



**GOOGLE**  
BIKE VISION PLAN

NORTH SANTA CLARA COUNTY  
SPRING  
2015



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# NORTH SANTA CLARA COUNTY BIKE VISION PLAN



## Introduction

### Background

Northern Santa Clara County, home to tech companies like Google, Microsoft, Intuit, and LinkedIn, draws a significant number of employees from all over the Bay Area.

As the North County grows, Google remains committed to reducing single-occupancy vehicle trips and encouraging active transportation.

Essential to reducing single-occupancy vehicle trips is the provision of connected, safe, and convenient networks for bicyclists.

Google envisions North County as a place where almost anyone can ride a bike comfortably & safely - for any type of trip they might need to take. This document presents Google's vision for bicycling in North County.

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The future Google envisions for the communities of the North County area:  
“RESIDENTS OF ALL ABILITIES, FROM AGES  
8 TO 80, FEEL SAFE AND COMFORTABLE  
RIDING A BICYCLE.”



*Previous Page: Seattle, WA.  
Left: Bicycle superhighway in  
Copenhagen.  
Right: Indianapolis Cultural  
Trail, Indianapolis, IN.*

Google's Goal for Bicycling

“ALMOST  
10% OF ALL  
GOOGLE  
EMPLOYEES  
BIKE TO  
WORK TODAY.  
WHAT WILL IT  
TAKE TO GET  
TO 20%?”

Left: Seasonal closures of the Adobe Creek bicycle & pedestrian crossing of Highway 101.  
Right: A gBike rider on the Google campus.

## Today's Commute in North County

As a major jobs center for the Bay Area, North County sees its share of commuting woes. Rush hour traffic, both in the mornings and afternoons, can back up freeways across the region and create gridlock on major streets. To reduce their footprint on the Bay Area's roads, Google was a leader in pioneering the large-scale use of shuttle bus fleets, and now the vast majority of Google employees living more than ten miles away do not commute by car. Other companies in our region have followed suit, but for employees that live nearby, driving alone is still the number one option.

We can do better.

When considering alternatives to driving alone, bicycling is an obvious choice. Riding a bike five to eight miles takes about 25 to 40 minutes, competitive with driving during rush hour today.

In spite of a limited and disconnected bicycle network, a large number of residents in North County communities ride bicycles.

While the number of people riding bikes in North County is comparatively high, the pool of potential bicyclists in these communities is larger still.

The reasons people chose not to ride are varied, but a key factor is the state of today's roads and bike network. Meeting the demands of these potential riders will go a long way toward reducing car trips, vehicle emissions, and gridlock.

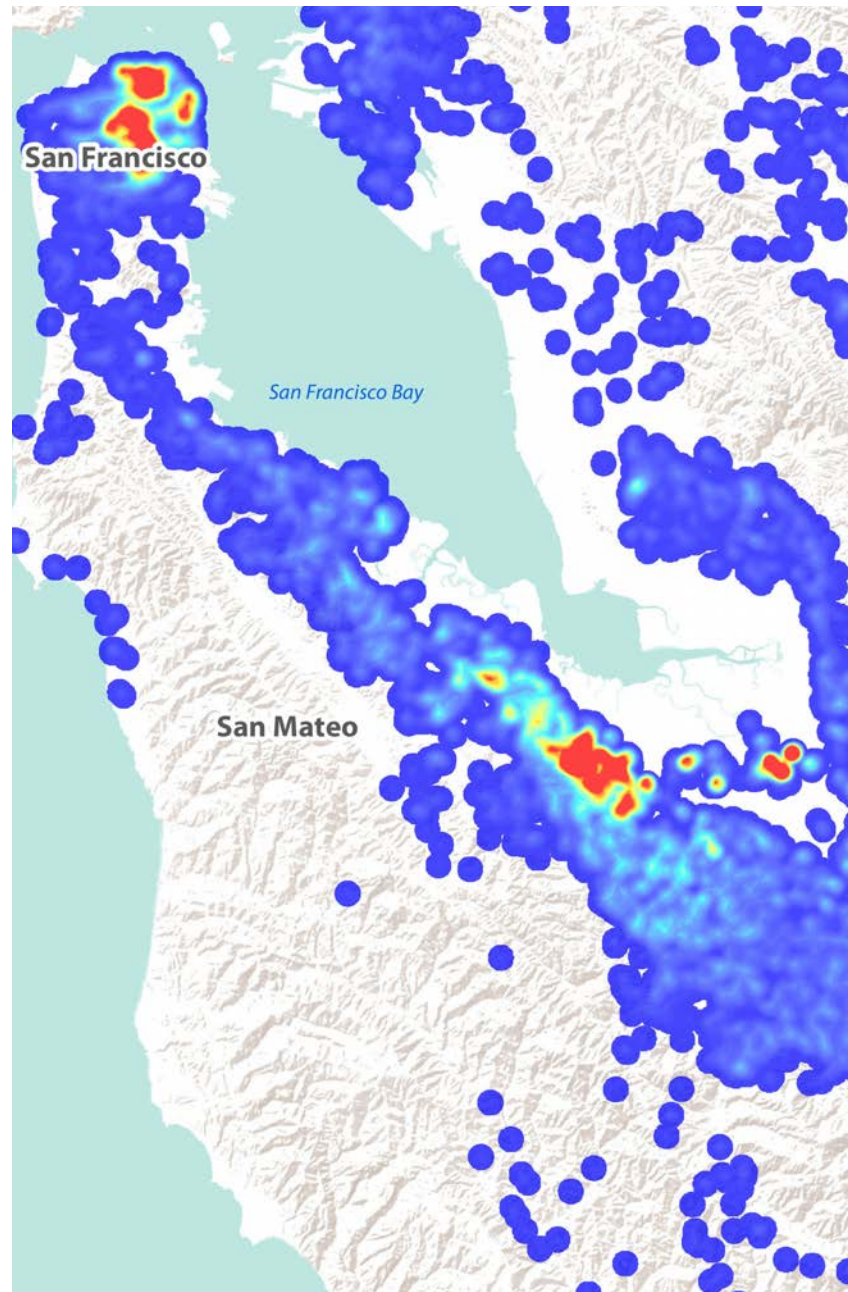


Google wants to be a good neighbor and ensure positive outcomes for the communities with which it shares its home. While Google's shuttle fleet has significantly reduced the number of single-occupant car trips, the majority of car trips to Google now originate from within North County - the perfect distance to bike to work.

### **A Better North County for All**

Better bicycling facilities don't just benefit people on bikes. A growing body of studies around the United States prove that bicycle infrastructure improves safety for all road users, increases property values, sparks local economic development, improves public safety, and improves public health. Even a small shift in the percentage of people choosing to ride bikes can have large spillover effects.

Google's Bicycling Vision Plan is modeled after similar successful systems, facilities, and projects in some of the most innovative and bicycle-friendly communities around the globe, including: Copenhagen, The Netherlands (Amsterdam, Houten, Groningen), Germany (Muenster, Munich, Berlin), Melbourne, New Zealand (Hastings, Nelson), Hong Kong, Singapore, Bogotá, Guadalajara, Portland, New York City, Montreal, Vancouver, Washington D.C., Minneapolis, San Francisco, Long Beach, Boulder, Fort Collins, Davis, and Palo Alto.



*While spread throughout the Bay Area, the homes of Google employees are densest in San Francisco and the cities of northern Santa Clara County.*

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## Envisioning the Future

“I WANT MY NINE-YEAR-OLD DAUGHTER TO BE ABLE TO BIKE WITH ME TO WORK.”

### THE 4 TYPES OF BICYCLISTS

According to research conducted by the City of Portland, the general public falls roughly into four categories when it comes to bicycling:



**1% of the population can be classified as “Strong and Fearless”;** typically young men - comfortable bicycling on major roadways and are often willing to ride without any bicycle facilities.



**5% of the population can be classified as “Enthusied and Confident”;** comfortable bicycling in most urban environments - but will seek out bicycle infrastructure and low-stress streets when available.



**60% of the population can be classified as “Interested but Concerned”;** will only bicycle on low-stress streets, having low tolerance for high-stress streets or intersections.



**35% of the population has no interest in bicycling, classified as “No Way, No How”;** due to a number of factors including opinion, age, disability, and commute distance.



## BICYCLING AT GOOGLE

Today almost 9% of Google employees working in North County ride a bike to work; among Google employees living within nine miles of work, bicycling commute trips rocket up to 21%.

When it comes to encouraging more bicycling trips, most of the “Strong & Fearless” and “Enthusied & Confident” riders are already accounted for. If we want to substantially increase the number of people riding bicycles to work, we need to attract the largest pool - the “Interested but Concerned” group.

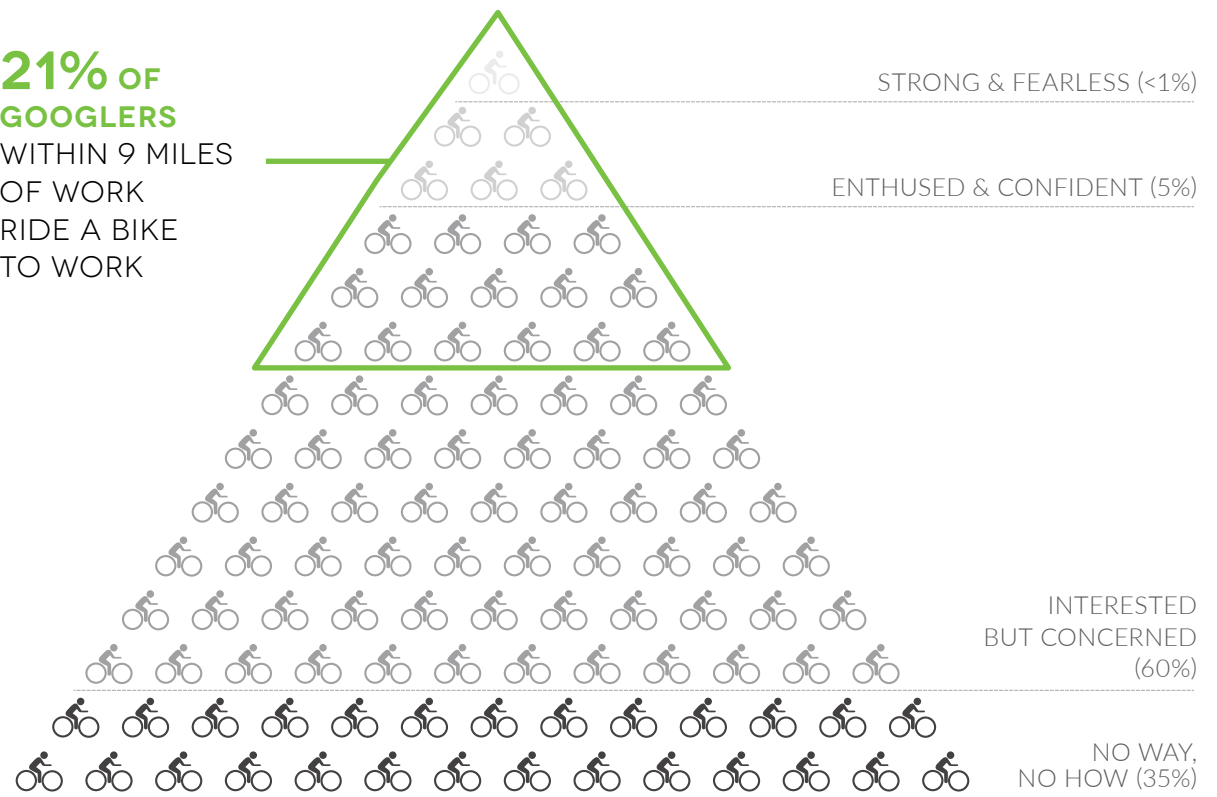
## GETTING MORE PEOPLE ON BIKES

Getting the “Interested but Concerned” set to try bicycling is not an easy task. Most cities in the United States have bicycle networks designed only for the most confident of riders.

To get more people to try bicycling, cities must focus on three key goals:

- Low Stress Facilities
- Continuity, Connectivity, Convenience & Completeness
- Bicycle-Friendly Programs

**21% of  
GOOGLERS  
WITHIN 9 MILES  
OF WORK  
RIDE A BIKE  
TO WORK**



City of Portland “Four Types of Bicyclists” Source: Roger Geller



Top left photo: Richard Risemberg



## GETTING “INTERESTED BUT CONCERNED” PEOPLE TO TRY BICYCLING

### Low Stress Facilities

People riding bicycles feel most comfortable on facilities with few or no vehicles and low speeds. As vehicle speeds and volumes increase, more and more separation between bicyclists and vehicles is necessary to maintain comfort and safety for all potential bicyclists.

### The Four C’s: Continuity, Connectivity, Convenience & Completeness

It is not enough to provide a network of bicycling facilities, they must also follow the “Four C’s.” Bike networks must be **continuous**: too many bike lanes in the United States disappear at intersections and other stressful spots. Bike networks must **connect**: a single gap in an otherwise complete bike route can discourage potential bicyclists. Bike networks must be **convenient**: people won’t ride bikes to key destinations if they must go far out of their way.

It is also not enough to provide a network of bicycle facilities without also considering what happens when a bike ride ends. A successful network includes sidewalks, safe intersections, and access to transit and bike parking. This design approach is sometimes called “**Complete Streets**”.



## GOOGLE'S WORK TO DATE

Google already provides a wide range of programs for employees who choose to ride a bicycle. Below is a small selection of what Google does to encourage bicycling among its employees:

### **gBikes**

Google has introduced a fleet of over 1,000 bicycles, free to use for employees. gBikes allow employees to travel quickly between different offices without a car.

### **eBikes**

Google also offers check-out electric bicycles for trips between campuses.

### **Bus Racks**

Google provides bike racks and bike storage on their shuttle bus fleet.

### **Bike Racks**

Google has installed hundreds of bike racks at all entrances and exits to Google buildings, as well as bike parking inside buildings.

### **Helmets**

Google provides boxes of bicycle helmets, free to use, at each building entrance and exit.

### **Accommodations**

Google's buildings are highly accommodating to people who ride a bike to work. Employees are allowed to bring bicycles in with them and most buildings have showers, lockers, changing rooms, and other amenities important to people who commute by bicycle.

## *Bicycle Friendly Programs*

Providing bicycle facilities alone isn't enough; programs and policies must be in place to make bicycle trips safe and easy from start to finish. This includes providing enough bike parking (both long-term and short-term) at key destinations, bike-friendly facilities at businesses and apartment buildings, incentives for people to try bicycling, and laws to protect vulnerable road users.

## **WE'VE MADE GREAT PROGRESS, BUT IT'S STILL NOT ENOUGH**

Google's extensive work encouraging bicycling has nearly exhausted all the gains that can be made from programs alone. Google's commitment to having 20% of its employees commute by bike must extend to changes beyond our own campus and into the communities around us.

This Vision Plan is meant to provide inspiration to the cities and communities of the North County. With commitment, funding, and public support, the cities of North County can literally transform themselves into the best place to ride a bicycle in the world.

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# Understanding Current Conditions

## “North County,” Defined

The “North County” of the Vision Plan can be defined roughly by the following boundaries:

- The Santa Clara County/San Mateo County line in the northwest
- The Foothill Expressway in the southwest
- Homestead Road in the south
- The San Tomas Aquino Creek Trail in the east

North County encompasses Palo Alto, Mountain View, Los Altos, Sunnyvale, and parts of Santa Clara. It is meant primarily to capture those commuters to the North Bayshore area who could easily switch from driving to bicycling.

A number of other criteria went into defining this area, including jurisdictional boundaries, density of current and potential bicyclists, geographical barriers, and the presence of regionally significant bicycle infrastructure like the Bay Trail and San Tomas Aquino Creek Trail.

We also limited the geographical area of study to examine at a fine-grained level the realities, constraints, and possibilities for bicycling in North County.

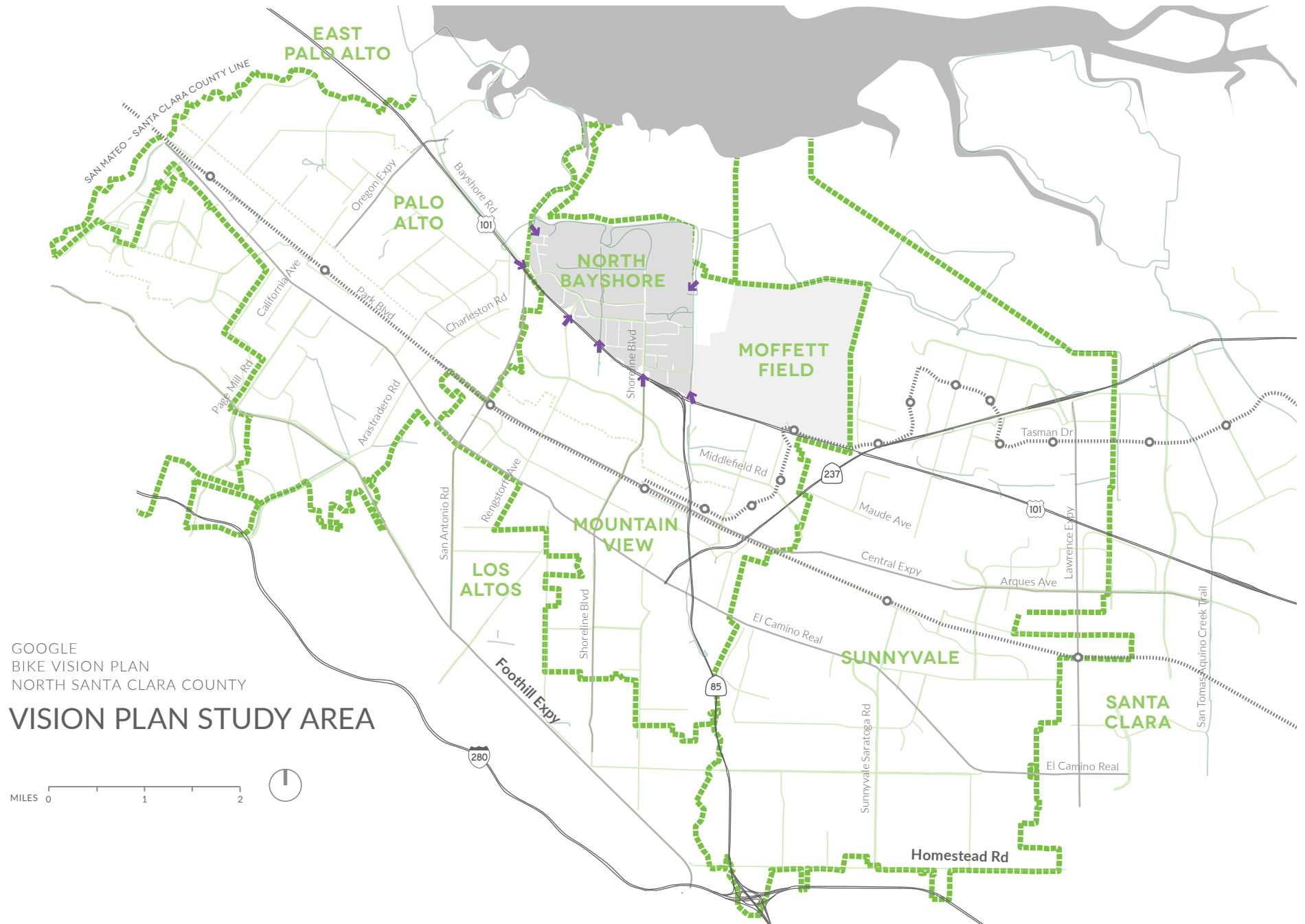
## Who’s Commuting By Bike Today?

City	Estimated number of commuters using bikes
Palo Alto	2,925 (9.6%)
Mountain View	3,366 (8.1%)
Sunnyvale	2,338 (3.2%)
Santa Clara	1,365 (2.4%)
Los Altos	442 (3.5%)
East Palo Alto	551 (4.5%)
San José	10,431 (2.3%)

Source: 2013 American Community Survey 3-year estimate

**Figure 1: North County Study Area**

The study area for the North Santa Clara County Bicycling Vision Plan includes Mountain View, Palo Alto, Los Altos, Sunnyvale, and western Santa Clara



GOOGLE  
BIKE VISION PLAN  
NORTH SANTA CLARA COUNTY

## VISION PLAN STUDY AREA

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## Existing Bicycling Network

The cities across North County already have a large network of bikeways, including:

- High-quality bike paths like the Stevens Creek Trail, the Permanente Creek Trail, and the San Tomas Aquino Creek Trail provide low-stress routes, although some trails are unpaved
- Bike lanes on major roadways like Middlefield Road or Shoreline Boulevard provide direct routes for confident riders
- A limited number of dedicated bicyclist and pedestrian crossings over and under Highway 101, State Route 85, State Route 237, and the Caltrain tracks
- Bicycle boulevards, like Bryant Street in Palo Alto, provide low-stress alternatives to bike lanes on higher-volume streets

The map on the facing page shows today's bike network in North County. Because signed bike routes (without any additional pavement markings or traffic calming features) have been shown in studies to have no impact on bicycling safety or comfort, they have been removed from this map.

Despite what looks like a fairly complete network of bikeways in the map on the facing page, Google's campus in the North Bayshore area is still cut off from the surrounding communities by Highway 101 and Moffett Field. There are seven points at which a bicyclist could access the North Bayshore campus area:

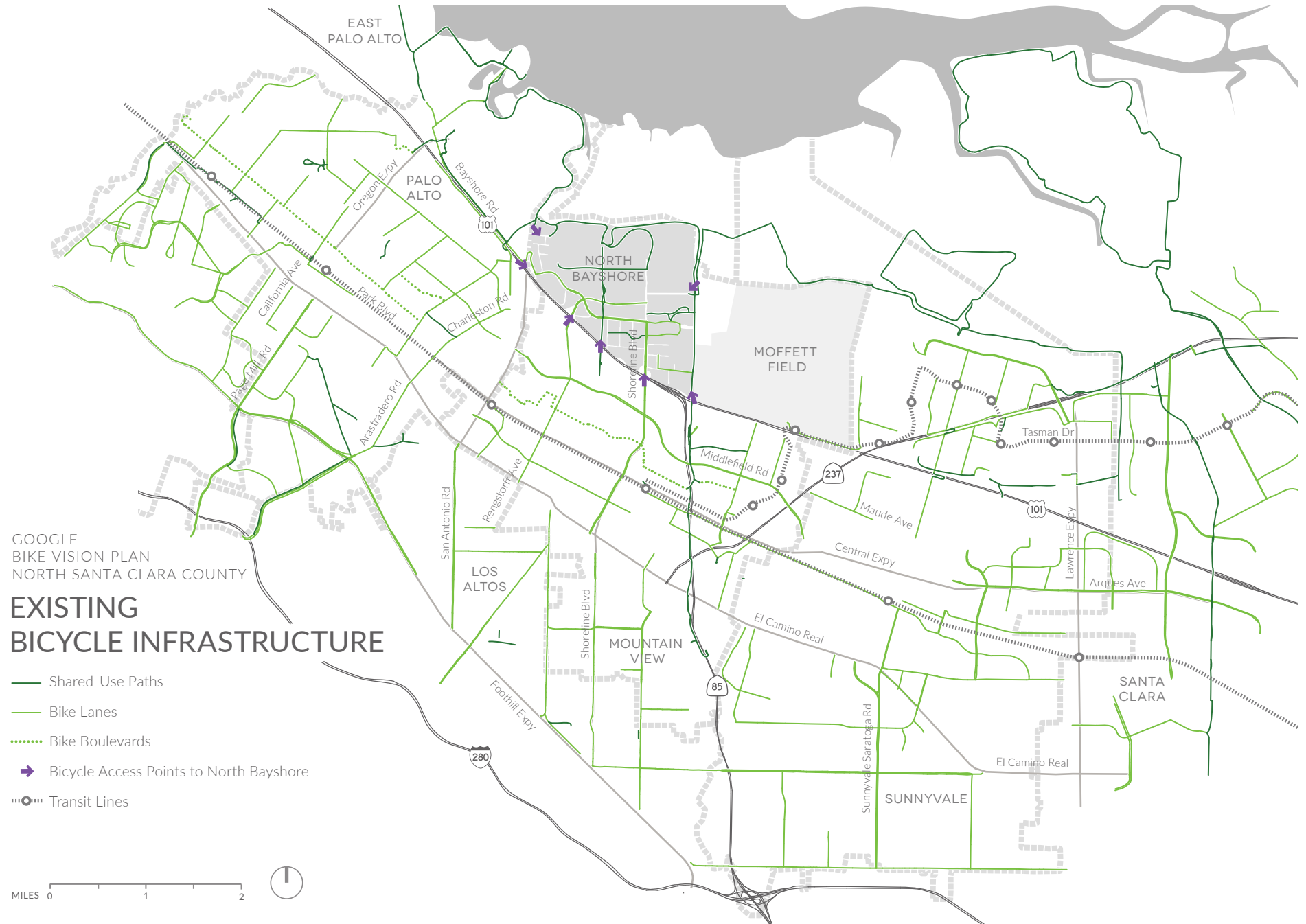
- Bay Trail
- East Bayshore Road
- San Antonio Road
- Rengstorff Avenue
- Permanente Creek Trail
- Shoreline Boulevard
- Stevens Creek Trail



*Although there are a lot of bike lanes in the communities across North County, many don't have the comfort or separation from faster-moving traffic necessary to attract a wide range of riders. Pictured above: bike lanes on Shoreline Boulevard near downtown Mountain View.*

**Figure 2: Existing Bicycling Network**

The existing bicycle networks for the communities across North County are in green. Access points to the North Bayshore campus area are in purple.



## Barriers to Bicycling

Although high-quality bike facilities exist within North County, the network is limited by **geographical barriers** and **high-stress streets**. A single high-stress intersection along an otherwise bicycle-friendly route can be the tipping point between getting residents to try bicycling or not.

**Geographical barriers** to bicycle access include: major highways, railroad tracks, creeks & flood-control channels that have few crossings and limited-access Expressways.

**High-stress streets** are those with multiple lanes and speed limits of 35 mph or more. Many streets that have bike lanes are also high-stress; building traditional bike lanes on such streets simply isn't enough to get more people riding bikes. High-stress streets are often designed for driving speeds well above the posted speed limit, discouraging all but the most confident of bicyclists. High-stress streets can also act as barriers to bicycling, with easy crossings only possible at intersections with traffic lights.

Geographical Barriers to Bicycling	Stressful Streets
Highway 101	El Camino Real
Highway 237	Tasman Drive
Highway 85	Shoreline Boulevard
Caltrain right-of-way	San Antonio Road
VTA Light Rail right-of-way	Moffett Boulevard
Central Expressway	Embarcadero Road
Lawrence Expressway	Sunnyvale-Saratoga Road
Oregon Expressway	Fremont Avenue
Moffett Field	Alma Street
Creeks & Flood Control Channels	Homestead Road

In addition to geographical barriers and high-stress streets, the design of intersections strongly influences who chooses to ride a bicycle. There are a number of ways intersections can be unfriendly to bicyclists:

- Bike lanes end before reaching the intersection
- Bike lanes merge across lanes of traffic
- Freeway on-ramps or off-ramps
- Uncontrolled crossings of multi-lane roads
- High-speed right-turn lanes (aka slip lanes)

To get more “interested but concerned” residents of North County to try bicycling, we need to tackle all three problems: barriers, high-stress streets, and intersection design. Bicycling solutions need to fit the context of the street's conditions - sometimes a bike lane simply isn't enough.

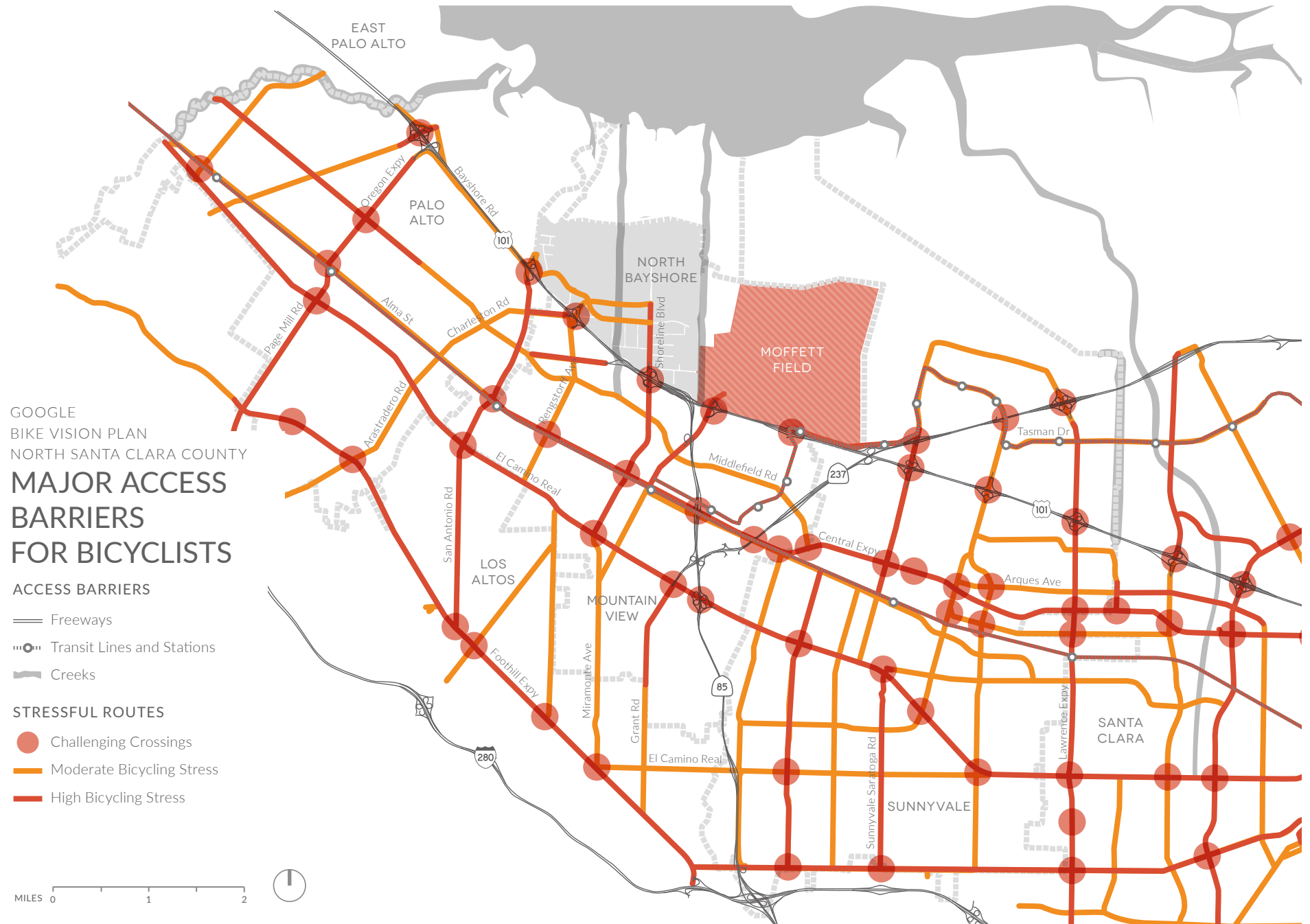


*A bicyclist waits for the signal on Shoreline Boulevard at Middlefield Road. Despite both streets having bike lanes, only the most experienced and confident residents would feel comfortable riding a bike through this intersection.*



**Figure 3: Major Access Barriers for Bicyclists**

High-stress streets are in red, moderate-stress streets in orange. Challenging crossings and intersections are shown as pink circles.



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## How Google Sees Bicycling

“BICYCLE NETWORKS SHOULD BE SAFE ENOUGH, COMPLETE ENOUGH, AND COMFORTABLE ENOUGH FOR PEOPLE OF ALL AGES TO RIDE ON THEM.”



While most bicycling maps show the existing bike network, and some even show notable barriers to access, what they don't show is an actual on-the-street experience for someone trying to ride their bike from one place to another.

If you're riding your bike in North County for the first time, will it be a harrowing experience or an easy breeze? Are there any barriers or high-stress locations that are blocking otherwise easy access? What would it take to get more people in North County to feel comfortable getting on a bicycle?

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## A NEW LOOK AT EXISTING CONDITIONS

To answer these questions, we needed to come up with a new way of looking at bicycling and bicycle networks. We identified three key measurements of what influences people's choices when riding a bicycle:

### 01 DISTANCE

The longer the ride, the less likely people will ride. This is especially the case if a bicyclist has to go far out of their way to use a better route.

### 02 RIDE STRESS

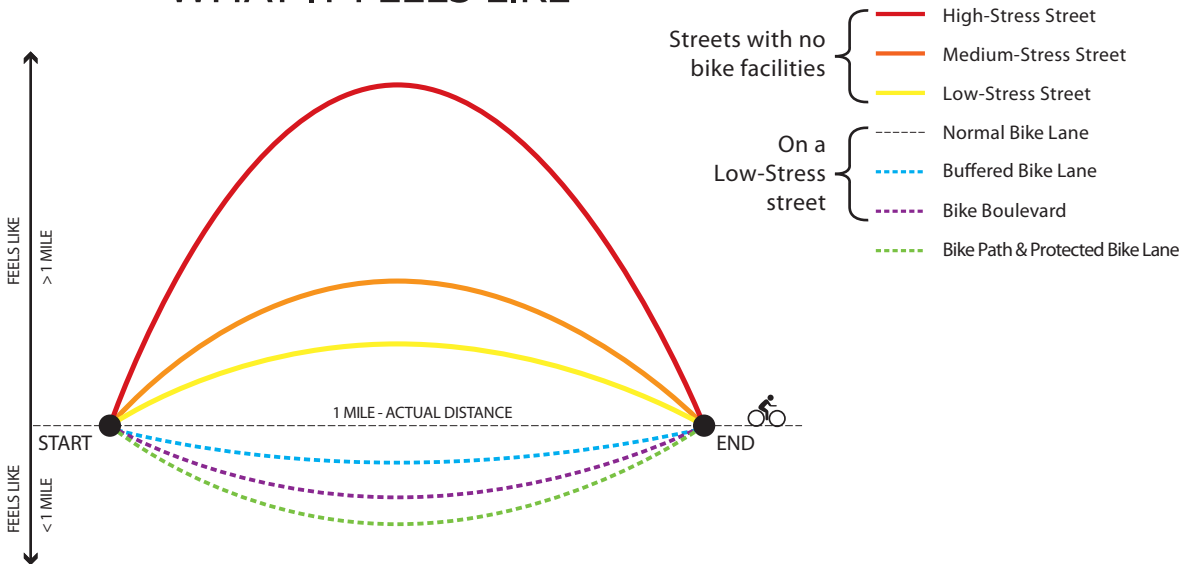
The wider the street, the faster the cars, the higher the stress for someone on a bicycle. More robust bicycle facilities can help reduce or eliminate stress for most bicyclists. Traveling on high-speed streets with no bike lanes, or crossing freeway on-ramps & off-ramps, is often too much stress for “interested but concerned” folks to tolerate - no matter how short the distance.

### 03 CONNECTIVITY

Routes need an acceptable level of stress from start to finish to get most people bicycling. A small gap in the network can introduce enough stress to prevent new bicycling trips. An otherwise complete network that doesn't get you where you want to go doesn't do you a whole lot of good.

# HOW MUCH STRESS WILL I ENCOUNTER ON MY RIDE?

## YOUR DISTANCE VS. WHAT IT FEELS LIKE



### If you want to ride a bike to North Bayshore, will your best route be too stressful?

The map on the facing page shows, in progressive grades, the total amount of stress you encounter on your best route to the North Bayshore.

From every point on the map, the best route to the North Bayshore is selected, taking into account your willingness to travel out-of-direction for a better route. Each segment on your route is scored for stress. The better the quality of your ride, the longer you can travel before reaching the next level of stress.

Notable on this map is the low-stress access provided by the Stevens Creek Trail, the Permanente Creek Trail, and Palo Alto's Adobe Creek undercrossing of Highway 101 (though open seasonally until a new overcrossing is built).

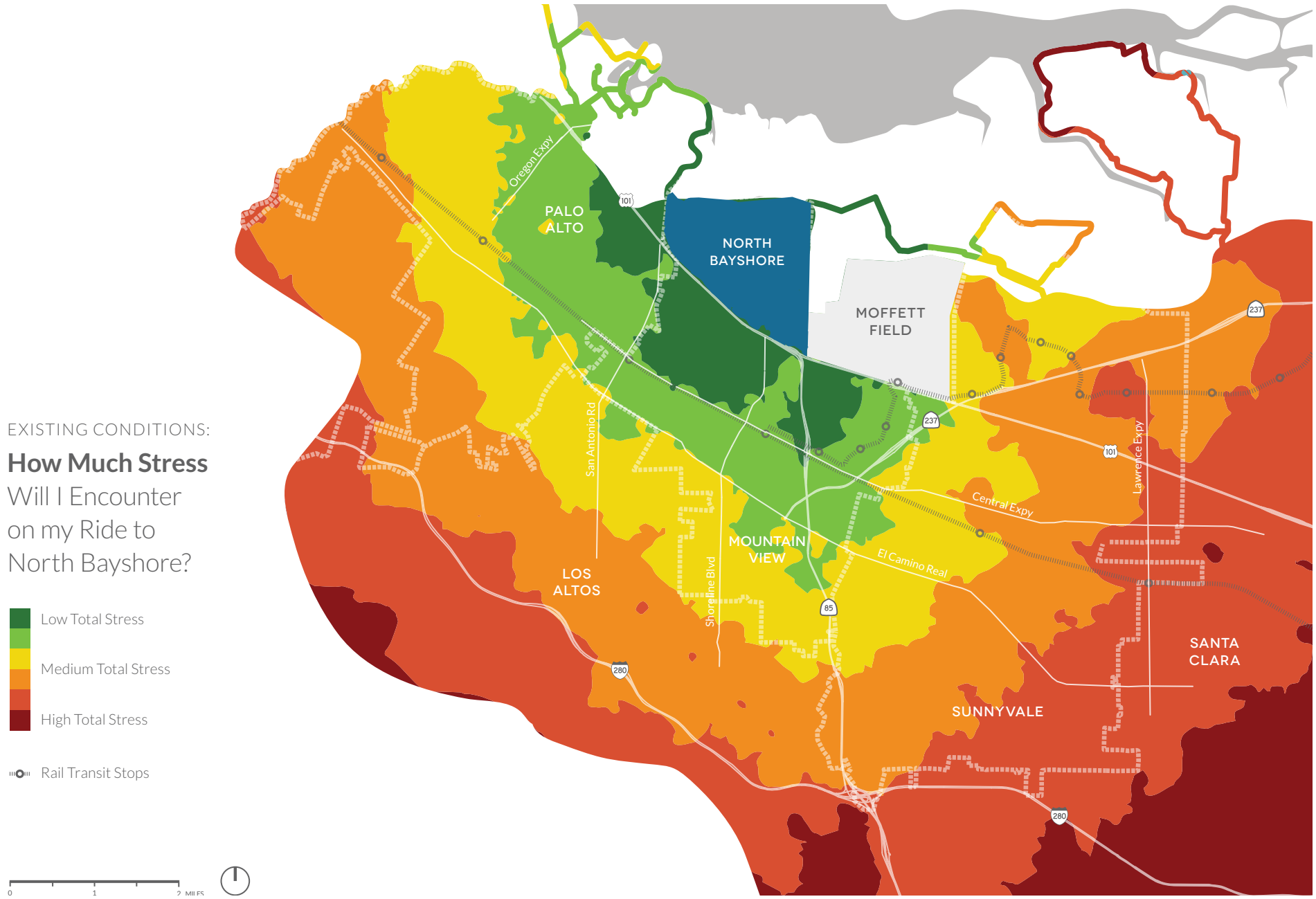
While this map is useful for comparing bicycle access in different areas, it doesn't give a complete picture for "interested but concerned" bicyclists. Because measured route stress increases with distance, a short route on a high-stress street can still produce a relatively good score.

Putting up with a short distance on high-stress streets may be okay for confident bicyclists, but can be a deterrent for less confident bicyclists.

Where are the points of highest stress that would stop people from riding a bicycle? Where are the locations where, no matter what route you chose, it's going to be a stressful ordeal?

**Figure 4: How much stress will I encounter on my ride to North Bayshore?**

This map measures how much total (distance-based) stress is encountered on your ride to North Bayshore. Pathways like the Stevens Creek Trail and the Permanente Creek Trail extend the range of low-stress routes to North Bayshore.



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## WHAT'S THE **AVERAGE STRESS** I'LL ENCOUNTER ON MY RIDE?



*Riding on a high-stress route, even for a short distance, can discourage all but the most confident riders.*

*Photo: Richard Masoner*

### **If you're traveling to North Bayshore from anywhere in North County, what is the average level of stress you'll encounter?**

The map on the facing page shows the average amount of stress you'll encounter on your route to the North Bayshore - no longer limited by the total distance traveled.

This map also shows "hot spots" where there are no good ways to get from there to the North Bayshore without being subjected to a high level of stress. Many barriers to bicycling, like El Camino Real, San Antonio Road, and the Central Expressway, show up as hot-spots on this map due to their high speeds and lack of bike facilities.

The hot spots in this average stress map have a downstream effect on areas to the south, creating stressful crossings and intersections for otherwise comfortable bike routes.

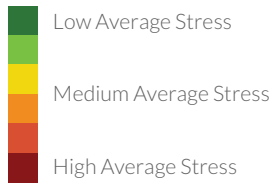
The Stevens Creek Trail has a positive impact on access from downtown Mountain View and western Sunnyvale. The Permanente Creek Trail, however, hemmed in by the higher-stress Shoreline Boulevard and Rengstorff Avenue, has a much more muted effect on spreading low-stress access to the North Bayshore.

But what would it take to remove those "hot spots" of stress? What would it take to make bike commuting to the North Bayshore safe, comfortable, and fun from anywhere in North County?

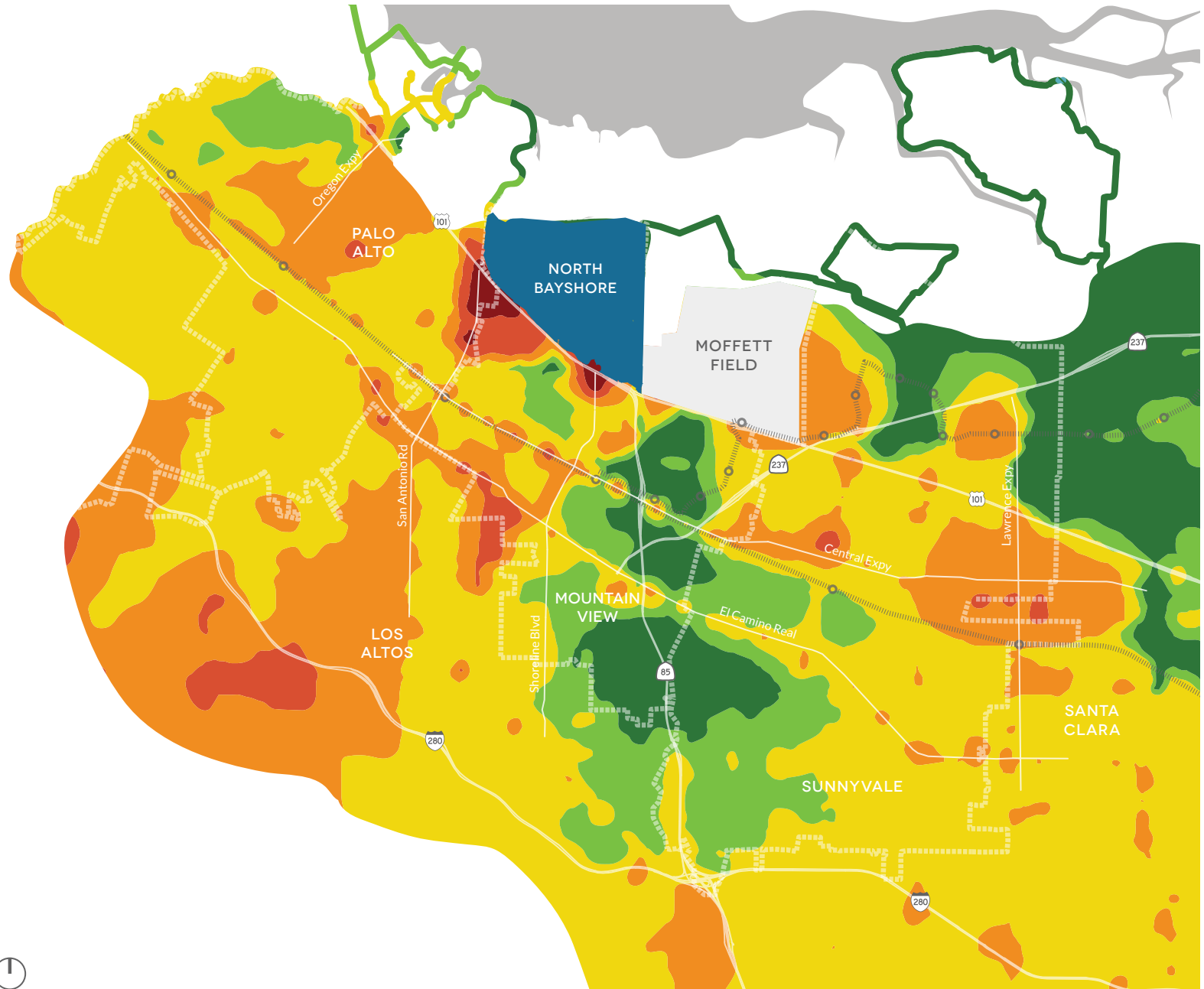
**Figure 5: What's the Average Stress I'll encounter on my ride to North Bayshore?**

This map shows the average stress of any given route to North Bayshore. Areas with bad scores may have short routes, but they also have a high level of stress between the starting point and the North Bayshore.

EXISTING CONDITIONS:  
What's the  
**Average Stress**  
I'll Encounter  
on my Ride to  
North Bayshore?



● Rail Transit Stops



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# Our Vision: North County-as-Copenhagen

## What Does it Take to Make Everywhere a Nice Place to Ride?

With today's bike network, quality low-stress routes to the North Bayshore are limited. This is especially the case for "interested but concerned" bicyclists, who have a lower tolerance for stressful streets and intersections.

The communities of North County already have fairly built-out bike networks, but they're cut off from each other and from the North Bayshore area by stressful gaps in the network (often at the city limits) and challenging intersections. Without improving these gaps and points of stress, it will be difficult to get more people to try bicycling.

So: what **would** it take to get more people to try bicycling? What kind of network do we need for people to feel comfortable and safe when bicycling to almost anywhere in North County?

We came up with what we call "**North County-as-Copenhagen**" - a radically different vision of complete, low-stress facilities connecting all the communities of North County.

## How Does the Vision Plan Change My Ride to the North Bayshore?

On pages 26-30, we've taken this concept and re-run our stress analysis. What do the following maps show us?

The Vision Plan displays transformative results for bicyclists across the region. Building out the priority corridor network expands the range of low-stress bicycling to a much larger area and to a larger number of potential bicyclists. Improvements in comfort for potential bicyclists are spread broadly among residents in Mountain View, Los Altos, Palo Alto, and Sunnyvale.

The corridors here are for demonstration purposes only, and do not constitute an explicit endorsement by Google.

## North County-as-Copenhagen:

### *Bicycle Priority Corridors*

Our network of low-stress priority corridors creates a cascade effect on large swathes of the surrounding communities, allowing low-stress bike rides between home, work, school, shopping, and play.

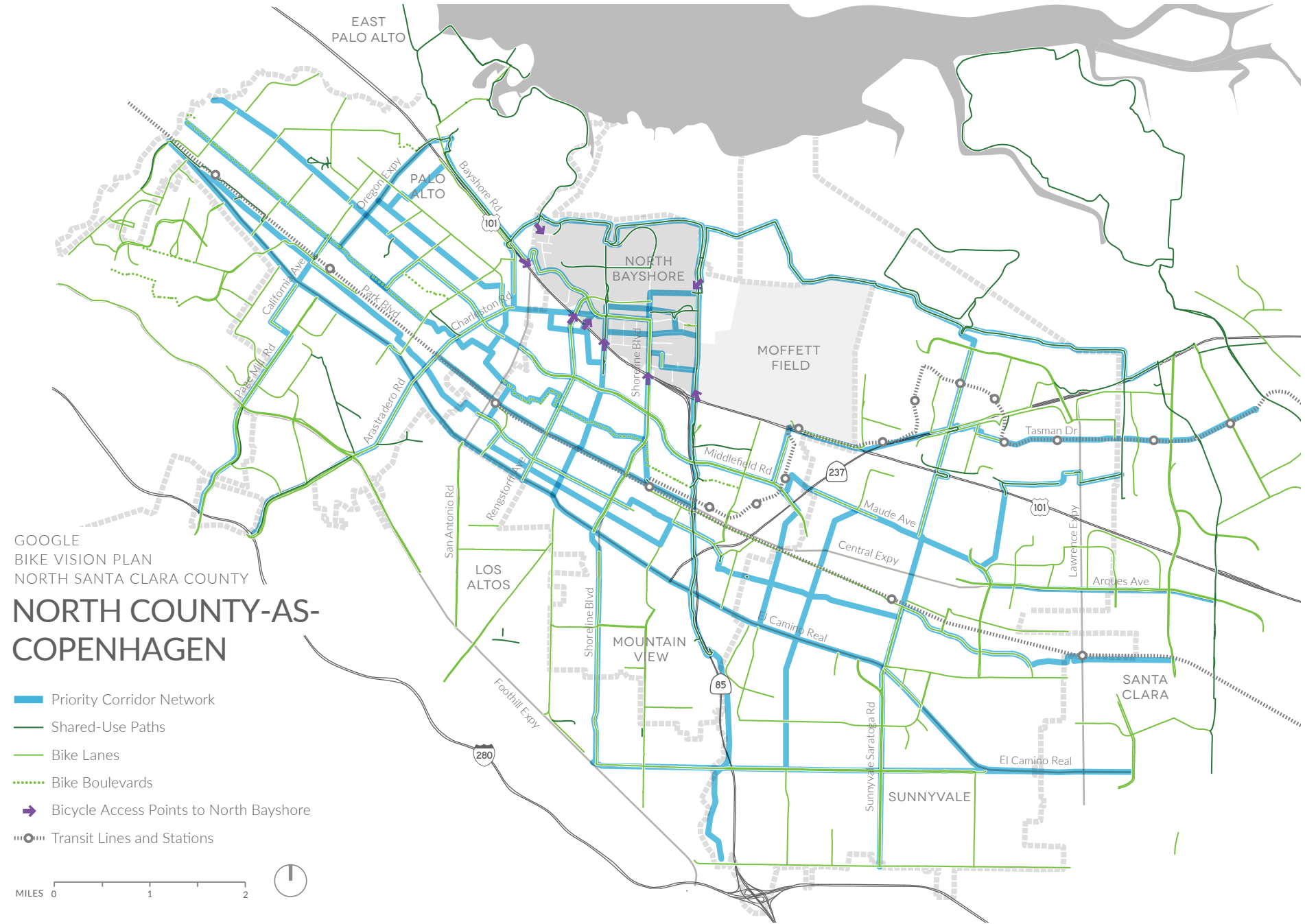
The map on the facing page shows the priority corridors of the Vision Plan and how it would connect with the existing bike network. Some priority corridors already have bike lanes; our vision sometimes uses existing infrastructure, sometimes improves upon a planned project, and sometimes proposes something new. In all cases, the Vision Plan concepts are sensitive to the context of the existing street.

North County-as-Copenhagen is inspired by VTA's Countywide Bicycle Master Plan, VTA's Bicycle Expenditure Plan, local Bicycle Master Plans, and the Grand Boulevard Initiative.



**Figure 6: North County-as-Copenhagen**

By improving key corridors in the surrounding communities, existing networks of bicycle-friendly neighborhoods can be connected and enhanced.

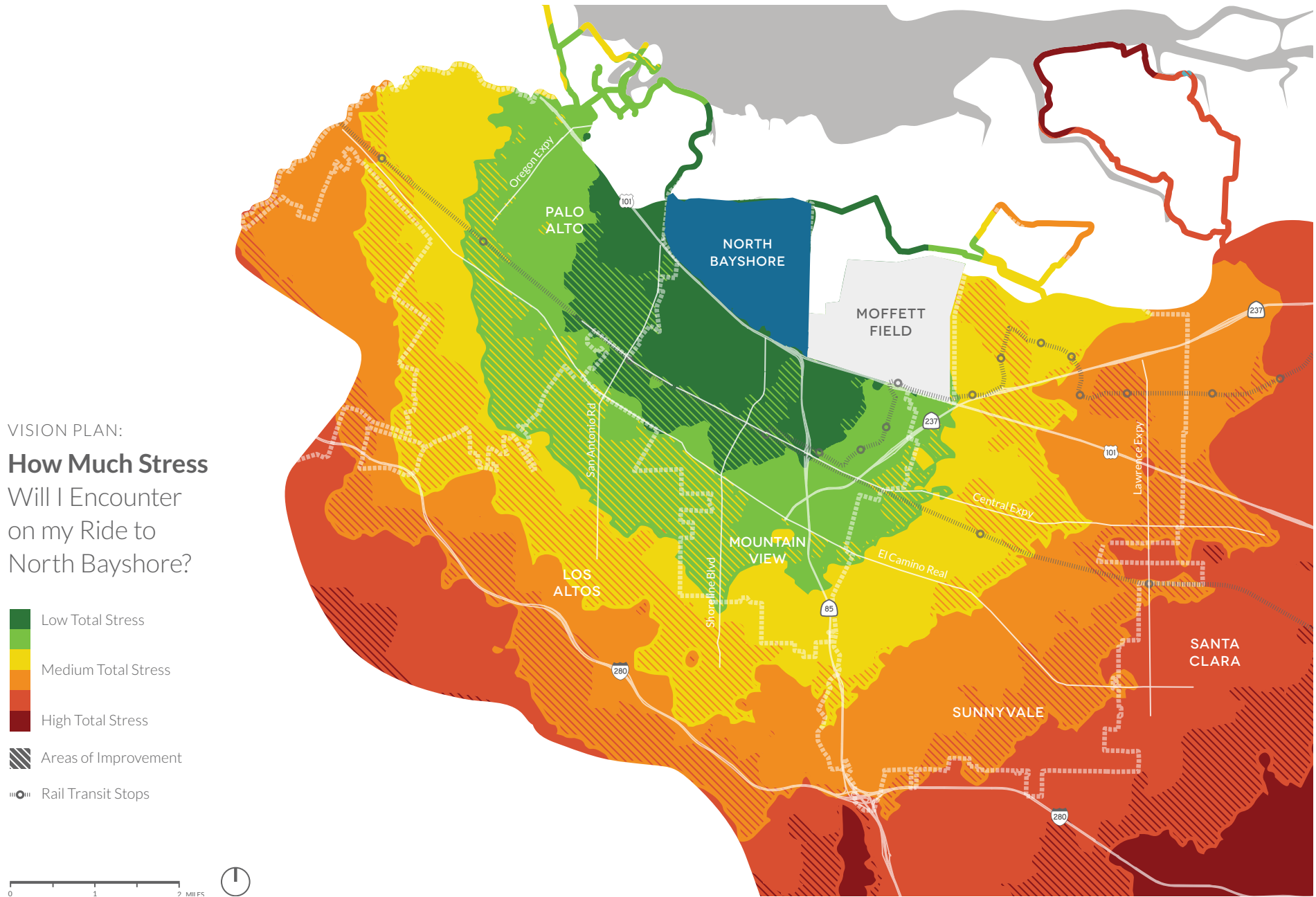


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NORTH SANTA CLARA COUNTY  
**NORTH COUNTY-AS-COPENHAGEN**

- ▬ Priority Corridor Network
- ▬ Shared-Use Paths
- ▬ Bike Lanes
- ⋯ Bike Boulevards
- ➔ Bicycle Access Points to North Bayshore
- ▬● Transit Lines and Stations

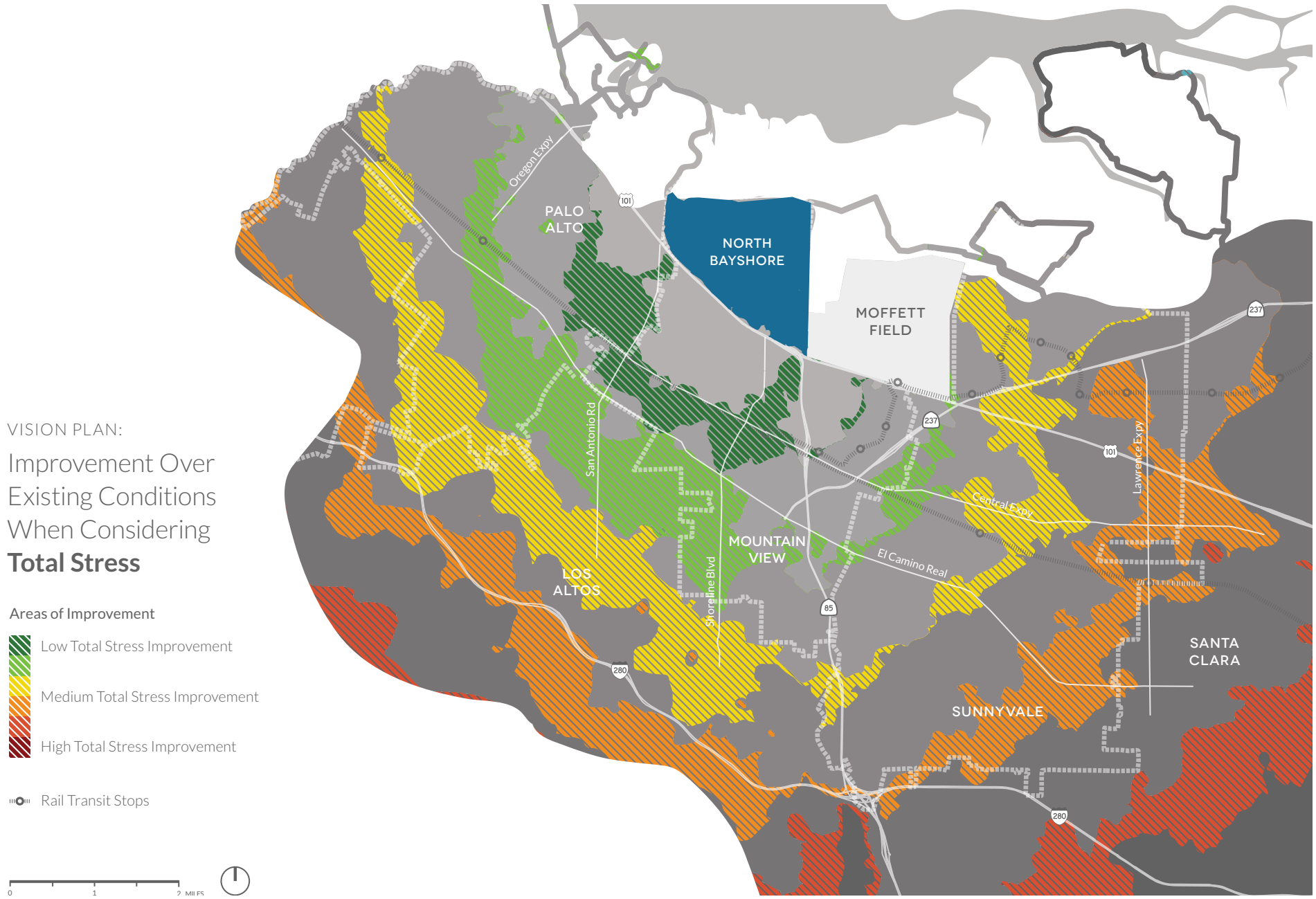
**Figure 7: How Much Stress Will I Encounter on my Ride to North Bayshore? (Vision Plan)**

This map shows the impact of the Priority Corridor Network on trips to the North Bayshore when measuring total (distance-based) stress.



**Figure 8: How Much Distance-Based Stress Does the Priority Corridor Network Remove? (Vision Plan)**






This map shows the areas of improved bicyclist comfort over existing conditions if the Priority Corridor Network were built out.

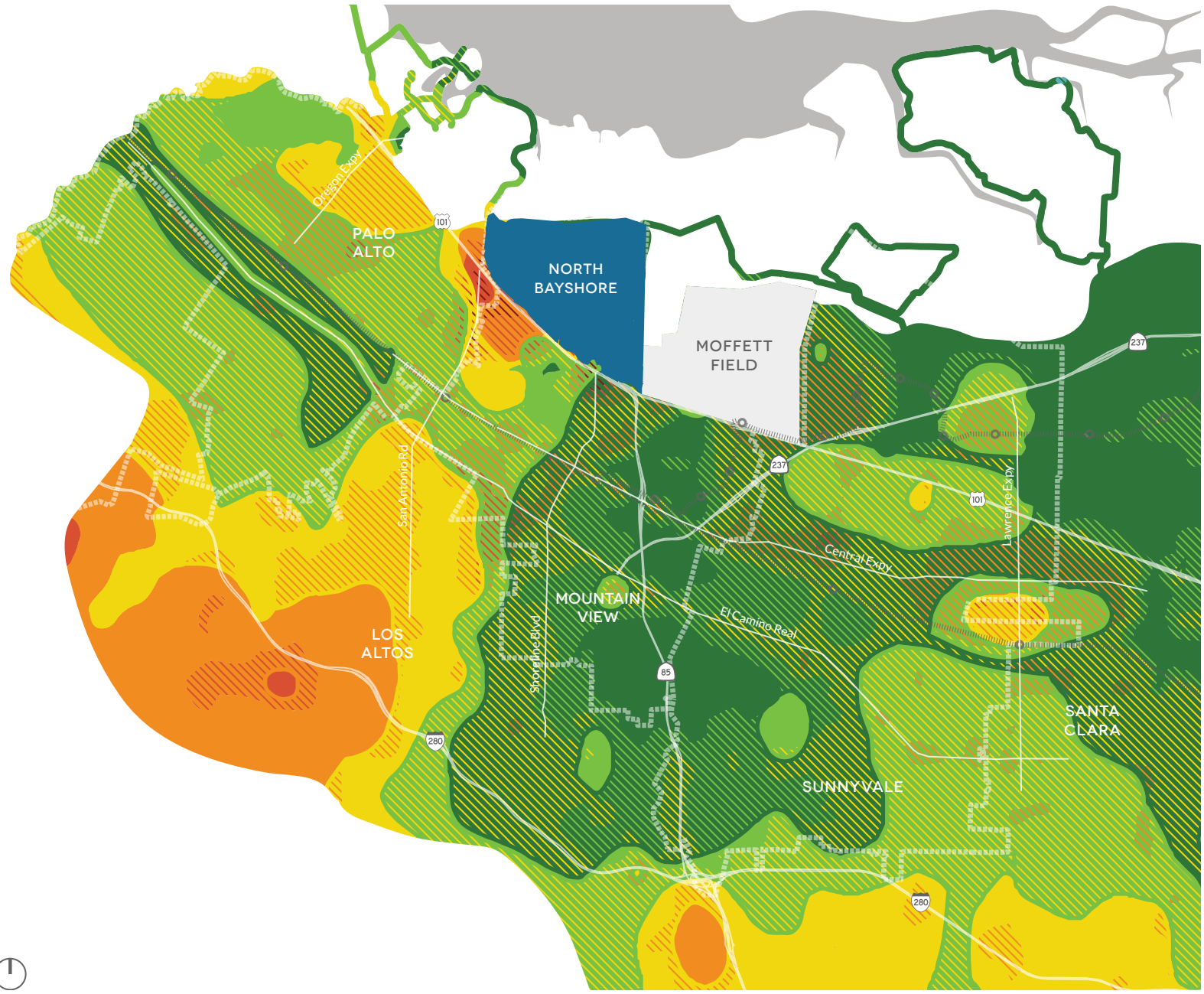


**Figure 9: What's the Average Stress I'll Encounter on my Ride to North Bayshore? (Vision Plan)**

This map shows the impact of the Priority Corridor Network on trips to the North Bayshore when measuring average stress.

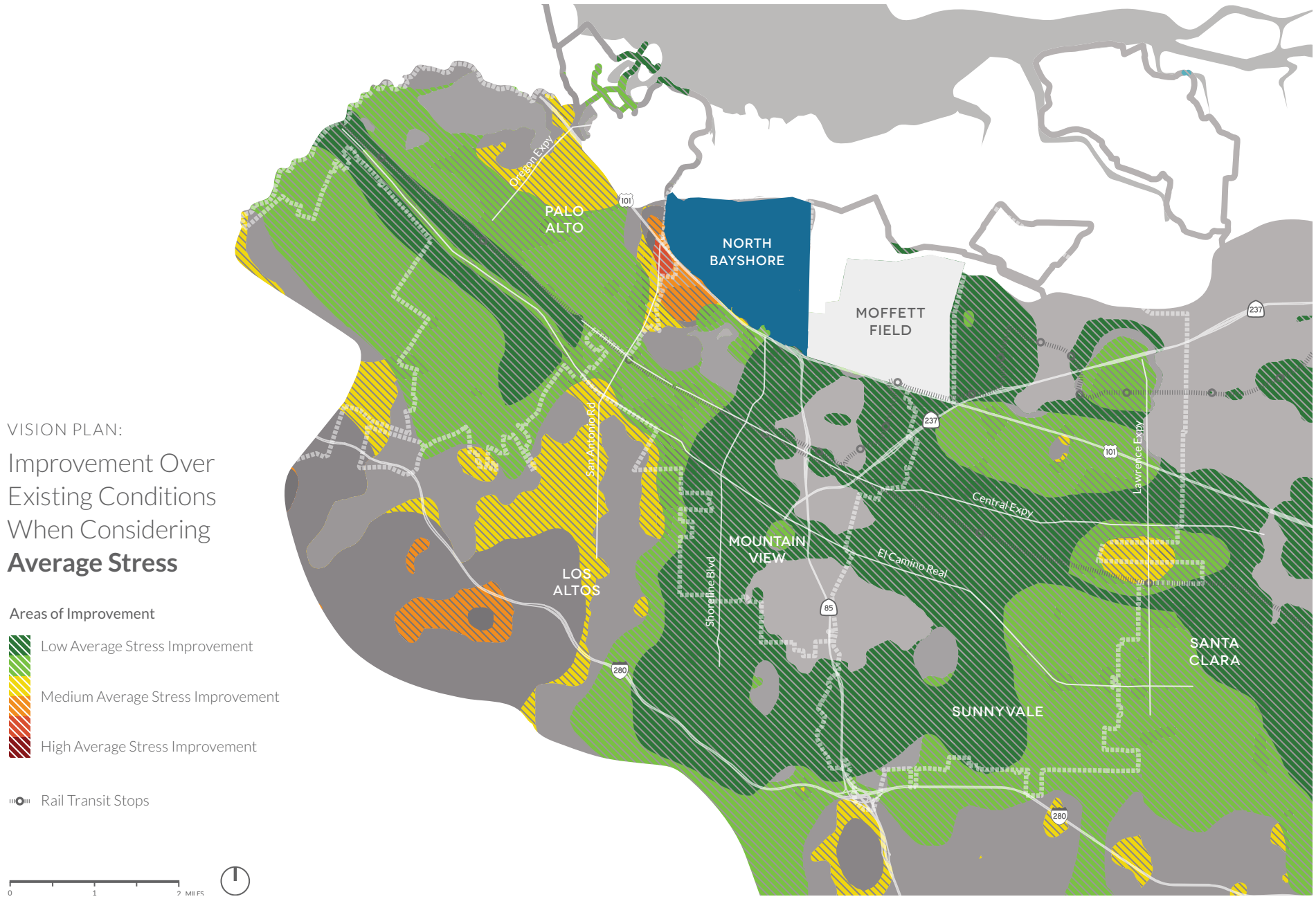
VISION PLAN:  
What's the  
**Average Stress**  
I'll Encounter  
on my Ride to  
North Bayshore?

-  Low Average Stress
-  Medium Average Stress
-  High Average Stress
-  Areas of Improvement
-  Rail Transit Stops



**Figure 10: How Much Average Stress Does the Priority Corridor Network Remove? (Vision Plan)**

This map shows the areas of improved bicyclist comfort over existing conditions if the Priority Corridor Network were built out.



# Creating Low-Stress Networks

## Getting More People on Bikes, Re-visited

**60%**

About 60% of the population can be classified as “Interested but Concerned” - they will only bicycle on low-stress streets and have a low tolerance for high-stress streets or intersections.



While this Rancho Cucamonga street has a bike lane, it would never be considered “low-stress”

SO, WHAT DOES “**LOW-STRESS**” MEAN AND HOW DOES THE VISION PLAN ACHIEVE IT?

*Our Vision Plan defines “low-stress” as:*

**Multi-Use Paths:** Bike paths and trails that easily accommodate people on bikes.

**Protected Bike Lanes (Cycle Tracks):** Bike lanes that are separated and protected from traffic by physical barriers, parked cars, or both.

**Bike Boulevards:** Bike Boulevards are streets with signs, pavement markings, and traffic calming devices all designed to make it more comfortable to ride a bike. Not all Bike Boulevards are equal: those in Palo Alto are the best in the region.

**Buffered Bike Lanes On Low & Medium Volume Streets:** While standard bike lanes on a medium volume street can be too stressful when riding a bike, a paint buffer can give more lateral separation and increase comfort & safety.

**Standard Bike Lanes On Low Volume Streets:** When there are few cars on a street, most people will feel comfortable using a standard bike lane.



Photo: Severin Martinez

## Am I Connected?

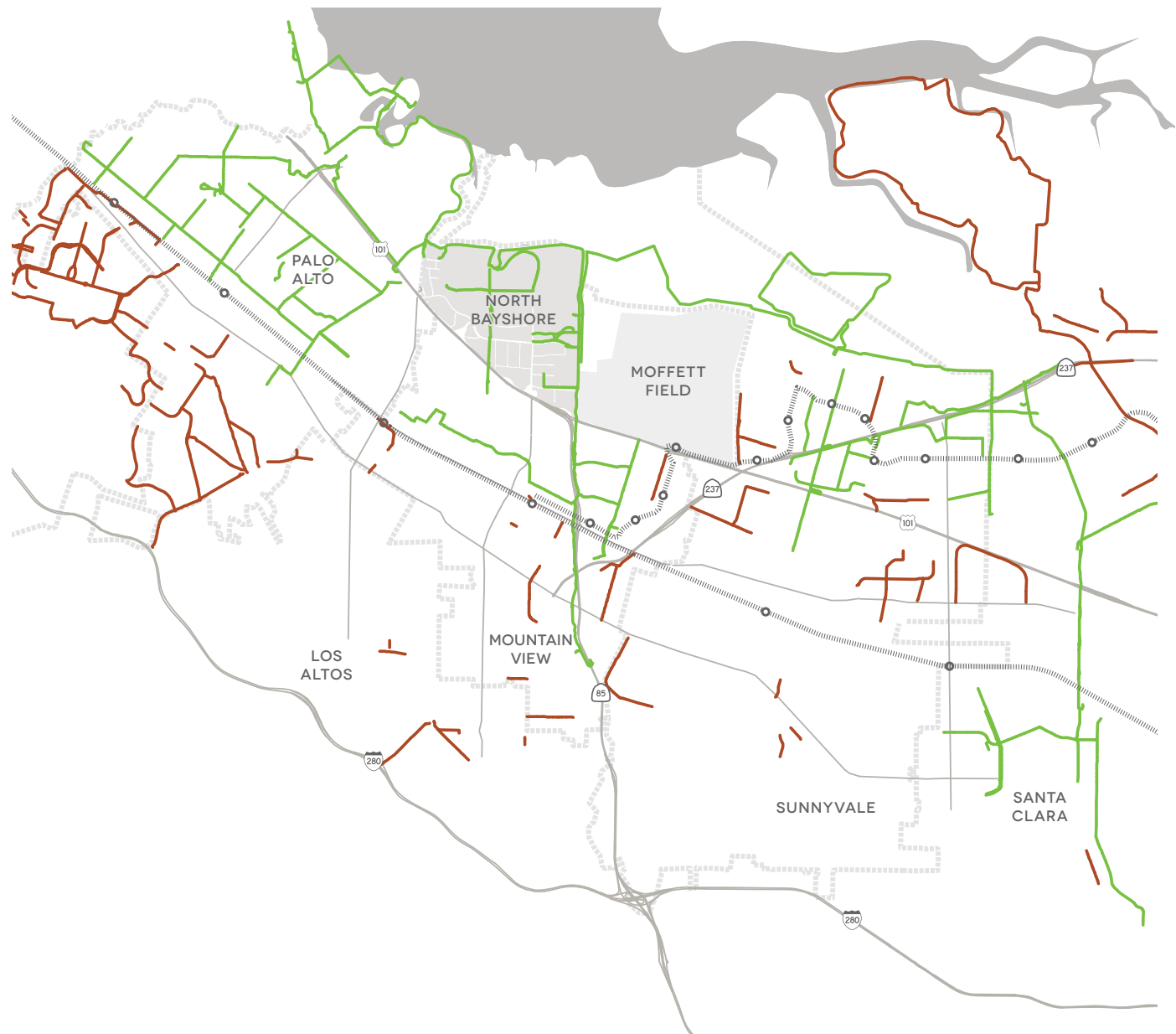
The series of maps on pages 32-33 show off only those parts of the bike network that “Interested but Concerned” riders would use - both under today’s conditions and North County-as-Copenhagen. Both maps show which parts of the network connect riders to the North Bayshore and which parts don’t.

Under existing conditions, there is a large network of bikeways in Palo Alto that are friendly for all riders, but with few connections to the North Bayshore. Sunnyvale and Mountain View have some connections to North Bayshore, but their total networks are far less robust than Palo Alto. Furthermore, many bike lanes in Sunnyvale and Mountain View are on the high-speed streets, and thus don’t show up on our network.

Under North County-as-Copenhagen, all of the cities become much more connected to each other. Access on low-stress bikeways extends far south into in Sunnyvale, Mountain View, and Los Altos.

AMSTERDAM AND COPENHAGEN WERE NOT ALWAYS BIKE FRIENDLY; THEY MADE A DECISION TO PRIORITIZE PEOPLE AND FOLLOWED IT UP WITH LEADERSHIP AND INVESTMENT.

IF THEY CAN DO IT, SO CAN WE.



EXISTING:

### Am I Connected to North Bayshore?

This map shows only the low-stress bike network available to “Interested but Concerned” riders under today’s conditions.

— Connected	87 mi
— Disconnected	77 mi
<b>Total</b>	<b>164 mi</b>



Figure 11: Am I Connected to North Bayshore? (Existing Conditions)



VISION:

## Am I Connected to North Bayshore?

This map shows only the low-stress bike network available to "Interested but Concerned" riders under the Vision Plan.

Connected	270 mi
Disconnected	7 mi
<b>Total</b>	<b>277 mi</b>

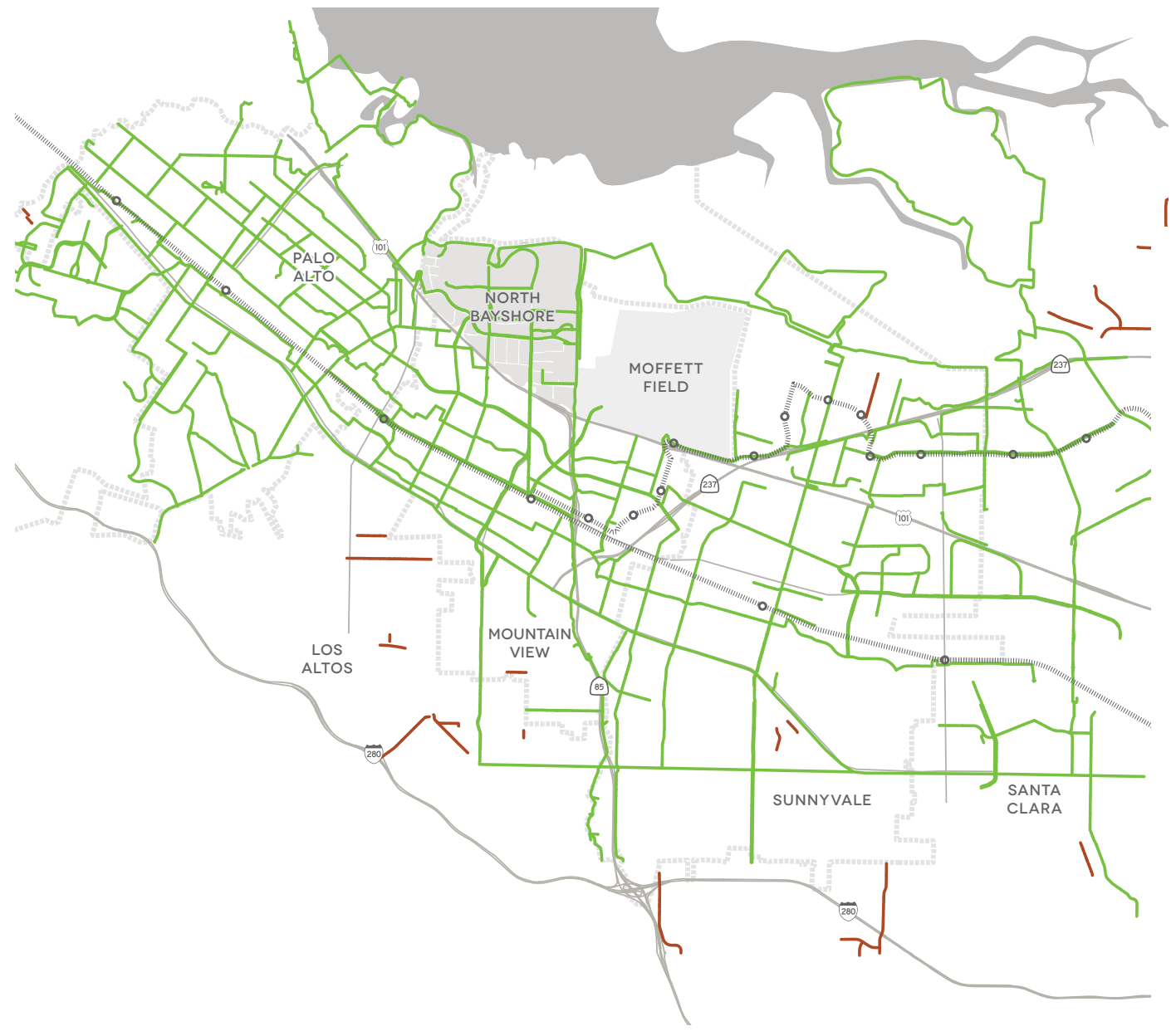


Figure 12: Am I Connected to North Bayshore? (Vision Plan)

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## Conclusion

Throughout this Vision Plan, we have tried to demonstrate our vision of a future where bicycling is easy, comfortable, safe, and direct. Solutions to today's most pressing transportation problems will come from more people choosing to ride a bicycle; we are convinced that such solutions are eminently possible in the communities we call home. Our belief in the power of the bicycle has led us to develop this plan and led to our support for building out bicycling networks in North County.

We need to start thinking differently about bicycling. No longer can we lay out networks that deter all but the bravest bicyclists. To get more people riding bicycles, we need to meet their needs: the need to be safe & feel safe, the need to reach a destination conveniently & comfortably, and (most importantly) the need to enjoy yourself while riding a bicycle.

We recognize that cities already have adopted Bicycle Master Plans, and that City staff work very hard to implement those plans for the benefit of all roadway users. Our Vision Plan is in no way meant as a replacement, but instead articulates a worthy goal.

Some bicycle master plans won't be completed in 20 years or more – let's challenge ourselves to get them built in 5 years instead. And once we've built them out, let's keep going until we've created the most bike-friendly region in California, then in the United States, then in the whole world. With leadership, public support, and funding, there is no limit to what we can accomplish together.

We hope that this Vision Plan can play a small part in helping cities around the country, and around the world, become places where everyone feels safe enough to ride a bicycle.

TO GET MORE PEOPLE  
RIDING BICYCLES, WE NEED  
TO MEET THEIR NEEDS: THE  
NEED TO BE SAFE & FEEL  
SAFE, THE NEED TO REACH A  
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& COMFORTABLY, AND (MOST  
IMPORTANTLY) THE NEED TO  
ENJOY YOURSELF WHILE RIDING  
A BICYCLE.



Photo: Kristen Maddox

# Appendix: Facilities & Programs

## LOW STRESS FACILITIES: BICYCLE BOULEVARDS

Bicycle boulevards are bike routes on local roads that prioritize bicyclists, pedestrians and neighborhood traffic while discouraging cut-through traffic. Bicycle boulevards come in many forms and can include:

- Wayfinding signs
- Pavement markings
- Traffic calming (bulb-outs, traffic diverters, chicanes, speed humps)
- Bicycle crossing signals
- High visibility pedestrian crosswalks
- Bicycle detectors at intersections



*Clockwise from the top left: Wayfinding signs in Berkeley, CA; Pavement markings in Berkeley, CA; Traffic diverters in Eugene, OR; Bicycle crossing signal in Santa Barbara, CA; Median island for crossing bicycles in intersection, Los Angeles, CA; Roundabout in Tuscon, AZ*



## LOW STRESS FACILITIES: BIKE LANES

Bike lanes provide a dedicated space on the roadway for bicyclists, usually with striping, signage, and pavement markings. Bike lanes are the most often used treatment in the United States to create space on the roads for bicyclists.

Standard bike lanes may not be enough to make all potential bicyclists feel comfortable using the street. Additional features can help make a bike lane inviting for bicyclists of all ages and abilities. Extra features, however, should consider the conditions on the street in question: on lower volume/lower speed streets, standard bike lanes may be enough.

Additional features for bike lanes include:

- Buffered paint areas, separating bicyclists from parked cars or from moving vehicles
- Green paint on bike lanes to improve bicyclist visibility at merging locations or at the start of each block
- “Bike boxes” at intersections, which let bicyclists filter in front of vehicles at red lights
- Bike lane markings through the intersection to guide bicycle traffic
- Two-stage turn queue boxes, which allow bicyclist to make left turns without merging across lanes of vehicle traffic
- Contra-flow bike lanes, providing two-way bike traffic on one-way streets

Clockwise from the top left: Buffered bike lane in San Francisco, CA; Green bike lane and merging zone in Cambridge, MA; Intersection bike markings in Vancouver, BC; Two-stage left turn box, NACTO Guide; Contra-flow bike lane in Washington, D.C.; Bike Box in Portland, OR

## LOW STRESS FACILITIES: PROTECTED BIKE LANES

For some streets with high volumes or high automobile speeds, less confident bicyclists will not feel comfortable even when provided with bike lanes - buffered or otherwise. In these instances, protected bike lanes are a recommended option.

A protected bike lane (also called “cycle tracks”) is an exclusive on-street bicycle facility that is physically separated from traffic. Protected bike lanes help provide more comfort and safety for potential bicyclists by providing separation and certainty to drivers and bicyclists alike. Protected bike lanes, wider than typical bike lanes, should also be considered for streets with particularly high volumes of bicyclists.

Protected bike lanes can be either one-way or two-way, on one or both sides of a street. Separation from vehicles is achieved with pavement markings, coloring, bollards, curbs/medians or a combination of these elements. Protected bike lanes can also have vertical separation from drivers, at a height halfway between the street and sidewalk to help differentiate the space for bicyclists. Protected bike lanes are particularly appropriate on roads with few cross-streets, a limited number of driveways, longer blocks, high traffic volumes, and signalized intersections.

Streets like Shoreline Boulevard or Sunnyvale-Saratoga Avenue, and the expressway system of Santa Clara County, are prime candidates for protected bike lanes.



Above: A protected bike lane in downtown Long Beach, CA. Photo: Richard Risemberg  
Below: A 2-way protected bike lane in Davis, CA. Photo: D Kemp.



## LOW STRESS FACILITIES: MULTI-USE PATHS

A multi-use path, also called a bike path, is an off-street facility for bicyclists and pedestrians. Multi-use paths are typically for recreational use, often following the routes of rivers, utility corridors or are built atop old decommissioned railroad lines. Some multi-use paths can also serve as major bicycle commuter routes. Multi-use paths often have limited points of access, limiting their utility for commuting to only those who have easy access to and from the path. Providing robust on-street networks of bicycle infrastructure around access points to multi-use paths can significantly increase the number of bicyclists using a multi-use path for commuting trips.

There are many multi-use paths in the communities around the region, including:

- The Bay Trail
- The Stevens Creek Trail
- The Permanente Creek Trail
- The San Tomas Aquino Creek Trail
- The Calabazas Creek Trail
- The Hetch-Hetchy Trail
- The Embarcadero Bike Path
- The Palo Alto-Los Altos Path
- The Bol Park Path
- The Arastradero Road Path
- The JWC Greenbelt



Above: The Permanente Creek Trail

Below: The Hetch-Hetchy Trail

## CONTINUITY, CONNECTIVITY, CONVENIENCE: SUPERHIGHWAYS

Superhighways are dedicated bicycle routes designed for high volumes of long-distance commuters, usually more than 10 miles. They are clearly marked, with route signs and wayfinding signs that resemble those of vehicular highways. Obstructions are minimized to provide a safe, comfortable journey. Superhighways combine segments of pre-existing multi-use paths, cycle tracks, and bike lanes to provide viable long-distance bicycle commutes. Superhighways meet the specific needs of commuters, providing a consistently fast, direct, and efficient route.

### COPENHAGEN

Copenhagen's network of 26 planned bicycle superhighways, some up to 14 miles long, connects multiple suburbs with downtown. The City completed the first 11-mile route in 2012 in the city's first step for this ambitious plan. Another two routes have been completed since then.

Along cycle superhighway routes, the City improves intersections, completes missing bikeway gaps, adds amenities, and reworks signals. Traffic lights are timed to average cycling speed, reducing the number of stops for bicycle commuters. Air pumps and bicycle repair stations are installed at mile intervals along the route and the routes themselves are branded with their own symbology, similar to that of the city's Metro system.

The Copenhagen bicycle superhighway model has since become the gold standard of cities striving to become truly world-class for bicycling. The Copenhagen model has been referenced in ambitious American bicycle plans such as the Chicago Streets for Cycling Plan 2020.



Above: A map of the planned bicycle superhighway network in Copenhagen. The network will have bicycle service stations and connect to regional and local transit hubs.

Source: [cykelsuperstier.dk](http://cykelsuperstier.dk)





Above: A section of the Barclays Cycle Superhighway. Each route is numbered, similar to freeways for automobile drivers.

### **BARCLAYS CYCLE SUPERHIGHWAY, LONDON**

The Barclays Cycle Superhighway in London is another cycle superhighway system in development. Launched in 2010, the network now has four routes between inner and outer London, with six more in planning. Barclays sponsored the cycle superhighway routes, which are built and controlled by Transport For London (TfL).

These superhighways connect many neighborhoods to key destinations and many routes are upgrades of popular existing bicycle facilities, identified through market-based research.

Superhighway maps identify cross streets, their level of vehicle traffic, and their level of comfort for bicyclists. The Barclays Cycle Superhighway provides bike parking, implemented by Transport for London, adding 7,708 bicycle parking spaces on-street and in local businesses.

The TfL cycle superhighway system has seen a measure of controversy since its introduction in 2010. Some bicycling advocates have criticized the incomplete nature of some routes on the system, citing gaps in infrastructure and poor transitions. TfL is in the process of planning infrastructure upgrades to existing cycle superhighway routes.

Full build-out of the system is predicted to boost bicycle mode share in London by 400% by 2025.

## PROGRAMS: BIKE SHARING

Bike sharing programs can support employees who wish to take transit, carpool, or bike to work by adding another transportation option for short trips - typically under 2 miles. Bike sharing helps replace short car trips, distances that are too far to comfortably or quickly walk. Bikeshare can provide an easy way for employees to get to another meeting nearby, as well as provide a “first-mile/last-mile” connection for transit riders.

Bike sharing programs include stations of bikes that are closely spaced in key destination centers to facilitate short trips. Users check out bicycles for a specified period of time at one station (usually 30 minutes maximum) and turn them back in at any other station. Bike sharing programs are usually subscriber-driven, but also can allow users to purchase short-term passes of one to three days.

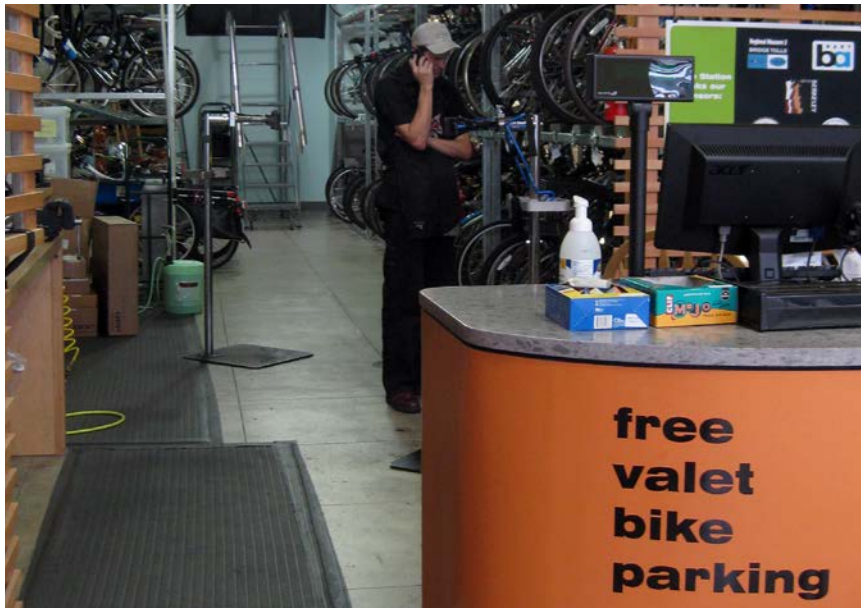
The bicycles used in bike sharing programs are specially built to withstand most tampering or theft, and can easily be adjusted to accommodate most adult heights and sizes.

Bike share is rapidly growing in North America; New York City launched a bikeshare system, Citibike, which will eventually boast 10,000 bikes at over 600 stations. Citibike already boasted its millionth ride within the first year of operation. Washington DC, Boston, Chicago, Minneapolis, Denver, and many other cities around the country boast their own bikeshare systems.

In the Bay Area, the Metropolitan Transportation Commission has launched, in late summer of 2013, a pilot bike share program in San Francisco and on the Peninsula - and is slated for a massive expansion in San Francisco and East Bay by 2017.



Above: Bike sharing programs are running in cities such as Melbourne, London, Paris, Washington, DC, Boston, Minneapolis, and more. The San Francisco Bay Area has launched a pilot bike share system that will see massive expansion in the coming years.



## PROGRAMS: BIKE STATIONS & BIKESPAS

Bike stations and BikeSPAs (Secured Parking Area) promotes commuting to work by bicycle, meets bicyclists' needs at key transfer locations on high capacity transit systems, and encourages biking as a form of local mobility.

Pioneered in Europe, bike stations are open in Long Beach, Santa Monica, Palo Alto, Oakland, and Berkeley. Bike stations offer services such as: secure bike parking & storage, bicycle repair, retail sales of parts and clothing, bike rentals, food & snack sales, information kiosks, and shower & changing facilities. Bike stations in Berkeley and Oakland offer popular valet parking for bicyclists commuting on transit (BART), allowing bicyclists to safely store their bicycles throughout the day in an indoor, monitored location.

As a result of their success, bike stations are proposed for San Francisco, Pittsburgh, Cambridge, and Fort Collins. Denver and Oakland will open bike stations later this year.

A BikeSPA is a semi-enclosed parking area, accessed by key-card, with capacity for between 80-100 bicycles. Key features include closed-circuit television monitoring, a variety of bike racks to accommodate multiple styles of bicycles, a bicycle repair station and a vending machine offering often-used bike parts and gear.



*Above: The Berkeley bike station provides free valet bike parking, bike repair services, and sells bike accessories and parts. It is located two blocks from the downtown Berkeley BART transit station.*

*Below: The grand opening of the first BikeSPA in Portland, OR, serving commuters on the Tri-Met transit line.*

## PROGRAMS: BIKE REPAIR (“FIXIT”) STATIONS

Bike repair stations, also called “fixit stations”, are small stations installed along popular bike routes that have multi-use tools, air pumps, and stand that holds the bicycle in place and off of the ground.

Fixit stations typically are built simply for ease of use and reduced maintenance costs, including a paint coating that allows graffiti to be easily washed off. Tools are connected to the bike repair station by flexible metal wire resistant to bolt cutters. Bicycle tire pumps are often built into the frame of the bike repair station and can easily reach the tire of bicycle suspended on the bike stand.

Fixit stations are typically installed at regular intervals along highly-traveled bicycle routes (like along the Cycle Superhighways of Copenhagen) or at popular bicycling destinations. The City of Los Angeles is currently seeking partnerships within the business community to sponsor bike repair stations installed on the sidewalk outside their businesses.



Above: A bike repair station at the train station in Davis, CA

Below: A bike repair station at the UCLA Campus in Los Angeles, CA



## PROGRAMS: DIVERSE PARKING OPTIONS

Just as important providing safe and attractive bicycling facilities, communities must also provide ample and diverse types of bicycle parking to be truly world-class for bicycling. The needs of bicyclists are just as diverse as those of drivers, and the right types of bicycle parking can encourage all types of trips to be taken by bicycle.

For short-term stops, standard bicycle racks are a good solution. These typically take the form of the “inverted-U” rack style of bicycle parking, though some cities have experimented with “art racks”. Cities seeking to highlight “bicycle-friendly business districts” have installed fanciful bicycle racks that match the purpose of the business in front of which they are installed.

For medium-to-long term parking, more secure bicycle parking is necessary. This can take the form of bicycle lockers, valet (or monitored) bicycle parking at a Bikestation, or a BikeSPA (Secured Parking Area).

In addition to public and semi-public bicycle parking, policy changes should be enacted on the municipal level to require robust bicycle parking in all new developments. This should include both long-term and short-term bicycle parking depending upon the use of the building. Los Angeles, notably, has written a provision into their bicycle parking ordinance allowing developers to swap some of their required automobile parking for bicycle parking. This incentivizes developers to provide more bicycle parking by reducing the overall footprint needed to meet parking requirements.

Clockwise from top left: Standard “inverted-U” racks, “art rack” in the form of a bicycle in Los Angeles, CA, bicycle lockers at a Metro station in Los Angeles, CA, a “bike corral” - on-street bicycle parking - in Berkeley, CA

