

URBP 298

Planning for Dedicated Cycling and Pedestrian Pathways in Santa Clara County



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Executive Summary

Many cities in Santa Clara County have recently begun to put emphasis on increasing cycling ridership through improving existing cycling infrastructure. The City of San Jose is using their Better Bike Plan 2025 as a guide for the improvements which they are striving to make. However, this is different from the plan made by the Santa Clara Valley Transportation Authority (VTA) which focuses on improvements on a countywide level. Despite this, both plans have different priorities which can benefit each other. This paper examines both plans and compares them to existing infrastructure and interviews with representatives from the cities of San Jose, Milpitas, and Palo Alto. There is also a special emphasis on designing around areas that it is more difficult to implement infrastructure, by this I mean areas which would require more extensive work to ensure a complete development such as rivers and freeways.

After examining a map of existing cycling infrastructure in the county, the majority of the higher quality routes are adjacent to schools and universities. Additionally, this is backed up by the interviews where the interviewees discussed how it is easier to get cycling projects approved if it can be proven that they are beneficial to schools and school routes. The interviews also discussed the importance of acquiring funding, which is a process which requires the cities to compete for funding with each other. The process of creating cycling infrastructure in Santa Clara County is a competitive process which involves trying to secure funding from the county rather than that funding being given to another city. The main recommendation for the San Jose Bike Plan involves improving the clarity of information provided to the public regarding funding sources from the county. Both plans should also make sure that the sections talking about school-based infrastructure are given more prevalence due to how impactful that can be for getting a project approved.

1: Introduction

In recent years there has been an increased focus on the role of cycling and other forms of active transportation as a method for residents to commute to work and to use for recreation. Due to a variety of factors including climate change concerns, congestion on major roads, and a general desire for more physical activity; there are more cities and organizations attempting to increase cycling usage by their residents. In California, Santa Clara County has some cities which have been making notable steps towards encouraging their residents to focus more on cycling and active transportation. The most important factor when it comes to cycling is undoubtedly the infrastructure which is in place to support constant cycling. Without proper cycling infrastructure in place, there is less opportunity for residents to engage in cycling. In addition to this there may also be places where due to lack of infrastructure it is unsafe for residents to engage in cycling which once more leads to a reduction in cyclists. Many cities have different guidelines and goals in place to meet the demands for, and encourage an increased focus on, cycling by ensuring there is sufficient infrastructure in place within the city. Measuring cycling infrastructure at the county level would require examining the VTA's Countywide Bicycle Plan. The plan was first adopted in May 2018 and focuses on future bicycle developments until 2028.

Aside from this, there are other important considerations to take into account which are not explicitly covered by the guidelines and goals for cycling routes in the county. The most notable example is constructing cycling infrastructure in places where the installation process is more difficult. Difficult to install infrastructure refers to areas where it would be much more difficult to construct or maintain cycling routes as opposed to routes which are located in more easily accessible areas for maintenance and construction workers. A few examples of this

include freeways, rivers, or other water features. These are not the only locations where construction may be more difficult, however they are the sections which will be focused on for the purposes of this paper. This is an important consideration considering the physical layout of Santa Clara County as it has many rivers and water features alongside major freeway systems.

1.1: Current State of Santa Clara County

Santa Clara County is approximately 1,304 square miles and according to the county website it is home to over 1.9 million people. According to the United States Census Bureau, the top three race demographics in the county are 49.7% White alone; 41.4% Asian alone; and 28.3% White alone, not Hispanic or Latino. There are 15 cities within the county including Milpitas, Gilroy, Palo Alto, and San Jose (the largest of these cities which has just over a million residents). Additionally, in 2022 the Median Household Income (MHI) according to the Census was \$140,258 and a poverty rate of 6.9%. The eastern and western sides of the county are bordered by numerous hills and mountains which makes the entire county fit into a “bowl” shape. What is also important to know is that the majority of the area in the county is actually taken up by unincorporated areas. According to Local Agency Formation Commission of Santa Clara County (also known as Santa Clara LAFCO), of the 1,304 square miles in the county there are only 364 square miles which are within city boundaries. This is all the more important considering how, according again to Santa Clara LAFCO, 95% of the population resides within the incorporated areas.

Santa Clara County does have its own list of qualifications for cycling routes which can be found on the Santa Clara County Parks website. The website says that “All Park paved and dirt bikeways are Class I bikeway. Class 1 bikeways are for exclusive use of bicyclists and

pedestrians with limited vehicular interaction. Speed limit for paved and dirt trails is 15 mph.” This is useful for routes in county parks and on longer trails through the area however it also leaves aside considerations for bike lanes in cities. One notable location in San Jose is the “Velodrome” which the site lists and describes as a bike racing facility however since this does not impact standard commuting it will be ignored for the purposes of this paper.

What is important however, is a VTA Bikeways map which was published in June 2020 and details the various bike pathways in the Santa Clara Valley. This map is going to be one of the most useful resources for the paper, however it is not the only useful resource here. There are some important features such as the exact mileage of all combined routes and the nearby state park which are not included in the existing map. Aside from that, the map can still be used in multiple important ways. To start, we can find the specific definitions of the different types of bike routes on the map. These types include: “Bike path off street”, “Unpaved path”, “Separated bikeway”, “Bike lanes on street”, “Bike Boulevard”, and “Bike route or sharrow”. The map also helps to mark all of the freeways and rivers in the area which helps to illustrate where the previously mentioned “problem areas” are in regard to development of future bike routes and maintenance of existing routes.

1.2: The Importance of Cycling

With all of this it is important to answer the important question of “Why does this matter?” The answer to this is that there are multiple benefits which come from cycling in terms of a physical, mental, and social context. Immediately the main benefit which people think about when thinking about cycling is physical health benefits. According to the Harvard School of Public Health, “cycling reduces the risk of cardiovascular disease, diabetes, and early deaths, and

may prevent weight gain or obesity” (Harvard School of Public Health). Considering that according to the CDC approximately 41.9% of people in the United States suffer from obesity that only increases the benefits which can be provided from cycling. The Harvard School of Public Health also discusses these benefits are improved when cycling for a commute due to how it “provides the benefits of incorporating exercise into everyday life, reducing costs associated with driving a car or taking public transportation” (Harvard School of Public Health).

The Harvard School of Public Health also discusses how physical health benefits from cycling are due to engaging in aerobic exercise which is the most beneficial type for the heart, lungs, and blood vessels. Another notable benefit cycling has on public health is one which is not talked about as often, less interaction with greenhouse gas emissions while cycling as opposed to when driving a car. Samantha Green, a physician at St Michael’s Hospital in Toronto, conducted an analysis of previous studies which found that “a systematic review of 39 studies investigating the relationship between transportation mode and air pollution exposure concluded that motorists consistently experience the highest exposure to air pollution.” (Green 2021). This stands in contrast to the idea that by cycling you would be exposed to more greenhouse gases which could possibly counteract the perceived health benefits of cycling. As a result of this, it only furthers the beneficial effects of cycling while also showing how greenhouse gas emissions and exposure from cars are a major point of concern rather than exposure from cycling.

Another notable benefit from cycling is how it improves the quality of the climate and atmosphere. Engaging in cycling for a regular commute reduces the amount of Carbon Dioxide (CO₂) emissions into the atmosphere by reducing the number of cars on the road. A study conducted by the United States Department of Transportation in 1993 estimated that with an increased focus on cycling and walking the amount of CO₂ emissions per year could be reduced

by “7.3-49.8 million tons, or 0.7%-4.8% of projected passenger vehicle emissions” (US Department of Transportation). This was an important prediction which was unfortunately not met since according to NASA “The concentration of carbon dioxide in Earth’s atmosphere is currently at nearly 412 parts per million (ppm) and rising. This represents a 47 percent increase since the beginning of the Industrial Age, when the concentration was near 280 ppm, and an 11 percent increase since 2000, when it was near 370 ppm.” (NASA)

A final important benefit of cycling is one which is not mentioned as often, the mental health benefits from engaging in cycling. To start with, when it comes to the more extreme mental health issues, such as panic or anxiety attacks, it has been found that cycling is more effective in reducing their likelihood of occurrence. A report conducted by Ma, Ye, and Wang found that “regular bicycling (bike frequency \geq 3 days/week) was significantly associated with lower levels of psychological distress” (Ma 2021). This makes it clear that engaging in cycling for a regular commute, such as to or from work, can have noticeable positive impacts on mental health. What is important to know however is that this is only the case for people engaging in regular cycling habits, the same study found that biking for 2 or less days per week had no impact on the participants in the study.

Additionally, when it comes to other mental health issues such as stress, cycling is also effective at reducing the likelihood and severity of these issues especially compared to driving. Ione Avila-Palencia conducted a study in Barcelona on almost 800 residents to determine their stress levels when compared against each other. They found that “Bicycle commuters who bicycled 4 or more days per week had lower risk of being stressed compared with those who bicycled less or did not bicycle commute at all. This relationship remained statistically significant in all sensitivity analyses and after controlling for individual and environmental

confounders.” (Avila-Palencia et al. 2017) This study does not discuss commuters who used the bicycle less than 4 days per week, however considering how this was conducted in a major city with the main goal of analyzing a regular commute it makes sense. This would consist of cycling four or more times per week due to how currently that is the standard number of days an average person goes to their work, especially after the increase in people working at home from 2020.

All these benefits which are gained from cycling are examples for how important it is to further encourage and develop cycling infrastructure around the county. With notable benefits to a person’s physical and mental health along with reducing greenhouse gas emissions into the atmosphere it is clear that cycling has multiple benefits provided residents and commuters have the right environment to engage with these benefits. However, it is also important to note how it is more difficult to design cycling infrastructure in certain areas as opposed to simply designing routes on a standard road.

2: Literature Review

1. What are some current strategies being employed in other countries for effective cycling routes/infrastructure?

Chengxi Liu conducted an analysis of Stockholm’s cycling infrastructure and found some important data about the costs and benefits associated with developing new cycling infrastructure in the city. When he examined a project which created a new bike lane in an area where there had been no cycling infrastructure previously, Liu learned that “Cycling travel time increases by 1880 min, equivalent to 1.14 min increase per cycling trip” (Liu et al. 2021) This showed how there was little impact on car transit however there were slight increases in ridership for bicycles.

Meanwhile in the United Kingdom, Adam Martin conducted a cost-benefit analysis on the current cycling infrastructure for the city of London. It was found that “If the Government’s planned expenditure on walking and cycling in England during the period 2020-2025... were as cost-effective, and were sustained for ten years, it could be associated with a 0.51 ... to 1.10 ... percentage point increase in cycling prevalence” (Martin, Morciano, & Suhrcke 2021) which shows a positive correlation between spending on cycling infrastructure and the actual usage of said infrastructure. If there were similar results in Santa Clara County that would lead to increases of between 9,600 and 20,700 extra residents engaging in regular cycling over the course of five years.

2. What are the different costs associated with cycling and are there areas which are more expensive to develop in?

Starting with the report from Marques, it was conducted on the city of Seville in Spain and focused on analyzing the costs and benefits recovered from investing in cycling infrastructure. The report found that “Investment in cycling infrastructure has high returns in terms of less capital and maintenance costs per trip. Moreover, smart public bike sharing systems imply similar or less operating costs that conventional public transport, provided they are properly integrated in the city cycling infrastructure” (Marques, Hernandez-Herrador, Calvo-Salazar, & Garcia-Cebrian 2015). What was also important was discussing the importance of place when it came to designing infrastructure because “if the infrastructure is built fearfully and slowly, very probably we will see how other activities, such as terraces or motorbike parking, flourish on the bike-paths, making them useless for cycling. However, if the whole infrastructure is fully operational few months after the civil works begin, many people will realize its usefulness and use it.” (Marques, Hernandez-Herrador, Calvo-Salazar, & Garcia-Cebrian 2015). This is

important to notice because it shows how infrastructure will always have alternative uses assigned to it. The main way to ensure that bike routes are used for bikes is to ensure that they are designed with solely that in mind.

Another important report from here in California is from Neil Maizlish and focuses on the environmental and physical health benefits of cycling. Serving as a perfect addition to this report, the Maizlish reading is about the Bay Area and the benefits which can be gained from increased focus on cycling. The paper focused on three different scenarios: Cycle, Walk, and Transit. The report found that all of the different scenarios led to greatly reduced “burden of disease and injury” while Walk and Cycle led to an additional reduction of 10% in terms of “burden of cardiovascular disease and diabetes.” (Maizlish, Linesch, & Woodcock 2017)

3. What are the measures used to determine a cycling path’s impact on the community when it comes to traffic mitigation and are they more prevalent in the “difficult areas” (freeways, rivers, etc.)?

The most notable reading about biking projects over the long term comes from Hanson and Young where they discuss the changes in the Arlington, Virginia bike system over the course of 30 years. In the reading they discuss how they observed the successes of the Arlington system over those years despite pushback from a political standpoint. They also discussed the impacts of the bicycle paths in an economic sense “Biking opportunities have improved developments’ marketability and have offered economic incentives in the form of reduced parking requirements.” (Hanson & Young 2008) This is important to notice due to how increased marketability and economic incentives are often the major driving forces in project approval from multiple groups.

Larsen and El-Geneidy focused on cycling route usage and compared it between more experienced cyclists and more casual ones. Route usage was calculated by using a mixture of surveys, models, and route mapping to find an accurate picture of route usage in Montreal, Canada. The main results were that experienced cyclists are less likely to use bicycle facilities when compared to casual cyclists (Larsen & El-Geneidy 2011) however these results leave out a few important considerations. The most notable of these is the fact that experienced cyclists are more confident and certain about themselves and their routes, which means they have less need for these facilities. However, it is still important for casual cyclists since it ensures that they are able to have a safer experience and get the help that they need from what is available.

The Stappers et al. report primarily focused on reviewing previous reports, however it still contains important information about the usage and impacts of cycling routes. The most notable takeaway was the finding that cycling tends to follow infrastructure changes and that as new roads and buildings are constructed it also leads to the increase in potential for cycling routes to follow suit (Stappers et al. 2018). This shows how primarily construction on these routes is conducted when it is easiest to do so since there would not be many major changes required in the area to accommodate the new cycling route. Additionally, increasing the quantity of infrastructure means that there are more facilities and more potential endpoints for cycling trips leading to an increase in potential cyclists.

3: Methods

There are many important steps to the project to ensure a complete understanding of the state of cycling in Santa Clara County. First it is important to understand the actual content of the Better Bike Plan and the Countywide Bicycle Plan to understand what the focus is on and how it will be addressed. Then I will briefly address zones where it is more difficult to install infrastructure due to reasons such as being adjacent to waterways or having to deal with freeways in the path of planned routes. Next is an analysis of existing cycling infrastructure and comparing it to the currently stated goals in the City of San Jose's Better Bike Plan 2025 and the VTA Countywide Bicycle Plan. After that is interviews with transportation department members of four different cities in Santa Clara County. I then combined the information gained from the interviews with the current state of infrastructure in the county to properly convey the county goals and how well they have been achieved with the current cycling infrastructure. Lastly, I have compared the goals set out by both the Better Bike Plan and the Countywide Bicycle Plan to determine the merits of each plan, where they are lacking, and the places where they can learn from each other.

It is easy enough to read and discuss the city and county bike plans due to how they are readily available on the City of San Jose and VTA websites, respectively. By understanding what is in the plans it makes the future steps much easier because we can understand exactly where the priorities lie and why they are prioritized in such a way. This can build well into discussing difficult to install infrastructure because by understanding the priorities we can further infer an unofficial cost-benefit analysis of when too much is required to install a project. It is also important to understand where this difficult to install infrastructure is because with the numerous freeways in San Jose and the wider Santa Clara County there are many ways which it can be easy

to interrupt an existing bike path. With that in mind, it is important to see the strategies being created to counter this disruption while also furthering the development of cycling and pedestrian routes in those areas.

The infrastructure analysis began with collecting the GIS cycling route data from the Santa Clara Valley Transportation Authority (VTA). The most recent data which is available from the organization is the “Santa Clara County Existing Bikeways 2020” map. This data has provided an excellent look into what shaped the decisions and goals made in the County Bicycle Plan and its immediate effects while also showing the infrastructure state of San Jose which led to the decisions made in the Better Bike Plan.

The other important aspect of this process is the interviews with the transportation department members. These interviews were planned to be conducted with members of the transportation department for the cities of Gilroy, San Jose, Milpitas, and Palo Alto. The goal of the interviews was to receive further information about the processes involved with developing cycling routes that cross city boundaries and how they work with the VTA. There will also be questions about the current state of infrastructure in the city to further understand where things currently stand beyond what is listed in the VTA map. Presently the five planned questions for the interview are as follows:

1. What are the biggest concerns/points of focus when it comes to creating new cycling infrastructure?
2. What is typically the most difficult type of bike infrastructure to install in the city?
3. How much does the city work with the county or other cities on large scale cycling projects?
4. Are there certain locations in the city which receive priority when it comes to installing new bicycle infrastructure and/or maintaining old infrastructure?

5. What are the main goals for the city when it comes to bicycle infrastructure over the next five years?

After conducting these interviews, it will then be important to understand how they fit in with the currently obtained data. Questions 2 and 4 especially will be important since they can be directly compared against the map to confirm the answers. Additionally, if the answers have changed since 2020 when the VTA map was made it would allow for more follow up into why certain areas or certain types of bike routes have received more or less priority than they originally did back in 2020.

Lastly is the comparison between the bicycle plans. This comes as the final step of the project because it is perfectly situated for the synthesis section of the report. With both aspects of the project being completed it is important to understand how one might succeed at the county level but be considered lacking at the city level. By understanding this, it will be easier to make recommendations to both agencies to improve future iterations of the plans while finding new ways to ensure they are successful.

4: Bike Plan Overviews

4.1: City of San Jose Better Bike Plan 2025

As was stated at the beginning of the report I will be using a specific cycling plan from the City of San Jose as one of the main comparison points for the county. That plan is the Better Bike Plan 2025 which was approved in October 2020 (see Figure 1). The Better Bike Plan 2025 was developed alongside San Jose's Vision Zero Program which is a program with the goal of increasing safety in transportation. The "Zero" in the name of the program refers to the goal of having zero fatalities and zero severe injuries due to traffic accidents. Vision Zero focuses on safety for all modes of travel; however, looking at in relation to the Better Bike Plan helps to showcase the focus on bicycle safety and ensuring there are plenty of resources available for residents to use while cycling.



Figure 1: San Jose's Better Bike Plan 2025 Report Cover

One of the most important parts of the Better Bike Plan 2025 is how it details the current state of cycling infrastructure in the city and the successes of goals from the previous plan. In 2009 San Jose adopted the Bike Plan 2020 which served to set goals for the city to achieve by the year 2020. According to the previous bike plan, 195 miles of bikeways were installed since 2009, bringing the total up to 392 miles in San Jose. Currently, the city has since installed another 151 miles to the bike network bringing the total up to 543 miles. Additionally, the city installed multiple new “bike parking spaces” and now have a combined total of 3,450. The city also collected data which reveals that the number of people riding bikes in San Jose has been increasing, with a 28% increase between 1990 and 2017. It also helps knowing that more than half of the people living in San Jose want to ride bikes more, as per a survey conducted by the city.

However more than this, the Better Bike Plan 2025 also contains information about the goals which the city has currently put in place. It is these goals which will be used as guidelines for the rest of the paper when comparing between the plans. One of the main goals set out by the plan is to ensure that the city makes more protected bikeways which require more designing over simple roadside bike lanes. This includes having bike lanes which have fewer crossings in high traffic areas and which are able to maintain a continuous pathway with few gaps across the city. When it comes to specific numbers the plan proposes adding “104 miles of new protected bike lanes (Class IV). 253 miles of existing bike lanes upgraded to become protected (Class IV). 102 miles of bike boulevards (Class III).” (Better Bike Plan 2025, p. 65) Additionally, the report clarifies that the preferred style of bike lanes is not streetside but instead separated, specifically when it comes to high-traffic areas.

Implementing these different strategies is also discussed heavily in the Better Bike Plan 2025 due to how many of these strategies would require either physical redevelopment or social changes. There are three priorities which are proposed by the City of San Jose which are used to guide the different projects and proposals for improved cycling infrastructure: Mode Shift, Increased Safety, and Increased Equity. Mode Shift projects would involve the city improving the cycling infrastructure near residences in order to further encourage a switch to cycling rather than using a car; Increased Safety would focus more on the Vision Zero side of projects with an emphasis on streets with higher fatality rates; and Increased Equity deals with providing access between “Communities of Concern” and high traffic areas such as offices and schools. Of these three, the most useful for infrastructure appears to be Increased Equity since it is focused on providing access through improving the quality of, or increasing the quantity of, cycling infrastructure.

One more important aspect of the Better Bike Plan 2025 is the list of all proposed upcoming cycling infrastructure projects. The list contains multiple different pieces of info including:

- Focus Area
- Street (Name)
- From (Intersection)
- To (Intersection)
- Planned Bikeway (Type)
- Prioritization Score
- Project Coordination
- Miles

Each of these is useful going forward as a way to measure the success of other projects in Santa Clara County. The Miles and Prioritization Score sections are especially important since they can be easily compared against other projects in the area.

The final important facet of the Better Bike Plan 2025 is the section on “Monitoring and Evaluation”. These are split into two different measures: Input measures and Outcome measures. The input measures are focused entirely on the implementation of the different methods from the plan, specifically making sure that the city continues to meet the goals which it has set for itself regarding routes specified in the plan. The Outcome measures focus on the impact which the plan has had on the city by seeing how effective each new implementation has been. Input measures include: “Miles of new protected bike lanes, Miles of bike lanes upgraded with separation, Number of protected intersections, Number of new connections to the multi-use path network, New miles of multi-use paths, Miles of bike boulevards, Rate of bicycle crashes, Number of new bike racks and corrals, and Percent of destinations accessible by bike.” (Better Bike Plan 2025, p. 88) Meanwhile the Outcome measures are: “Average monthly bikeshare or micromobility users, Results of user surveys, Demographic (race, gender, age, etc.) composition of users, and Bike counts from manual and automatic bike counts; plus other sources; including anonymized, location-based data.” (Better Bike Plan 2025, p. 88) For this paper the majority of focus goes into the Input measures since they are more focused on simply the infrastructure and ensuring it is created. However, there will still be some focus on the Outcome measures since the entire point of making new cycling infrastructure is to support existing cyclists or encourage new people to take up cycling.

4.2: VTA Countywide Bicycle Plan

The VTA Countywide Bicycle Plan was adopted in May 2018 and focuses on bicycle goals which the VTA has set for the county to achieve before 2028 when the new plan will be created. The plan does an excellent job setting the stage for the current built infrastructure in the county by properly breaking down the cycling paths into 4 distinct classes: Bicycle Paths (Caltrans Class I), Bicycle Lanes (Caltrans Class II), Bicycle Routes (Caltrans Class III), and Cycle Tracks (Caltrans Class IV). One important comparison between the VTA plan and the San Jose plan is in the percentage of residents using bikes for their work commute. The VTA report found that in 2015 Palo Alto and Mountain View had the most percentage of residents commuting with 9.2 and 6% respectively. Conversely, Saratoga and Milpitas were found to be among the lowest with 0.4% of residents using bicycles to commute to work. Overall it was found that only 1.9% of the county used bicycles for their regular commute in 2015. Focusing on just the city of San Jose is interesting due to how the values differ between the plans. The VTA report lists San Jose as having 1% of commuters cycling to work as their primary method of commute while the San Jose Better Bike Plan has 3% listed. One possible reason for this is how the Better Bike Plan is taking values for 2020 while the VTA plan is using values from 2015. Keeping those numbers in mind, it shows exceptional progress on San Jose's front with how they managed to increase the percentage of commuters cycling to work by 2% in approximately five years.

The Countywide Bicycle Plan, like the Better Bike Plan, contains a section on the goals for the county to achieve before 2028. The most important goal for this report is "Goal 1: Develop a Comprehensive and Continuous Countywide Bicycle Network" since it focuses on the physical layout of cycling infrastructure and where it is throughout the county. What is most

notable about this section is that it specifically mentions difficult crossings such as rivers and freeways in the county, which it refers to as major barriers. This goal also seeks to increase the network of cycling paths throughout the county and ensure that they are built on a larger scale than would previously be allowed.

What is also very important is how the goals section contains a subsection focused on how the Countywide Bicycle Plan relates to other plans at the city, state, and national level. The main plans which it supports are focused on supporting an increase in cycling across the state and reducing greenhouse gas emissions through said increase in cycling. There is also special focus on “long-range” plans which focuses on plans which detail the upcoming 30 years of development.

Some additional sections which are of importance to the county and this report include: Cross County Bicycle Corridors; Costs, Funding, and Implementation; and most importantly Across Barrier Connections. Across Barrier Connections will be covered later in the report however looking at Cross County Bicycle Corridors it focuses on cycling routes which share paths which start or end outside of the county. However, aside from just that it focuses on Bicycle Superhighways, routes which are intended to accommodate large numbers of cyclists to further encourage cycling. Currently there are no official Bicycle Superhighways in the county, however the plan lists ten candidates for the title (as seen in Figure 2).

VTA Potential Bicycle Superhighways
Bay Trail
Stevens Creek Trail/Union Pacific Railroad Trail
Caltrain/Evelyn/Alma Corridor
Blaney/Sunnyvale East Channel Corridor
Stevens Creek/Pruneridge Corridor
San Tomas Aquino Creek Trail/Saratoga Creek Trail
Guadalupe River and Guadalupe Creek Trails
Coyote Creek Trail
Three Creeks Trail/Five Wounds Trail
Branham Corridor

Figure 2: VTA list of potential Bicycle Superhighways

An important example of a project being developed under the guidelines and goals of the VTA Countywide Bicycle Plan is the Central Bikeway Project. This is a project which was analyzed and reported on in 2021 and focuses on developing a bicycle superhighway going east-west along El Camino Real (in the west) and through central San Jose before ending along Mabury Road (in the east). According to the project report, the main goals of this project are to improve equity and accessibility for cycling between major destinations while also servicing previously underserved communities. The inspiration for this project comes from other bicycle superhighways present in European countries such as those in the United Kingdom. It is currently estimated that the project will cost a total of \$213 million with the majority of the costs (\$152 million) going to construction costs.

What is interesting is how most of these corridors are adjacent to creeks and rivers, as these are part of the “difficult implementation groups” which are a notable part of this current report. Additionally, the majority of these corridors have sections which directly intersect with San Jose which makes it interesting to see how the Better Bike Plan also applies to the Countywide Bicycle Plan.

The final important section which we will discuss here is Costs, Funding, and Implementation. In the Countywide Bicycle Plan this section puts a large amount of focus on the costs associated with Across Barrier Connections (ABCs) and Cross County Bicycle Corridors (CCBCs). The total estimated cost of implementing all proposed ABCs is approximately \$1 billion. Of that amount only \$316 million is estimated to be needed for the priority projects. Meanwhile, the estimate for all CCBCs is around \$776 million with the priority projects estimated to require \$431 million to be fully implemented. This section also heavily discusses revenue sources for the county in the past with the important knowledge that between 2008 and 2016 “VTA allocated almost \$115 million in total funding for bicycle infrastructure, programs, and planning” (VTA 2018). The primary funding for projects comes from the One Bay Area Grant Program (OBAG) which has allocated around \$64 million for cycling projects between 2008 and 2016. Briefly touching on OBAG, it is currently in its third round of funding with an estimate of \$375 million being awarded to cities and organizations over the next 4 years for climate smart transportation funding. The money is overseen by the Metropolitan Transportation Commission (MTC) and nine other Bay Area County Transportation Agencies (CTAs).

The Implementation section details the specific actions being undertaken by the county to satisfy the goals previously outlined in the Countywide Bicycle Plan. The most important information for this report is the set of actions to achieve goal one, improving infrastructure. The

main priorities here include coordinating infrastructure that crosses multiple cities, improving safety for cyclists, and improving the quality of existing infrastructure. It is very promising to see that the majority of implementation strategies are focused on improving safety since that is one of the primary concerns for cyclists and one of the main reasons most people avoid cycling. This is backed up by the National Highway Traffic Safety Administration which put out a report about cyclist fatalities and how it has remained consistently high. That leads to a decrease in cyclists on the road unless in large enough groups.

4.3: San Jose Bike Plan Network Update

A more recent update on cycling infrastructure in San Jose can be found in the annual update on the Bike Plan Network. In the 2024 update they discuss the current developments in San Jose including installations within the last year, maintenance on existing infrastructure, and budgeting for the projects. “In 2023, the City installed 17.6 miles of new on-street bikeways and upgraded 5.3 miles of existing on-street bikeways” (Ristow 2024). The city also had a mixture of extensions to existing paths around the city and removing lanes to make room for bike paths. These locations include: Almaden Boulevard at Park Avenue, Lawrence Expressway to Williams Road, 1st Street to Airport Boulevard, and Hamilton Avenue to Southwest Expressway. Meanwhile, there were three major additions to off-street cycling infrastructure. Coyote Creek Trail had two of those improvements with the section from Mabury Road to Empire Street getting a new pedestrian bridge. Coyote Creek’s second improvement went to the section from Phelan Avenue to Tully Road which received an extension to fully connect San Jose to Morgan Hill. The third major off-street cycling infrastructure addition went to Thompson Creek Trail where the stretch from Quimby Road to Aborn Court received pavement additions since it was previously an unpaved trail.

There is also a section about maintenance conducted on existing trails however instead of detailing specific sections of road which were affected they decided to focus on the current issues with repaving and maintaining bike infrastructure. The first challenge is the lack of space available to engage in complete maintenance efforts due to factors such as residents putting out their garbage cans for collection. Because of this, “DOT is currently developing a plan to improve maintenance and keep bikeways unobstructed, which may contain educational and operational components.” (Ristow 2024). The second major challenge is a lack of available resources which is a challenge that also ties in with the budgeting section of the update. It is estimated that the city requires approximately 14 to 19 million dollars each year to install sufficient updates to remain on track with the goals set out in the Better Bike Plan. However currently, the funding issues have become more noticeable with approximately 780 thousand dollars being made available to the city per year through non-competitive sources. This means that the city still needs to compete for the remaining 13 to 18 million dollars every year in order to stay on track with their listed goals.

5: Designing Around Difficult Construction Zones

Cycling is an activity which is conducted around a variety of environments and situations. While it is understood that some areas are more hazardous for cycling it is also important to understand how some sections have more complications when it comes to installing cycling infrastructure. The two major examples of this which will be covered in the paper are: cycling around waterways, and cycling when involved with freeways. The term “difficult construction zone” may be a bit misleading so it is more important to think of this as areas where it takes more effort to implement new infrastructure or update old infrastructure. While it is true that all methods of developing infrastructure are difficult, there are particular locations where

there are more barriers in place impacting the implementation process. These factors can be natural or human-centric, however they share the same outcome of leading to a more difficult development period. Designing around waterways and freeways is a process which runs into natural development barriers while developing on and around freeways must also deal with human-centric difficulties.

5.1: Waterways

Four of the main concerns involved with constructing pathways over and around waterways are public safety, environmental impact, coordination with other agencies, and cost to implement. Public safety is the primary concern since whatever pathways are constructed should be constructed with the safety of the general public in mind. One of the major factors in public safety, which comes almost exclusively from waterways, is flooding as a result of heavy rains or other weather effects. A 2011 report by Darrow Vanderburgh-Wertz discussed how waterways are especially dangerous when it comes to bridges over water since heavy flooding can increase the river to beyond capacity and lead to further flooding on a major element of the trail. The majority of proposed fixes for this issue revolve around increasing public awareness of flood prone areas, however the most important fix from a physical design standpoint is making sure that trails are designed to be “accessible within 500 feet to emergency vehicles” (Vanderburgh-Wertz 2011). This works as a solution for events after the fact, however in terms of prevention it is still lacking in making trails more resilient to flooding or other weather events.

Another major concern with developing around waterways is the environmental impact which the construction would have. All projects undertaken by a public agency in California are subject to the California Environmental Quality Act (CEQA) in order to ensure that the

development does not have an adverse effect on the surrounding environment. As a result of this most projects are subject to review which makes the process of implementing the development longer than originally expected. Additionally, with waterways there is the added concern of building materials contaminating the area during development. However, the final major concern is runoff and how that is impacted by the development. The Venderburgh-Wertz report discussed how especially for San Jose most developments should “[obtain] a storm water permit that allows the trails to “run off” into the surrounding open spaces” (Vanderburgh-Wertz 2011) because this would also help to ensure that the environmental impact is kept minimal and the process of clearing CEQA would be sped up.

The last two concerns are building bridges which cross into an area where another city or agency has jurisdiction and the costs associated with creating a bridge. Both of these topics will be covered more in depth in the section on freeways due to the amount of overlap between the two however there are still a few points which should be mentioned here. The main discussion has to do with the shared jurisdiction, having to coordinate with other groups always adds a bit of difficulty to the design process and requires more time is taken to ensure that all proper guidelines are followed. In Santa Clara County that usually means cities cooperating with the VTA to create bridges which go from the city into county lands.

5.2: Freeways

In the VTA’s Countywide Bicycle Plan, Across Barrier Connections has a section on “Large Distance between Existing Crossings of Major Barriers” (VTA 2018, p. 58). These are locations where there is a mile or more lacking infrastructure for connections. One of the primary listed examples of this is Highway 101 in San Jose, specifically the section between

Blossom Hill Road and Coyote Creek Trail. Since the VTA plan was posted in 2015 this section of freeway has been fixed however the underlying issue still exists in other locations. The main issue associated with this type of infrastructure change is that to fix them it usually requires large scale construction projects. The most common type of fix for these areas is bridges, however there are also discussions about having undercrossings in areas with reduced traffic. However, what is most clear is that these barriers, known to the city as Category 3, are the most important to the city. This is made most evident by how of the 39 ABCs listed as priority targets, 25 of them are Category 3.

One of the major issues listed for developing ABCs for over freeways is the increased cost associated with developments and the necessity to work with multiple agencies to ensure the project is fully implemented. In terms of costs, bike bridges vary in their pricing based on distance and material used, however the average range appears to be anywhere from \$10 million to \$25 million for a standard bridge. A good example of a standard bridge is the Xander's Crossing bridge in San Jose. The bridge was finished in 2012 and cost \$10 million at the time, accounting for inflation this goes up to a total cost of approximately \$13.5 million. The bridge is about 315 feet long and crosses over Monterey Road, Endicott Boulevard, and train tracks passing between the two roads. There are not as many unique aspects to the bridge which helped to keep its costs down. Meanwhile, in Palo Alto the city finished construction on a 1,400-foot-long bridge over Highway 101. The project was completed in 2021 and had a final cost of \$23,718,769. The bridge was constructed with the idea of being used continuously for cycling which is why it included LED lights continuously along the bridge to ensure cycling at all hours of the day. The combination of the extended length of the bridge and the LED lights is part of what contributed to the increased cost of development.

6: Analysis

6.1: Analysis of Existing Infrastructure

The primary sources of information regarding current cycling infrastructure are the VTA's Valley Bikeways Map and their 2018 Countywide Bicycle Plan. The map was last updated in 2020 so some of the information may be outdated however it still contains some important information about the current distribution of cycling infrastructure across the county. The most important thing to focus on first is the distribution of bike infrastructure relative to the sizes of the individual cities.

What is most interesting about the ratio of bike infrastructure to streets in Santa Clara County is how the majority of the infrastructure is developed in areas of high population and high transit, leaving many gaps in coverage in less populated and less traveled areas. However, what is also immediately apparent is how there are two major locations in the county where the ratio of bike infrastructure appears to be much higher than average. The first is in downtown San Jose, which is predictable for a number of reasons. Firstly, Downtown San Jose has a larger number of facilities and businesses which makes it a primary target for any transportation changes and improvements, including cycling pathways (see Figure 3). However, looking specifically at the data provided by the map you can also see how Downtown San Jose serves as a hub of sorts for off-street bike paths with two long trails (Los Gatos Creek Trail and Guadalupe River Trail) almost intersecting with each other. Guadalupe River Trail is important because it ends just west of the major downtown area of San Jose. It serves as a connector to Diridon Station however it does not progress much further into the city.

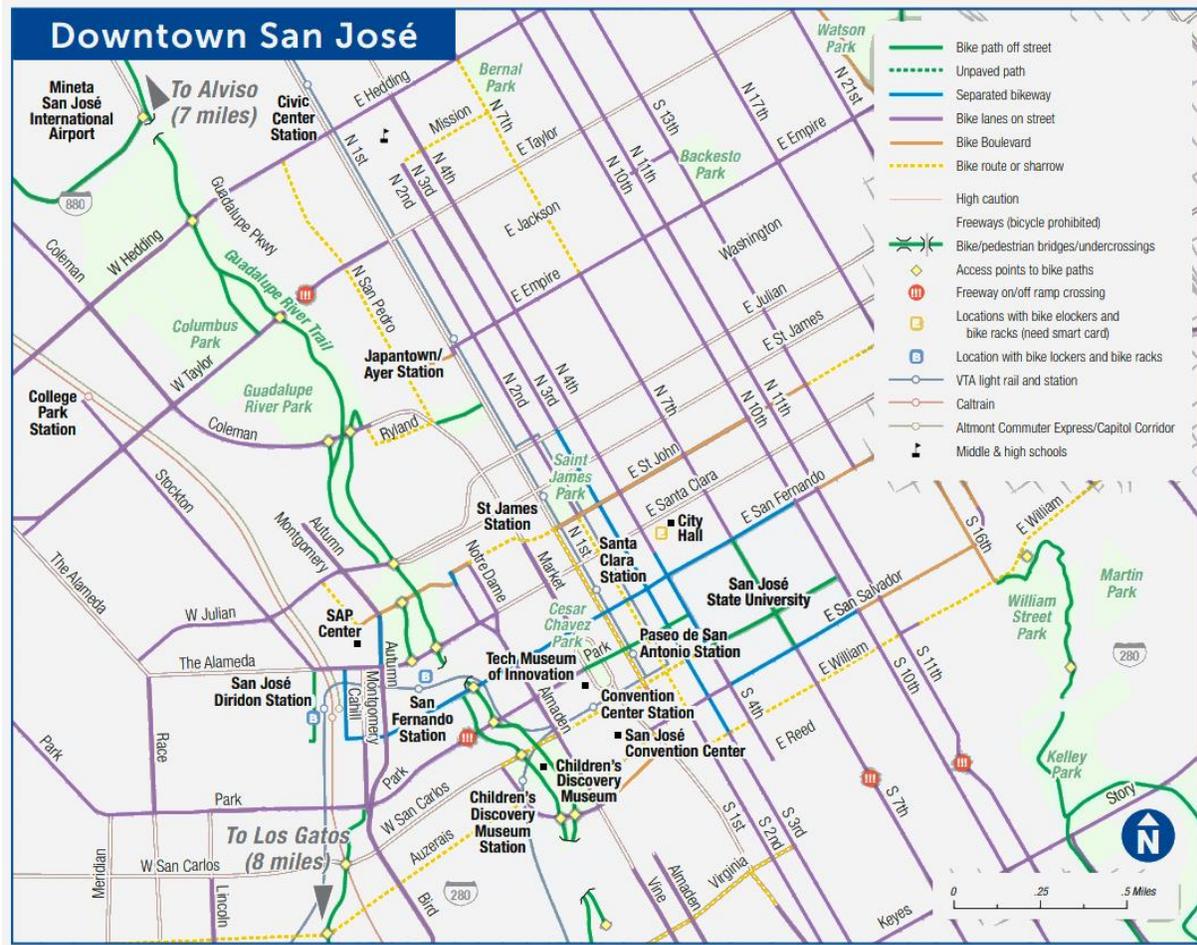


Figure 3: Downtown San Jose Bicycle Map from the VTA

The second major location for bike infrastructure is the city of Palo Alto, more specifically the area around Stanford University. With Stanford being a major university, the increased number of bike paths makes sense considering there is increased focus on ensuring ease of access for the students regardless of the mode of transit. Additionally, most of the infrastructure is off-street bike paths which adds to the safety of the greater bike network by providing safer trails and further encouraging students and residents to engage in more cycling. Stanford also has a specific dedication to cycling with a section of their website dedicated to discussing all the improvements made to the campus to further encourage students to cycle to and from their classes. The University has also received four Platinum Bicycle Friendly

University awards from the League of American Bicyclists. These award designations last for four years and were first awarded to the university in 2011.

Just as important as the quantity of cycling infrastructure is the quality and design of the different types of infrastructure. The VTA's Countywide Bicycle Plan breaks down into four Classes from I to IV. Class I are considered Bike Paths and are trails kept fully separate from the street, as of 2016 it was estimated that there were 165 miles of Class I paths. Class II are Bike Lanes; these are the common streetside paths which are usually delineated with the standard white paint and bicycle symbol. Buffered bike lanes can also be considered Class II paths, and overall there is estimated to be 520 miles of Class II paths. Class III is for the approximately 150 miles of Bicycle Routes, these are defined as roads which are designated as being shared between cars and cyclists. These routes are specifically called out with signs in the area to inform cyclists and motorists about the shared street. Lastly is Class IV, also known as Cycle Tracks and these are the type with the least presence in Santa Clara County with approximately 18 miles according to the VTA's plan. Cycle Tracks are paths which according to the VTA are "physically separated from motor vehicle traffic by a vertical barrier, such as an adjacent parking lane, median, or raised curb." (VTA 2018). When it comes to safety, the best paths are Class I and Class IV due to how they specifically separate cyclists from cars and other automobiles.

6.2: Interviews

The first interview was conducted with the City of Palo Alto. In terms of responses to the individual questions, the main response for question one was that having sufficient right-of-way is the main focal point when it comes to developing bike infrastructure. Question two got responses about how basically all forms of installing bike infrastructure have difficulties and that

no one type sticks out as the “most difficult” to create, however the projects that stick out are the ones which require the removal of parking. For question three they talked about how primarily interactions with the county or other cities only occur if funding or permitting is required. Despite this, data is often shared across jurisdictions to ensure that “lines align across jurisdictions”. There was also an expressed desire to work more with the county on planning larger scale bicycle projects if they become the county’s focus. In terms of question four, there is no primary motivator for the city, however using school routes as an extra justification leads to help in getting projects approved. Additionally, having funding for specific projects is the main determining factor for where the routes are installed. The final question was answered when I was informed that they are currently working on their updated bike plan for the city which will be due out later this year. There was not much made available for public use so I will be returning to review the plan at a later date.

The next interview came from the City of Milpitas. Responding to the first question, the principal engineer for the city talked about the importance of safety when it comes to designing infrastructure. The second question provided an answer about how class IV (buffered bike lanes) are the most difficult type of infrastructure to install. This is due to how it often requires the removal of parking and having a lack of space to install the buffered bike lanes. For question three, the response was focused on how communication with other cities and counties was limited; however VTA was a common discussion partner for developing cycling programs. Question four’s answer was that there was commonly no particular emphasis on areas for cycling development. However a major limiter for designing upgrades is a lack of budget for the program, this leads to trying to find ways to combine improvements, such as repaving streets for both cars and bikes. For question five, the main goals were listed as making effective usage of

the grant they were recently awarded to design a project with a consultant for improvements to existing infrastructure identified in the master plan.

The third interview was with a lead transportation planner at the City of San Jose. Responding to the first question, the three biggest concerns for the City of San Jose are: funding, staffing, and physical space. This is seen most prevalently due to how the city has to compete with others to receive funding from the federal government to ensure that future bike projects can be designed and implemented. Staffing is another issue and it mostly stems from funding as well with the requirements for paying salaries being contingent on receiving proper funding. Having physical space in streets is also a concern when it comes to answering the second question due to how protected bikes lanes require lots of available space. Additionally, there needs to be unbroken stretches of street and having residential driveways in the area makes designing these protected bike lanes more difficult. Question three's answer was that the city primarily works with VTA directly rather than the county government since it is the proper agency to contact. Additionally, the VTA is primarily responsible for assisting the city with grant funding which is part of why the city works on aligning their goals with the goals of the VTA. Question four received a response about how the decision for where new projects are created is tied to funding. Additionally, paving is an important tool for deciding where infrastructure is updated. It works by examining current street conditions and then having the city appraise what specific areas could benefit from certain improvements. Vision Zero is also a major focus on which corridors have more prioritization by ensuring that they are designed/redesigned in a way to reduce fatalities from car collisions. Finally, for question five the city is planning to continue with goals previously set out in the 2025 Better Bike Plan. With not all of the goals predicted to be achieved by 2025 the main plan is to continue with the projects and developments listed in the

plan even after 2025 comes and goes. Additionally, there are plans for a five-year priority network of cycling infrastructure which the city will be implementing in the near future.

All three of these interviews were incredibly helpful for the project, however I was unable to conduct the fourth interview with the City of Gilroy. I sent multiple emails to people working on the cycling projects for the city and additionally went in person to try and conduct an interview. However, I was unfortunately unable to contact with anyone at the city so I was forced to drop that interview from the report due to the lack of communication received.

7: Synthesis

As stated before, it is very important to compare the different plans to each other in order to form a full opinion of the benefits and lacking areas of each. The largest difference between the two plans is the level of involvement which they have with the community. The Better Bike Plan has a section dedicated to addressing concerns which the community has about the project and ensuring that there is enough open communication between members of the public and the agency responsible for the project that everyone is aware fully of what is happening. There is an important reason for this difference though, and it relates to the level of involvement from the different agencies. The county is more concerned with larger more abstract details and there is a focus on ensuring that the broad strokes are covered by their guidelines and goals. Meanwhile, because the city is at a more personal level it allows them to consider the feedback from the community since there is more of a connection to the people in the city.

Another major difference between the two plans is the emphasis placed on education by the Countywide Bicycle Plan. The Better Bike Plan is primarily focused on improving the infrastructure of the city with a focus on ensuring that there is a perfect combination with the

Vision Zero program which City of San Jose has created. With the goal of the program being to reduce fatalities in the city this is where having a section on education could serve to greatly increase the impact of the plan since informing residents about proper cycling habits would work to reduce bike-related fatalities. One final difference is that the countywide plan focuses on discussing across boundary connections between different counties. While it makes sense this is not in San Jose's plan, it still would have been beneficial to the city if they included a section discussing how infrastructure works when it crosses city boundaries.

Aside from that, the two plans have a large number of commonalities with their wording and structure. Both plans sufficiently detail the plans for implementation of their proposed bike infrastructure and ensure that there is sufficient discussion about the impact which it will have on their regions. They additionally contain sections detailing the importance of funding costs and what it will take for certain projects to be constructed. The most important detail is how both plans prioritize monitoring the infrastructure to ensure that it continues to meet the standards and goals set out by the agencies. With the goal of infrastructure being to ensure continued operation of the routes being created it is equally important to ensure high quality otherwise if the infrastructure breaks or becomes inoperable it would be as if nothing had changed. Additionally, through increased monitoring of infrastructure the plans allow for more growth and awareness of which strategies work, leading to further developments in future bike plans to maintain a high level of quality.

When it comes to the interviews conducted, they also provide important information when compared with existing infrastructure and existing bike plans. Starting with the City of Palo Alto, the data tracks quite clearly the responses given and the current cycling infrastructure present in the city. It is very clear that the area around Stanford has the primary cycling routes,

which is promising to see since it can hopefully encourage more students to engage in cycling rather than using cars as their primary means of transportation (see Figure 4). If I were to conduct the interview again, I would ask how much the city coordinates with Stanford itself when it comes to cycling, since it is quite clearly a priority for both the city and the university. Additionally, it becomes apparent that schools and cycling have always been deeply intertwined. Consistently through the interviews one of the main points of focus was on ensuring that schools had sufficient cycling infrastructure and that the infrastructure that was created maintained a high level of safety. In San Jose's Better Bike Plan, there is a notable emphasis on schools with multiple small sections discussing the importance of designing for current and future school developments. Additionally, the Better Bike Plan lists schools as one of the main concerns given by residents when they were asking for opinions from the public. With that in mind, I do think it would have served the city well to have an extra section focusing on schools due to their clear priority for cycling infrastructure.

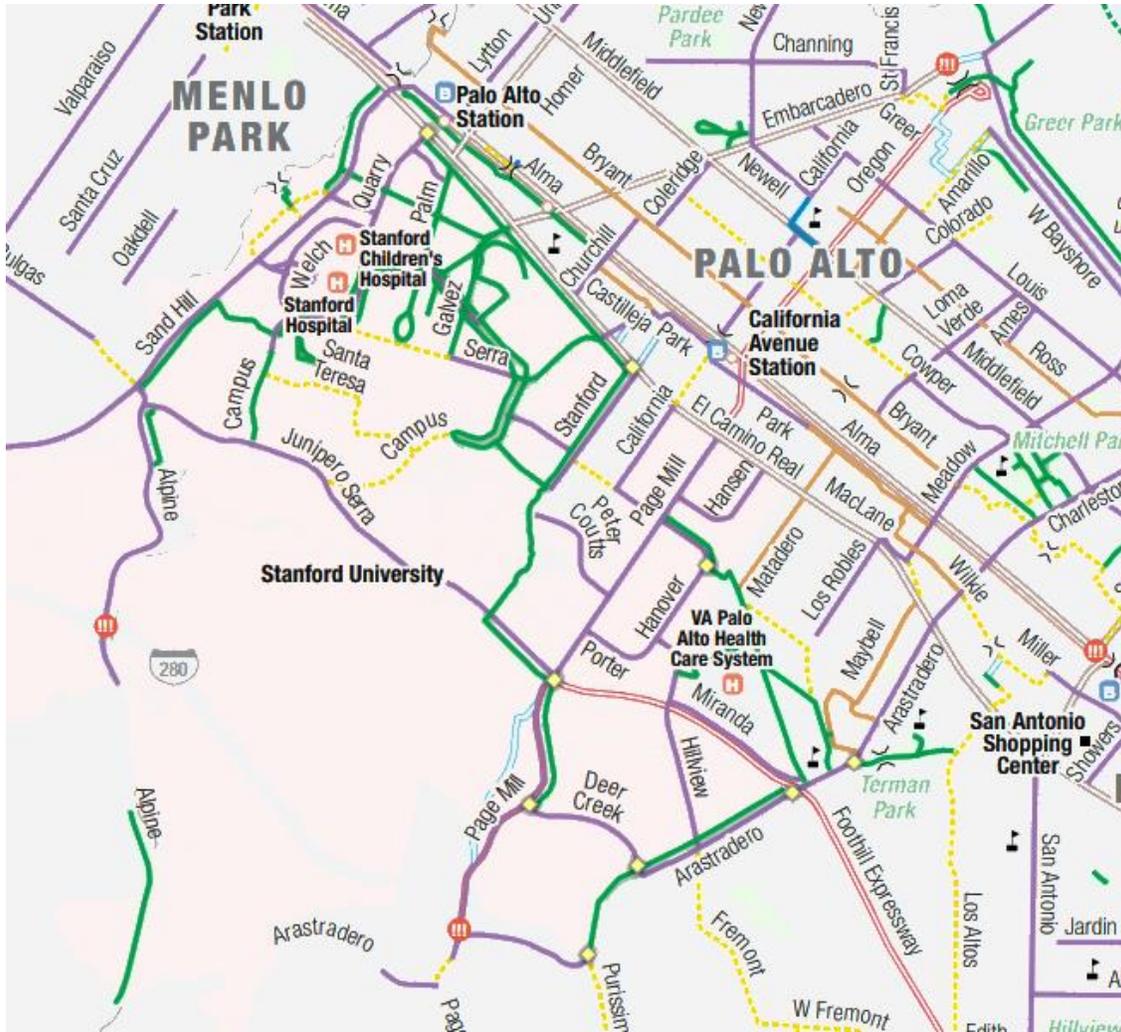


Figure 4: Palo Alto and Stanford Bicycle Map from the VTA

Carrying over from that, another factor which is made clear by comparing the interviews and current infrastructure is the difficulty included with installing Class IV (Protected Bike Lanes) infrastructure in the county. The amount of Class IV infrastructure is much less than the quantity of other classes of bike routes. There are many notable reasons for this limitation with the main two being cost and available space. The interviews frequently pointed out how receiving funding from the state and/or federal government was the main determining factor in creating new cycling infrastructure. Additionally, due to the amount of construction required to make them this makes Class IV bike lanes into a more costly project and limits the amount of

Class IV lanes which are constructed. Another issue concerns available space and this is limited in a few ways. Firstly is ensuring there is sufficient right-of-way unbroken by driveways or other obstructions such as parking spaces. This is primarily an issue in San Jose due to the large number of houses and apartment buildings which immediately limits the number of places which can be host to a Class IV bike lane. Another concern about space is the street width limiting the places which can host a Class IV bike lane. With San Jose having many narrower streets this makes it that there are areas which cannot have a protected bike lane due to reducing existing car lanes. One notable example of the inverse of this is Santa Teresa Boulevard between Longmeadow Drive and 1st street in Gilroy. That stretch of road already has existing class II bike lanes, however there is enough space and a reduced traffic flow which makes it easier to modify the area to install new class IV lanes.

The largest discussion point between both the interviews and the planning reports was the budget limitations currently faced and how to work around them. The Better Bike Plan has a section discussing funding for the next five years of projects and contains a cost estimate on what the final totals will be for the city. Meanwhile, the VTA's Countywide Bicycle Plan includes a much larger section with more detailed breakdowns about which projects receive priority for funding, and strategies for keeping costs down. One of the main strategies across all interviews and the VTA plan is combining the creation of Class II (Bike Lanes) with regular repaving of roads. This approach allows for easier installation of these lanes to ensure complete coverage across the county while also allowing for bike lanes to be repainted during regular repaving. While the Class II infrastructure is not as safe as Class IV, it is still a good start to have it covering the county to provide cyclists with at least a bit of extra safety.

8: Conclusion

The goal of this paper has been to examine the current state of cycling infrastructure in Santa Clara County and compare it with the statements made in the different plans for City of San Jose and Santa Clara County (through the VTA). The main takeaway from this report is the level of impact which funding has on cycling infrastructure. While this is not a surprise, the scale of discussion on costs and funding is what was most prevalent in the plans and the interviews. Most of the interviews I conducted had an emphasis on the funding aspect of projects and how that was the primary determining factor regarding where new cycling infrastructure was installed. This was different from what I was expecting with initial research due to how in the San Jose Better Bike Plan for example, the section on funding was relatively short being limited to a single page in the document. This was different for the Countywide Bicycle Plan which had a much larger section dedicated to funding, however that could be accounted for due to how they would also have to manage assigning funding to the different cities.

Another important point is the difficulty associated with removing parking or car lanes in order to install new cycling infrastructure. Especially in the Palo Alto interview, the fact that new bike lanes would often require the removal of existing parking was cited as a major barrier to getting projects approved. This problem was one which seems like it would primarily affect San Jose due to its size and overall population ensuring that it would require more parking availability for more people. Additionally, due to the size of the city it would be impossible for cycling to every location to be plausible for the average person. However, it is also important to consider how even the relatively smaller city of Palo Alto would be affected by these same concerns due to the number of important locations in the city which would draw more people to

visit. This requires a sufficient number of parking spots so a proposal to remove some to make place for bike infrastructure would be unpopular and less likely to gain approval.

With the interviews I was able to get some direct answers from the people working for the cities about what the priorities are and the numerous roadblocks which they face to create cycling infrastructure. When it comes to the plans and especially the interviews, I was surprised by how competitive everything is when it comes to the planning process but also how that fact is not as readily apparent in the documents when reviewing them. Many of the interviews discussed competing with other cities in the county to receive funding and more importantly how that would shape which projects were planned and proposed. The plans did discuss the process of receiving funding from the county and state however it did not phrase it as a competitive endeavor. Speaking with the planners it came across as a more important and present concern that they would have to ensure that they were the ones who received funding for the projects. I am still uncertain as to the reason that this was not discussed in the plans however it is also uncertain to me if that should be included or not. If the competitive nature were included it could shape public perception in a more negative sense of the planning process, however it is also important that the public is made fully aware of the process so that they can have proper input into it.

The main thing which could have benefited this study was following a project for San Jose from conception through to implementation. By doing so it would have helped to further develop and prove the points made in this paper about the competitive aspects and the difficulty involved with installing infrastructure. If more time were made available, then it would have allowed for following a new infrastructure installation project since that would have provided more valuable information than following a repaving or other maintenance project. Additionally,

not being able to contact Gilroy hurt the report as well since I was not able to examine conditions in smaller cities such as Gilroy or Morgan Hill in the southern part of Santa Clara County. In the future, finding a way to contact someone at one of those cities could help to provide complete coverage of study for Santa Clara County however until then there is still plenty of information gathered for San Jose and the surrounding area. It would also be an excellent next step to discuss directly with the city some of the proposed ideas for updating the plans since it could help to directly and immediately lead to changes in the project design phase of the plans.

9: Recommendations

There are a few ideas I have which could improve the quality of the planning documents and communication with the public. Those recommendations include:

- Adding and/or expanding a section detailing cycling infrastructure around schools
- Discuss the level of communication between the city and the county or other cities
- Add more encouragements for protected bike lanes

The first recommendation for the plans involves possibly adding a section detailing the importance of cycling infrastructure around schools. All the interviews talked about the importance of ensuring schools have adequate infrastructure and how it is easier to get projects if they are intended for schools to use. However, in both the Better Bike Plan and Countywide Bicycle Plan it feels as if there is not enough discussing the importance of this. While both plans do have small sections detailing the importance of infrastructure for schools it feels like these sections should either be expanded upon or given more weight due to how clearly important it was to the interviewees.

Additionally, while it was made clear that there is not as much communication between cities, it would be recommended to include sections discussing the role played by county to city communication. The VTA plays a large role in determining the type of projects which the city focuses on by determining which types of projects receive funding so addressing that link in more detail would be beneficial to ensuring that the process is fully understood by members of the public. This is mostly the case for the Better Bike Plan; however the Countywide Bicycle Plan could also benefit from this clarity since it would make the public understand the process behind the distribution of funding to the cities.

Lastly, it would be highly beneficial to see the reports including an in-depth discussion regarding the benefits associated with protected bike lanes and their installation in the city. Protected bike lanes are widely considered to be one of the safest forms of bike infrastructure however they have numerous barriers which prevents them from being widely used in major cities. With the lack of street space being one major concern and the requirement to have streets unbroken by driveways being another, it is much more difficult to install protected bike lanes than it is for other pieces of infrastructure. One factor which could help to remedy this is informing the public about the benefits provided by these bike lanes in order to gather more public support. One of the main reasons people avoid cycling is fears around safety, so by showing the safety features provided by protected bike lanes that could cause an increase in public demand for these bike lanes and a further increase in the number of people who engage in cycling. There would still need to be many factors being addressed such as the space and driveway requirements, however there are some examples of how this can be done well. South 11th Street in San Jose is a good example of how safer bike lanes can be created while avoiding the requirements of driveway space. The area is protected by a strip of concrete which has an

entrance and exit at the end of each block to allow cars to still reach their residences. There is still a concern with road space, since it takes up the equivalent of a full lane of traffic. However considering this was done on a one-way street, this approach could also work on other one-way streets in the area.

Overall, the Better Bike Plan and Countywide Bicycle Plan serve important roles in planning the future of cycling in their respective areas. They could learn from each other in certain areas such as the level of awareness the public has of the process, however they still contain enough relevant information for the process of designing cycling infrastructure. Seeing the Better Bike Plan discuss more about projects crossing waterways and freeways would be a beneficial addition to the plan. However right now, when both plans are taken together they show a complete view of planning cycling infrastructure in the county and help the public to further understand the process behind their planning decisions.

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