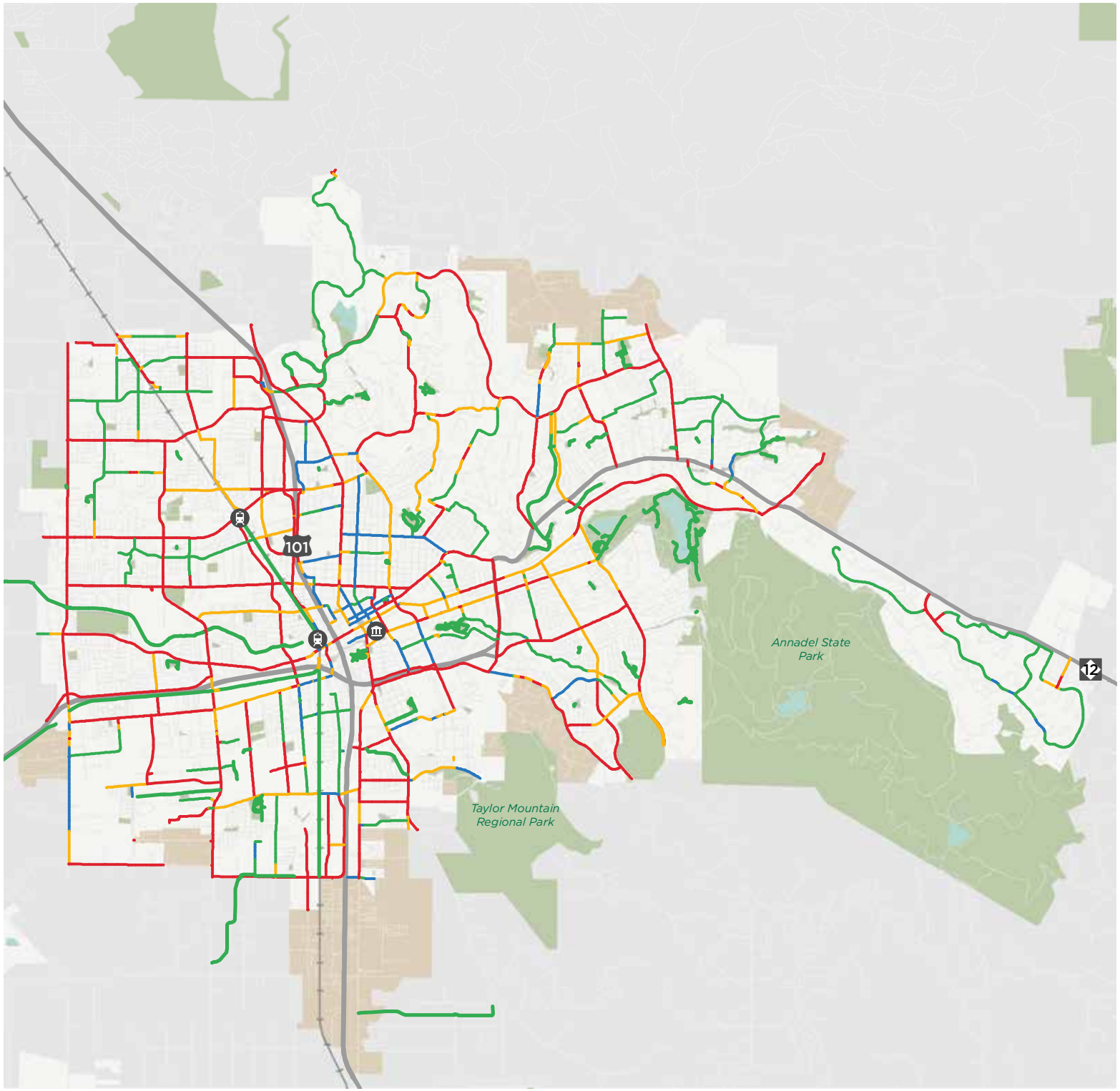
- Level 1 All Ages and Abilities
- Level 2 Average Adult
- Level 3 Confident Adult
- Level 4 Fearless Adult

DESTINATIONS + BOUNDARIES

- City Hall
- SMART Station
- Park
- Urban Growth Boundary

0 1 2 MILES

N



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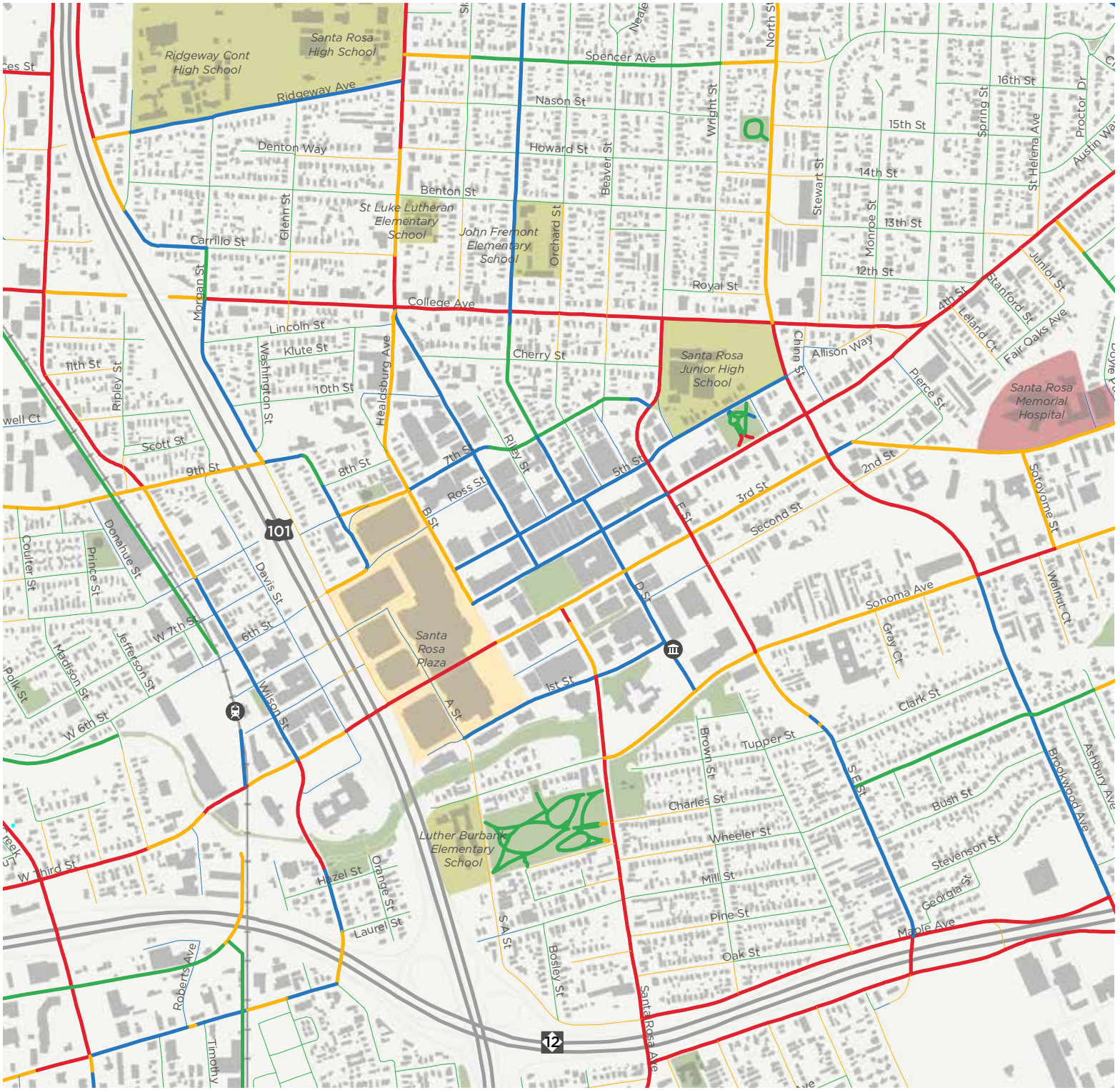
Map produced February 2018.

DOWNTOWN AREA

LEVEL OF TRAFFIC STRESS

SANTA ROSA BICYCLE & PEDESTRIAN MASTER PLAN UPDATE 2018

Figure 2-26



LEGEND

ROADWAYS AND PAVED TRAILS

- Level 1 All Ages and Abilities
- Level 2 Average Adult
- Level 3 Confident Adult
- Level 4 Fearless Adult

DESTINATIONS + BOUNDARIES

- City Hall
- SMART Station
- Shopping Center
- School
- Hospital
- Park
- Urban Growth Boundary

0 0.1 0.2 MILES

N

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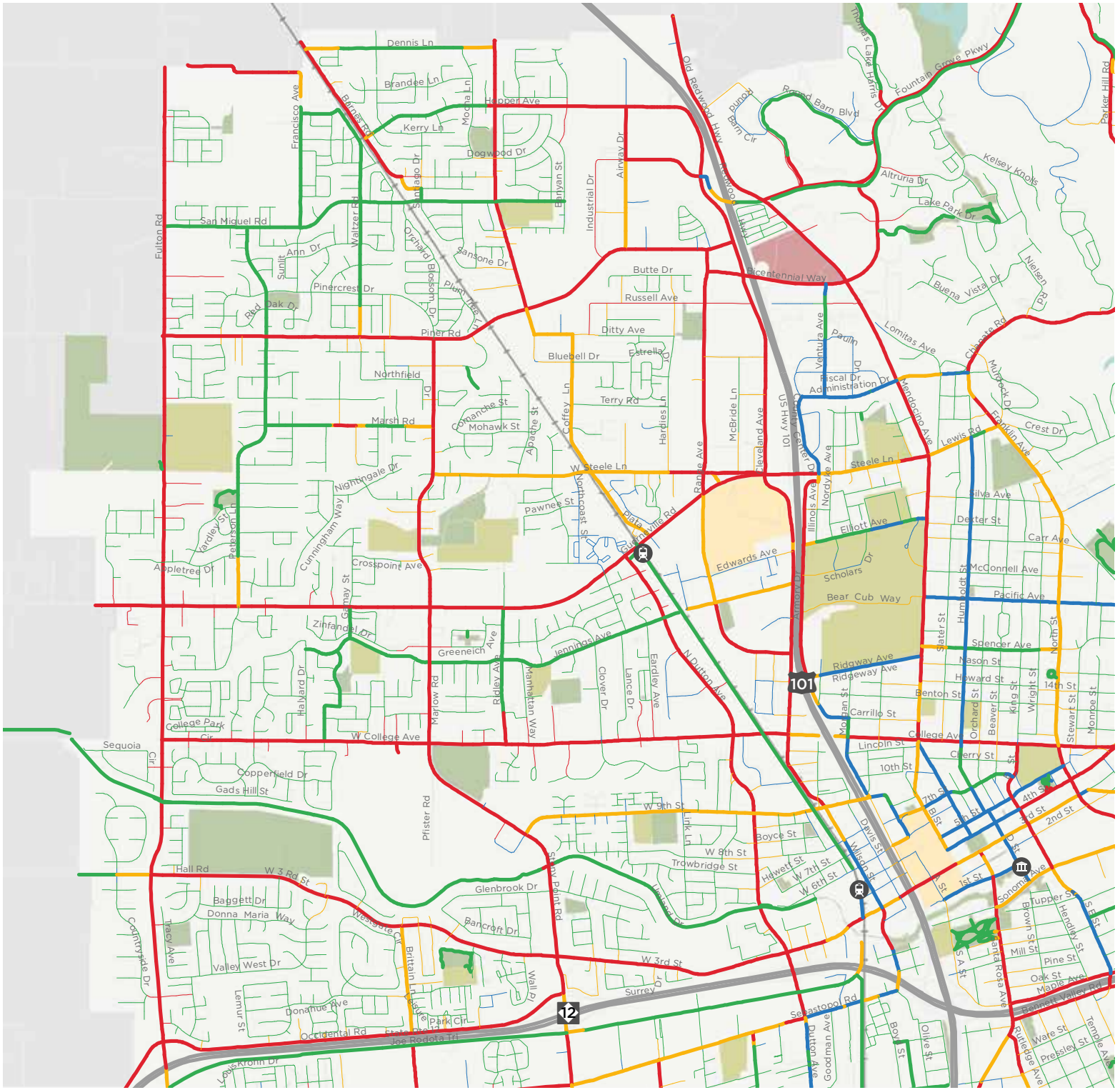
Map produced February 2018.

NORTHWEST QUADRANT

LEVEL OF TRAFFIC STRESS

SANTA ROSA BICYCLE & PEDESTRIAN MASTER PLAN UPDATE 2018

Figure 2-27



ROADWAYS AND PAVED TRAILS

- Level 1 All Ages and Abilities
- Level 2 Average Adult
- Level 3 Confident Adult
- Level 4 Fearless Adult

DESTINATIONS + BOUNDARIES

- City Hall
- SMART Station
- Shopping Center
- School
- Hospital
- Park
- Urban Growth Boundary

0 0.25 0.5 MILES

N

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City of Santa Rosa

Map produced February 2018.

NORTHEAST QUADRANT

LEVEL OF TRAFFIC STRESS

SANTA ROSA BICYCLE & PEDESTRIAN MASTER PLAN UPDATE 2018

Figure 2-28

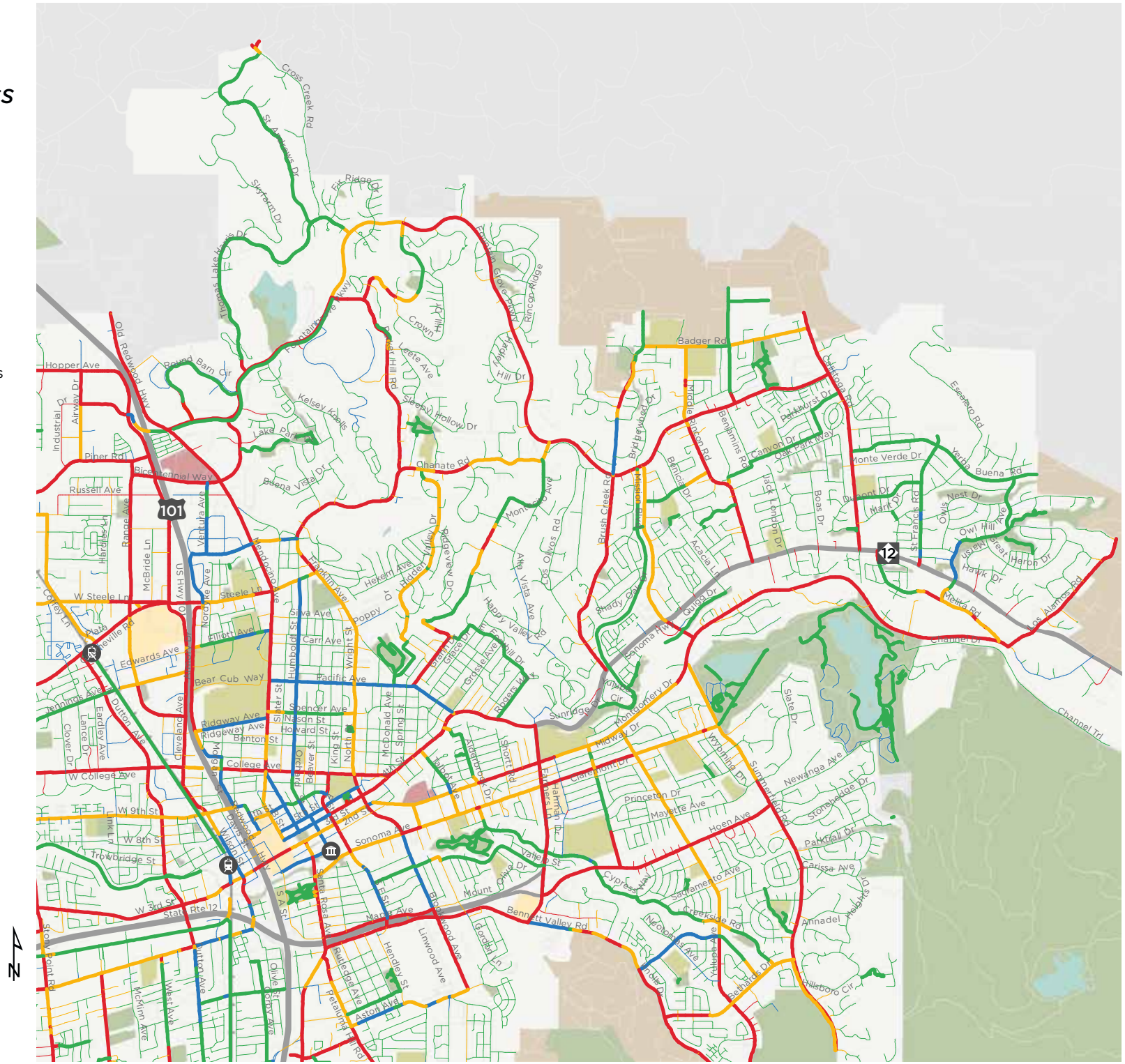
ROADWAYS AND PAVED TRAILS

- Level 1 All Ages and Abilities
- Level 2 Average Adult
- Level 3 Confident Adult
- Level 4 Fearless Adult

DESTINATIONS + BOUNDARIES

- City Hall
- SMART Station
- Shopping Center
- School
- Hospital
- Park
- Urban Growth Boundary

0 0.4 0.8 MILES



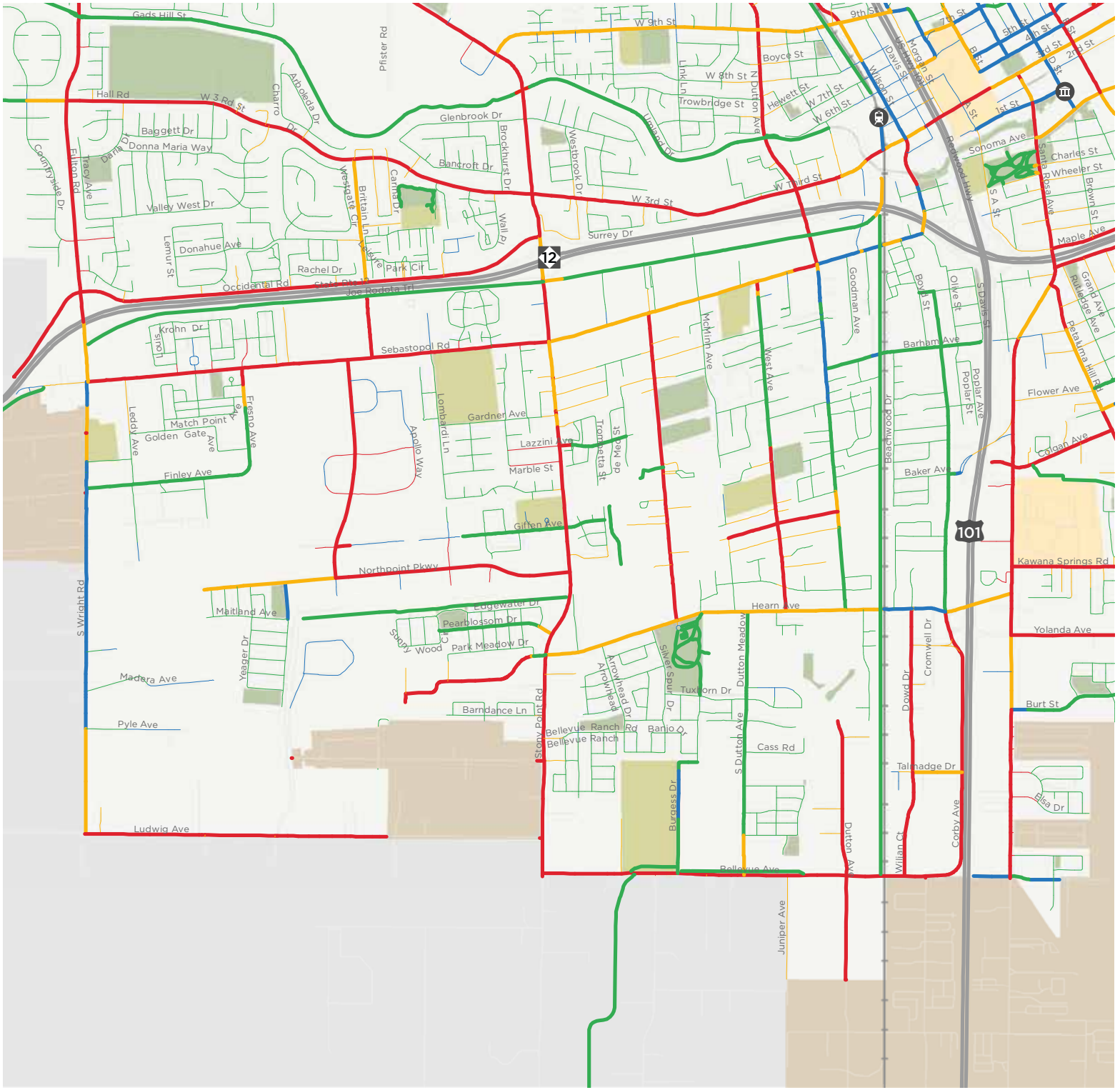
Map produced February 2018.

SOUTHWEST QUADRANT

LEVEL OF TRAFFIC STRESS

SANTA ROSA BICYCLE & PEDESTRIAN MASTER PLAN UPDATE 2018

Figure 2-29



ROADWAYS AND PAVED TRAILS

- Level 1 All Ages and Abilities
- Level 2 Average Adult
- Level 3 Confident Adult
- Level 4 Fearless Adult

DESTINATIONS + BOUNDARIES

- City Hall
- SMART Station
- Shopping Center
- School
- Hospital
- Park
- Urban Growth Boundary

0 0.25 0.5 MILES

N

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City of Santa Rosa

Map produced February 2018.

SOUTHEAST QUADRANT

LEVEL OF TRAFFIC STRESS

SANTA ROSA BICYCLE & PEDESTRIAN MASTER PLAN UPDATE 2018

Figure 2-30

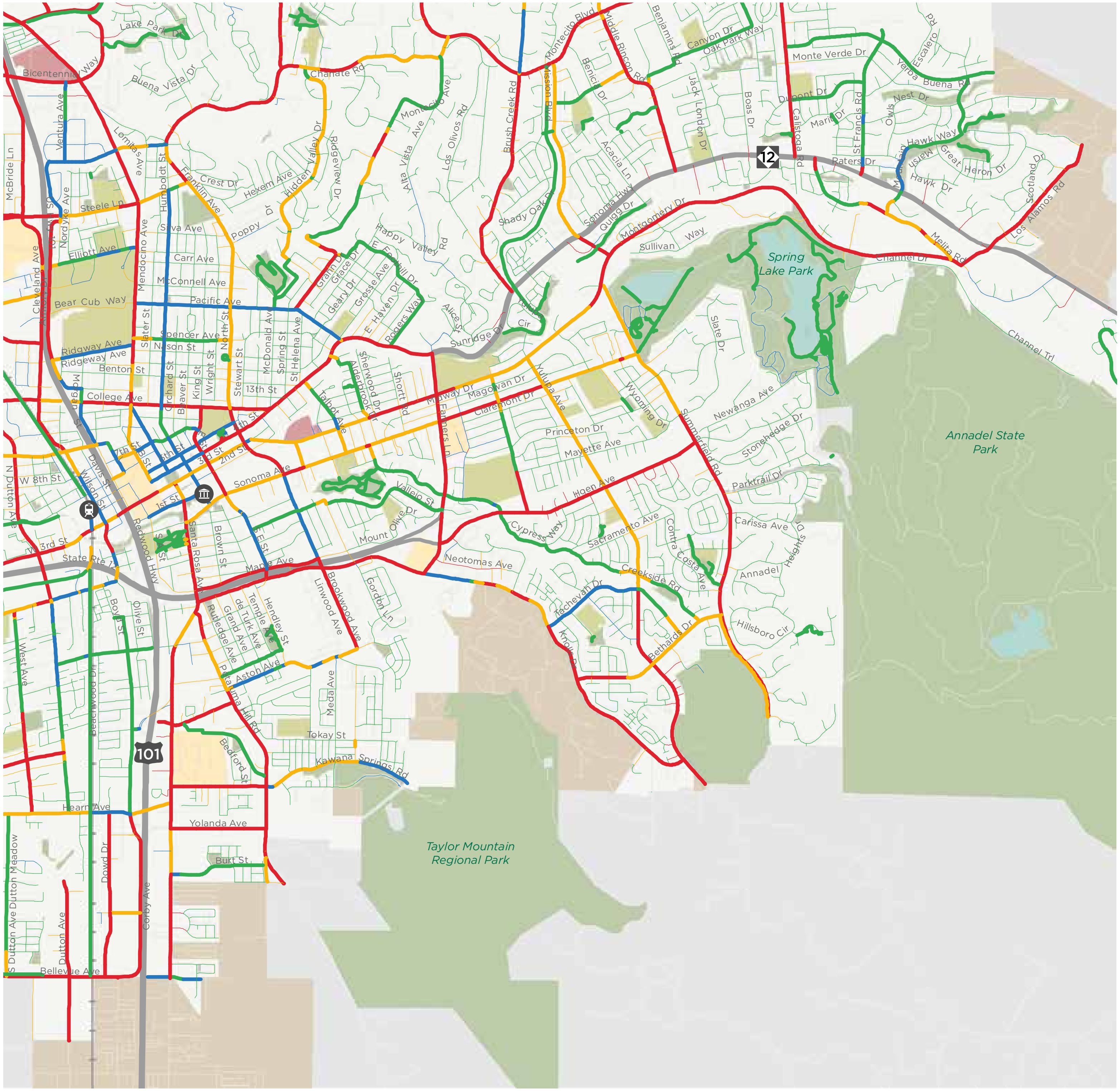
ROADWAYS AND PAVED TRAILS

- Level 1 All Ages and Abilities
- Level 2 Average Adult
- Level 3 Confident Adult
- Level 4 Fearless Adult

DESTINATIONS + BOUNDARIES

- City Hall
- SMART Station
- Shopping Center
- School
- Hospital
- Park
- Urban Growth Boundary

0 0.4 0.8 MILES



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City of Santa Rosa

Map produced February 2018.