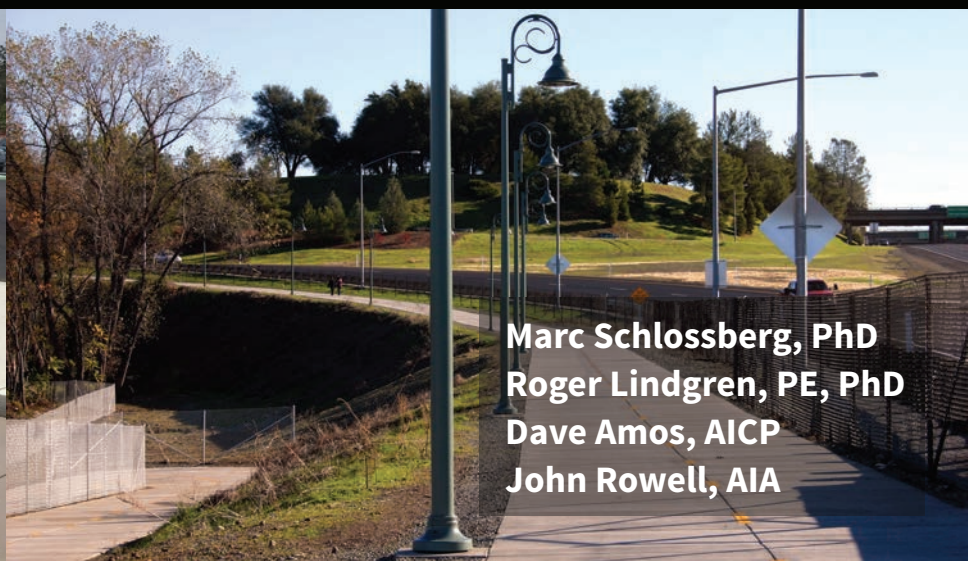
RETHINKING STREETS FOR BIKES

An Evidence-Based Guide to 25 Bike-Focused Street Transformations



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About SCI
The University of Oregon's Sustainable Cities Institute (SCI) focuses on sustainability and cities through applied research, teaching, and community partnerships. SCI works across disciplines that match the complexity of cities to address sustainability challenges. Projects range from regional planning to building design and enhancing engagement of diverse communities, to understanding the impacts on municipal budgets from disruptive technologies, and many issues in between.

SCI focuses on sustainability-based research and teaching opportunities through two primary efforts: 1) the Sustainable City Year Program (SCYP), a massively scaled university-community partnership program that matches the resources of the University with one Oregon community each year to help advance that community's sustainability goals; and 2) the Urbanism Next Center, which focuses on how autonomous vehicles, e-commerce, micromobility, and the sharing economy will impact the form and function of cities. SCI shares its expertise and experiences with scholars, policymakers, community leaders, and project partners.

SCI further extends its impact via an annual expert-in-residence program, SCI-China visiting scholars program, a study abroad course on redesigning cities for people on bicycle, and through co-leadership of the Educational Partnerships for Innovation in Communities Network (EPIC-N), which transfers SCYP to universities and communities across the globe.

About NITC
The National Institute for Transportation and Communities (NITC) is one of five U.S. Department of Transportation national university transportation centers and is comprised of six leading universities. NITC focuses on applied research and education in the areas of: 1) Increasing Access to Opportunities; 2) Improving Multi-modal Planning & Shared Use Of Infrastructure; 3) Advancing Innovation & Smart Cities; and 4) Developing Data, Models & Tools.

COVER PHOTO CREDITS: top left: Tampa Magazine, top right: City of Oakland, bottom left: City of Davis, bottom right: Caltrans

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Additionally, we would like to thank our students who identified potential streets to include, developed the background database of information, and created all of the design templates throughout this guidebook (and countless designs that did not make the cut)! These students include Jamie Willeke, David Escobedo, David Grabicki, Cassidy Jones, Taylor Stevens, Neo D'Lehoko and Griffin Gilbert from the University of Oregon, as well as Jordan Preston and Elizabeth Cox from Oregon Tech.
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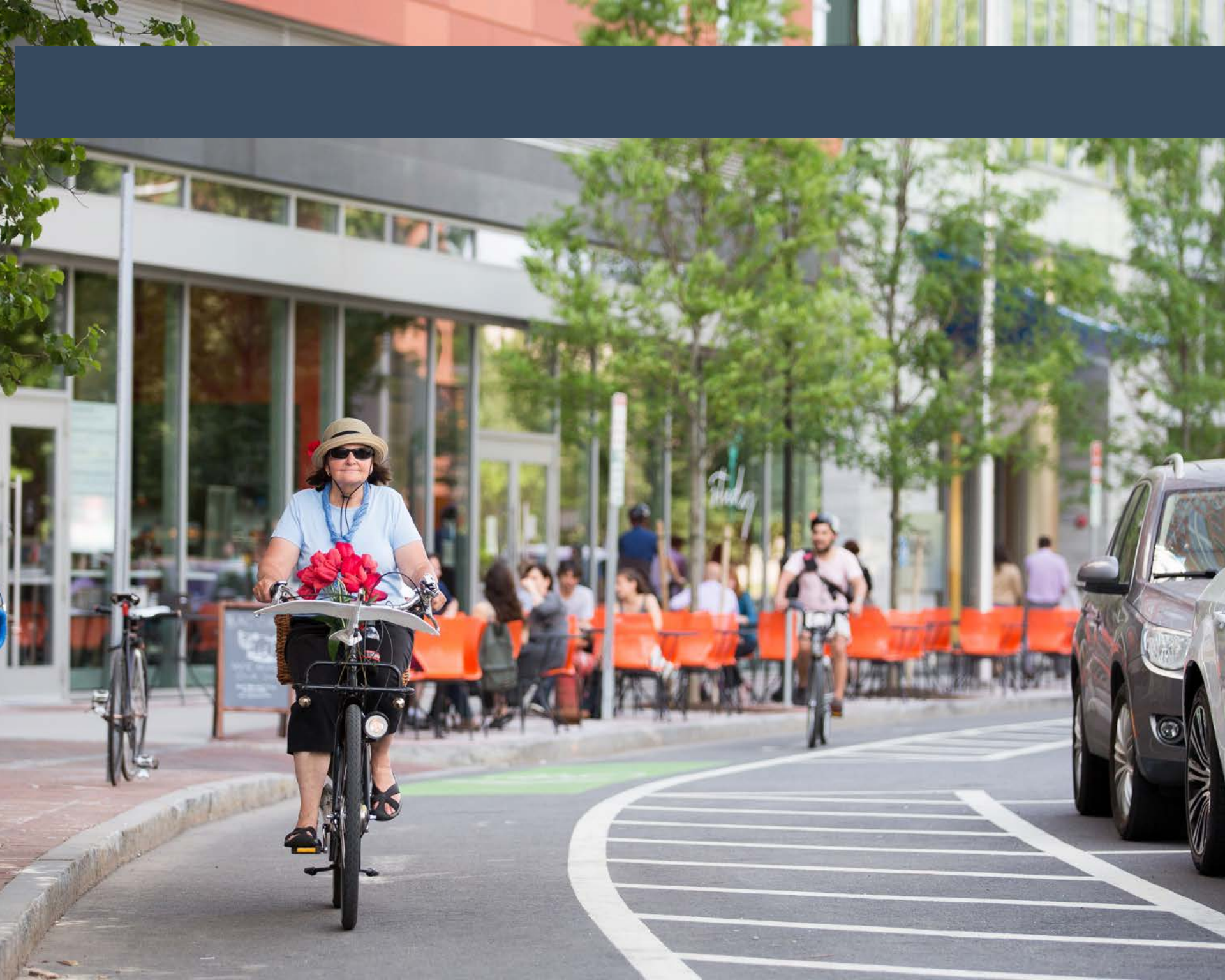
NITC NATIONAL INSTITUTE for TRANSPORTATION and COMMUNITIES
UNIVERSITY OF OREGON
Oregon TECH
SCI Sustainable Cities Institute
ROWELL BROKAW



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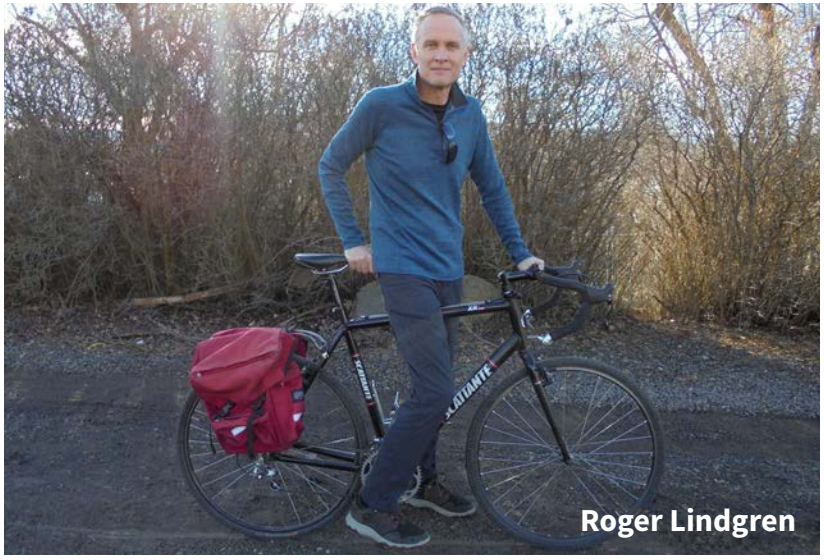
Foreword from the Authors

We are excited to present *Rethinking Streets for Bikes*, the second in the ”Rethinking Streets” series. This installment focuses on high-quality street retrofit projects that prioritize bicycle transportation. We were extremely encouraged with the response to the 2015 release of the first book, which looked at completed street retrofit projects that benefited walking, biking, or transit. Those projects were very straightforward and could be implemented in communities across the country. We purposefully chose such normal-looking streets because we wanted to make it clear to a broad range of community stakeholders and decision makers that re-designing streets can be a win for all modes, as well as a boon for economic development and enhancing community quality of life. That book has been downloaded over 5,000 times by people in over twenty countries, and we are hoping this one will reach a similar audience.


Marc Schlossberg

Our goal for *Rethinking Streets for Bikes* is to carry forward this practice-to-knowledge-to-practice approach and present examples of high quality, completed projects and do so in a highly visual way that policy makers, transportation planners and engineers, professional urban designers, advocates, and community members can all engage with. This book, as with the previous one, only highlights completed projects, not hypothetical ones, so everyone can understand the project and its outcome. Street design is commonly thought of as a technical task, but there is a place for innovative thinking by non-technical stakeholders and community members. A street is a publicly-owned canvas. How that space is allocated—to vehicles, to pedestrians, to cyclists, to art, to ecology, to play—is not a technical decision, but a political one. The more community members can understand street


Roger Lindgren

design and provide their input, the more likely that streets will reflect the values of the community.

The examples in this book focus on bicycle transportation and are largely taken from U.S. cities. This is intentional. International cities like Copenhagen (Denmark) or Utrecht (Netherlands) have much higher rates of bicycle use and many lessons to teach American cities, but the European context is foreign to many people in the United States. The reality is that for most communities, it is easier imagine street design solutions from familiar U.S. communities. We have also chosen projects from a wide variety of U.S. contexts, from small towns to suburbs and big cities. No matter the community, there are several case studies in this book that are applicable to that particular context. We hope this book helps communities redesign their streets to be as safe, comfortable, and efficient as those found in other cities around the world.

Thank you for your interest in this book. We included a set of diverse, practical, and inspiring case studies that will demonstrate how we can rethink streets for bikes. We want the contents of this book to inspire communities to redesign more streets and complete their projects faster. Please use the case studies in this book to further your community's efforts to redesign streets with bikes in mind. And please use this book as a starting point for your own street design innovations. We can't wait to see what you come up with!

Dave Amos


John Rowell

Changing the Framing of Our Streets

For the last seventy years, engineers, planners, and policymakers built streets to move vehicles quickly through space. This single-minded goal, largely accepted by a public that rapidly embraced driving, has damaged the urban fabric and made cities less safe. This focus on moving vehicles at all costs has counter-intuitively created more traffic. It was long believed that adding more lanes alleviates congestion, and although new lanes may solve the problem at first, such expansions ultimately induce new demand for driving for a variety of reasons including spurring new development at the outer regions of the widened road. The traffic jams return, but more people are stuck in traffic than before.

Framing matters. If we believe the purpose of our streets is to move vehicles as fast as possible with as little delay as possible, then traffic congestion becomes the primary problem to avoid or fix. What happens if we change our perspective? What if we ask engineers and planners to design streets for safety and for people of all abilities? Our streets would certainly look differently than they do now. This change of perspective is challenging, as most people make most of their trips by car. We all want to get where we're going without delay.

We need a middle ground in street design, one that meets the needs of people who are trying to get to their destinations, as well those who want to enjoy life along the street. These efforts to "rethink the street" are not new—we wrote a book with that name in 2015—but recently this new framing has become more popular as people are rediscovering and preferring urban life and its amenities. Residents of these neighborhoods no longer need

People who live in cities don't use just one transportation mode. This is why designing a transportation system that preferences the car does not make sense.

to drive for every trip, and appreciate a street that makes it easy to walk, bike, and take transit.

The table (at right) compares the different framings between the car-oriented decision-making paradigm with a new approach that places people at the center of street design. What frame does your community use?

Mobility vs. Accessibility
A mobility paradigm emphasizes the quick movement of vehicles, whereas an accessibility paradigm focuses on the ability of people to reach their destinations. Accessibility increases when the mixture and density of land use increases, bringing our destinations closer to where we begin. Our mode of travel may be slower, but it takes us less time to get where we are going.

Throughput of Vehicles vs. Throughput of People
Throughput is the measurement of how many things—cars, trucks, or people, for example—move on a street over a set amount of time. The traditional thinking is that the higher the throughput, the better. What is more important is how many people are moving on a street. In certain locations, more people on a bus, bike, or foot can get through an intersection than vehicles can, so optimizing for people instead of vehicles would seem to be a preferable approach to street and intersection design.

Vehicular vs. Person Delay
Similar to throughput, one common measure in the traditional paradigm is to look at delay in terms of vehicles. Delay for cars often emerges as a reason why bicycles cannot have preferred traffic timing. For which user should the intersection be optimized?

TRADITIONAL FRAMING	NEW FRAMING
Mobility	Accessibility
Throughput of vehicles	Throughput of people
Vehicular delay	Person delay
Average daily traffic (ADT)	ADT for all
Plan for the peak	Plan for off-peak
Journey to work	All trips
Congestion reduction	Congestion alternatives
AASHTO	NACTO
Vehicle level of service (LOS)	Multimodal level of service
Going somewhere else	Places to be

This table compares the traditional, car-first framing of street design with an alternative, people-first framing.

Changing the Framing of Our Streets

ADT vs. ADT for All
Average Daily Traffic (ADT) is a common measurement of the number of vehicles that travel on a road per day. This number leads to recommendations on how many lanes or space on the street should exist to handle the vehicles. ADT counts cars and thus results in allocating space for cars, not people. ADT calculations almost never count pedestrians, cyclists, or transit users, so the count itself leads to self-fulfilling policy decisions and investments.

Plan for the Peak vs. Plan for the Off-Peak
In the traditional framing, rush hour level of vehicle use guides most street allocation decisions. Yet in many cities, the rush hour may be little more than one to two hours per day and non-existent on weekends. This paradigm produces streets vastly and wastefully overbuilt for traffic 90 percent of the day. These overbuilt streets are then unwelcoming for cyclists and pedestrians. Alternatively, how might streets be designed if the peak were thought of as the hours when kids are walking to or from school rather than adults commuting to or from work?

Journey to Work vs. All Trips
Streets are generally designed to maximize throughput for one kind of trip: the commute to work. This ignores many of the trips we make, such as to run errands, see friends, or meet at a cafe or bar. About 40 percent of these trips are under two miles in length. Yet, even though these shorter, non-work trips are more common, streets are not designed for walking, cycling or scootering, perfect modes for these short trips.

When the paradigm shifts from vehicle delay to person delay, priorities shift to alternate modes such as cycling and mass transit.

Congestion Reduction vs. Congestion Alternatives
Congestion is the enemy of the traditional framing. The new framing focuses on finding the most space-efficient way to help the most people access their destinations easily and congestion reduction is not a top priority. Since building more lanes generally does not reduce congestion, the new framing for streets re-allocates space to make it possible for more people to conveniently travel by foot, bike, scooter, or transit. A single person on a bike uses significantly less space than a single person in a vehicle, so creating safe, comfortable, and pleasant bike infrastructure on an otherwise crowded roadway helps people access their destinations quicker, even though the throughput of vehicles may be reduced.

AASHTO vs. NACTO
New design standards are the perfect catalyst for transitioning to a new framing. Prior to 2011, the street design standards that almost all traffic engineers, and thus cities, followed in the U.S. was based on the American Association of State Highway and Transportation Officials' (AASHTO) *A Policy on Geometric Design of Highways and Streets* and the Federal Highway Administration's (FHWA) *Manual on Uniform Traffic Control Devices* (MUTCD). These design manuals were crafted by state highway officials, and the standards were focused on throughput of vehicles, congestion reduction, and minimizing vehicular delay. These may be appropriate principles for highways, but not for city and neighborhood streets. In 2011, a new organization called the National Association of City Transportation Officials (NACTO) began releasing its own design guides that focus on urban streets where cars, transit, bicycles, and pedestrians co-exist. The NACTO street design guides have liberated cities to redesign their streets in people-centered ways.

Street as Infrastructure for Going Somewhere Else vs. A Good Place to Be
Vibrant, busy streets are some of the best places to be. Streets are dynamic, and that's what makes them the lifeblood of a city. But with the singular emphasis on throughput, many streets become solely a mechanism to get somewhere else, no longer a series of public and private spaces to be used, lived in, and enjoyed. The re-introduction of people moving at walking and bicycle speed creates a place that supports street-oriented businesses, residences, entries and porches, and higher densities of varied uses. This can even happen along busy streets.

Framing does matter. This is particularly true when we've been subjected to the traditional framing for so long we don't realize that other paradigms exist. We live in a world where the car is the priority and streets are designed to move as many of them as quickly as possible. Our policies and investments all support this traditional framing. A shift in frame, from mobility to accessibility, and from infrastructure to place, can have a profound impact on our cities and its people.

Myths about Cycling

Street space is limited and contested among the users and proponents of different modes. The process of choosing a bike lane over a car lane, for example, is a political choice as much as an engineering one. Cycling is more popular than ever and new bike facilities are competing for space. This conflict breeds misconceptions about cyclists and bike infrastructure that may make it more difficult to build more bike facilities in the future. Below, we present ten common myths and misconceptions about bikes and the people on them.

MYTH: Cyclists are always breaking the law and investments should not be made until cyclists follow the law

FACT: All road users break basic traffic laws, like rolling through stop signs, at similar rates. Motorists, however, are much more likely to speed, fail to signal, to drink or text while driving, or fail to yield to pedestrians crossing streets, or give enough space to someone on a bike. Rarely is an argument made that society should stop investing in automobile infrastructure until drivers follow the law, but that is a common refrain arguing against investing in better bicycle infrastructure. An easy way to witness this reality is to sit and watch a residential street intersection and observe how many people in a car or a on a bike come to a complete stop at a stop sign. The reality is that few people do, unless there is cross traffic of some kind. Such behavior should be expected, for while it may be illegal, it is often prudent, safe, and appropriate. In Idaho, for example, stop signs are actually treated as yield signs for people on bike.

MYTH: Cyclists don't pay their fair share because they don't pay a gas tax or vehicle registration fee

FACT: Gas taxes and vehicle registrations only cover about half of the cost of road infrastructure. Other costs are covered through general taxes, property tax, and general bond measures—money everyone pays whether they drive or not. In addition to being one of the primary contributors to climate change, accidental death and injury, and other significant negative societal externalities, cars and trucks cause significantly more damage to our pavement than bikes.

MYTH: The safest thing a cyclist can do for safety is wear a helmet

FACT: The best thing that can be done to increase the safety of people on bike is to build connected systems of protected bikeways. The rate of cycling injuries and fatalities is significantly lower in global cities that have extensive networks of protected bikeways, where significantly more trips are taken on bike (over 35 percent of trips in some cities in Denmark and the Netherlands), and where helmet use is rare. Just like it is rare to bump into a fellow pedestrian in a way that results in serious injury, the same is true on bike when there is infrastructure that separates bikes from cars. Helmets do not cause harm, but they should not be the first focus for enhancing bicycle safety.

MYTH: Cycling in cities is bad for one's health due to inhaling vehicle emissions

FACT: While it is true that cycling in car traffic does expose riders to increased air pollutants, the physical activity of cycling out-

Bike helmets should not be a community's only—or first—solution to bicycle safety.

Myths about Cycling

weighs any negative exposure in all but the most polluted cities. As motorists begin to purchase electric vehicles, local exhaust emissions will decline. And, of course, the more trips taken by non-automotive modes, the lower the air pollution for all.

MYTH: Cycling is expensive and requires a big investment
FACT: Some cyclists choose to buy expensive bikes and high performance gear, but for most, cycling is a relatively inexpensive form of transportation. Bikes are much cheaper when compared to cars. It costs $8,800 per year to own and operate a new motorized vehicle, on average, in the United States.

MYTH: Bike-sharing programs make roads less safe by putting less experienced riders on the roads
FACT: While bike sharing programs do introduce more people to cycling, often on streets with inadequate bike infrastructure, there was only one reported fatality in over 130 million bikeshare trips between 2013 and 2017. Users of bikeshare systems also have fewer crashes and injuries than non-bikeshare cyclists.

MYTH: Cyclists must be fit and wear special clothes
FACT: The image of a fit, lycra-clad cyclist is a common one in the United States, but this isn't the case everywhere. When cities invest in protected, prioritized, connected bicycle infrastructure, there is no need to ride quickly to keep up with cars or to make green lights timed for motorized traffic. In many global cities with high cycling percentages, it is more common to see people in suits or dresses on a bike than to see cyclists wearing special clothing. The design of the bikes themselves can make it easier to wear everyday clothes; features such as chain guards, baskets for holding bags, and step-through frames can keep riders clean

Source: Nick Falbo via Flickr

Bikeshare riders do not make roads less safe, but they do give people another convenient way to traverse their community on bike.

and tidy. Most bikeshare bikes have these features to attract casual cyclists.

MYTH: Streets are for cars
FACT: Engineers, policy makers, and planners may have designed streets with cars in mind, but this does not give motorists exclusive rights to the street. State laws allow people on bike to use streets just like people in cars, especially when no dedicated infrastructure for biking exists.

MYTH: Bikes are for kids
FACT: Bikes are great fun for kids *and* adults. Research shows that when cities build infrastructure for safe and comfortable cycling, more people of all ages ride. In cities like Copenhagen—a city full of wide, 'American-style' streets—over 60 percent of residents use a bike to get to work or school.

MYTH: Bike lanes cause gentrification
FACT: The forces of gentrification are complicated and are caused primarily by market forces and local planning and land use decisions. Great bike infrastructure everywhere adds transportation options for community members at all income levels as the cost to bike is low and the geographic range is relatively large.

Bikes are for kids, adults, families, and everyone—especially when there is great bike infrastructure that keeps people safer than a basic bike lane.

The Changing Mobility Landscape

Urban transportation is in the midst of transformational disruption. As described in this book, cities of all sizes are seriously investing in local bicycle transportation systems. This trend will continue and the benefits will multiply as piecemeal bike infrastructure projects of the past begin to add up to connected and more complete systems. A dense, interconnected network of bicycle facilities is one of the best ways to encourage people to use a bicycle for all types of daily trip making. At the same time, cities are witnessing the rise of vehicle sharing (e.g., Uber and Lyft, e-scooters, and dockless bikes) and autonomous vehicles. As cities make changes to the street to accommodate these new modes, the results may make cycling safer and more convenient as well. The opposite may also be true.

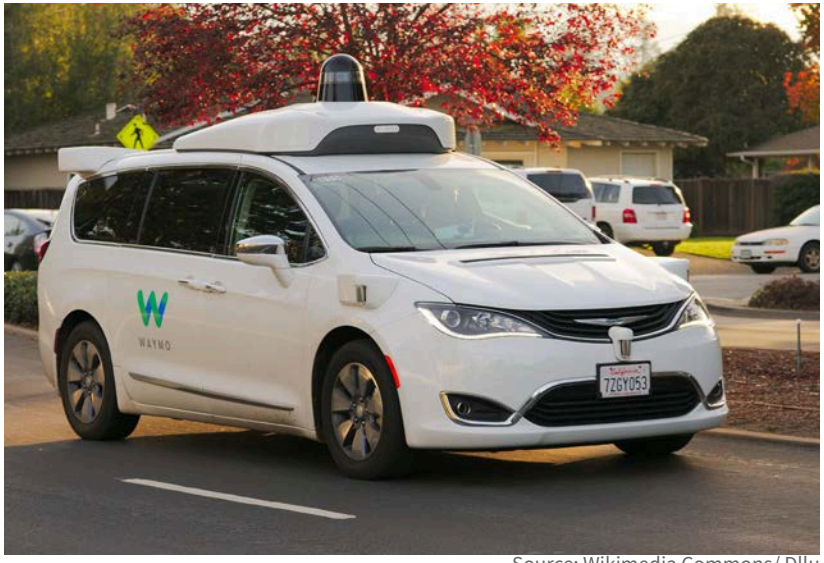
We don't yet know the full effect of these new modes because they have burst onto the scene quickly and recently. Take a moment to understand the scale of transformation: in 2009, there were no ridehailing services, dockless bikeshares, or e-scooter systems. In 2017, the ridehailing companies Lyft and Uber provided over 20 billion rides worldwide, e-scooter companies Bird and Lime provided over 20 million rides their first year in the U.S. and continue growing exponentially, and dockless bikeshare systems represented much of the 25% growth rate in bikeshare utilization between 2016-17. Cities are struggling to keep up with permitting, enforcement, and design decisions as the adoption of these services outpace city policy.

This shifting transportation landscape raises many questions of relevance to cycling, including:

E-scooters have become a popular mode of transportation in cities around the world.

- How well will automated vehicles 'see' people on bikes?
- If automated vehicles are programmed to not hit people on bike (or foot), does that mean people on bike (or foot) can freely use the entirety of any street any time? Or will people on bike (and foot) be criminalized if 'interfering' with vehicles on the public street?
- Will a possible reduction in the need for on-street parking mean that street space will be allocated for better, protected bicycle infrastructure or something else?
- With increases in ridehailing services, will more vehicles be crossing bike lanes to drop off and pick up passengers or will curbs be systematically placed on the other side of bike lanes?
- Will automated transit become a reality? Will this increase transit/bike conflicts in mixed traffic environments?
- Does the rise of ridehailing and new space-efficient, microbility options like e-scooters, make it more likely that the future of transportation revolves around buying rides by mode depending on the trip need rather than buying vehicles?

Bicycles remain the most efficient human transportation invention and their positive qualities will appeal to new cyclists, especially as cities start implementing connected systems of low-stress bike infrastructure. With the quick rise in new forms of mobility, cities will need to make some quick decisions to help guide these technologies in complementary ways to the past investments in bicycle transportation already made.



Source: Wikimedia Commons/ Dllu

The details of how self-driving cars will change cities are not yet known, but it is clear that communities will soon have to plan for them.

Bicycle Facilities

Many of the streets in this book have new infrastructure to accommodate cyclists. Depending on the size of the street and the context within the community, there are multiple potential strategies that help cycling be safe, comfortable, and direct.

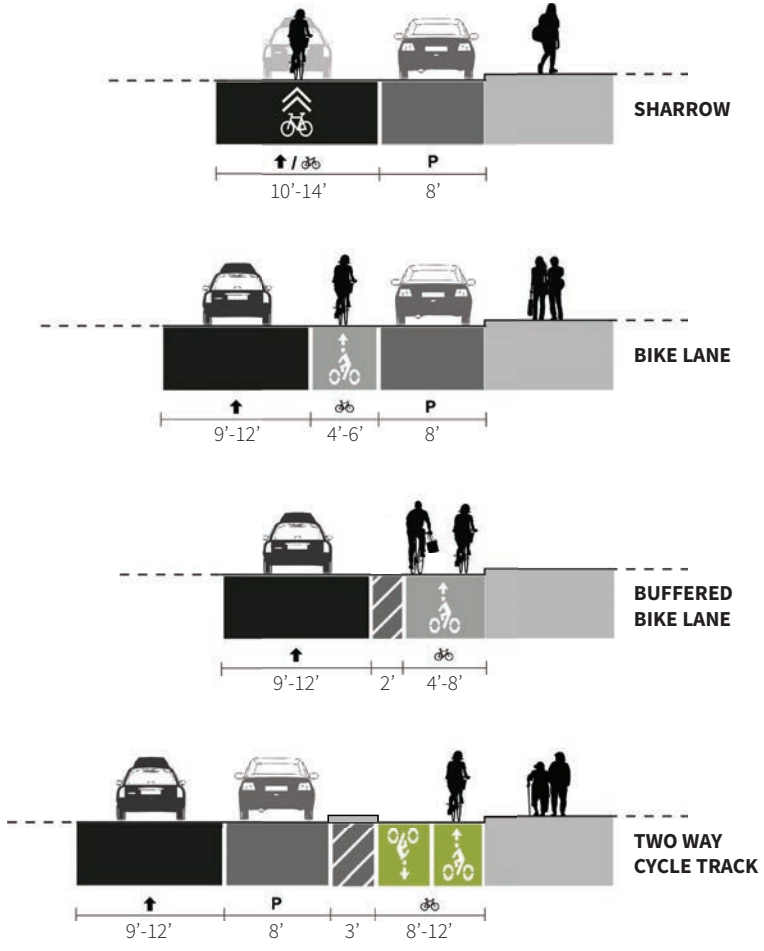
Sharrows are symbols painted in the lane indicating that drivers and bicyclists share the travel lane. Existing law generally already allows for shared use, and sharrows simply reinforce that reality in particular locations.

Bike lanes typically range in size from 4 feet to 8 feet, and are lanes specifically dedicated to cyclists, though they may occasionally share space with cars for right turns at intersections. They usually exist on busier streets and demarcate bicycle space from motorized vehicle space with a line of white paint.

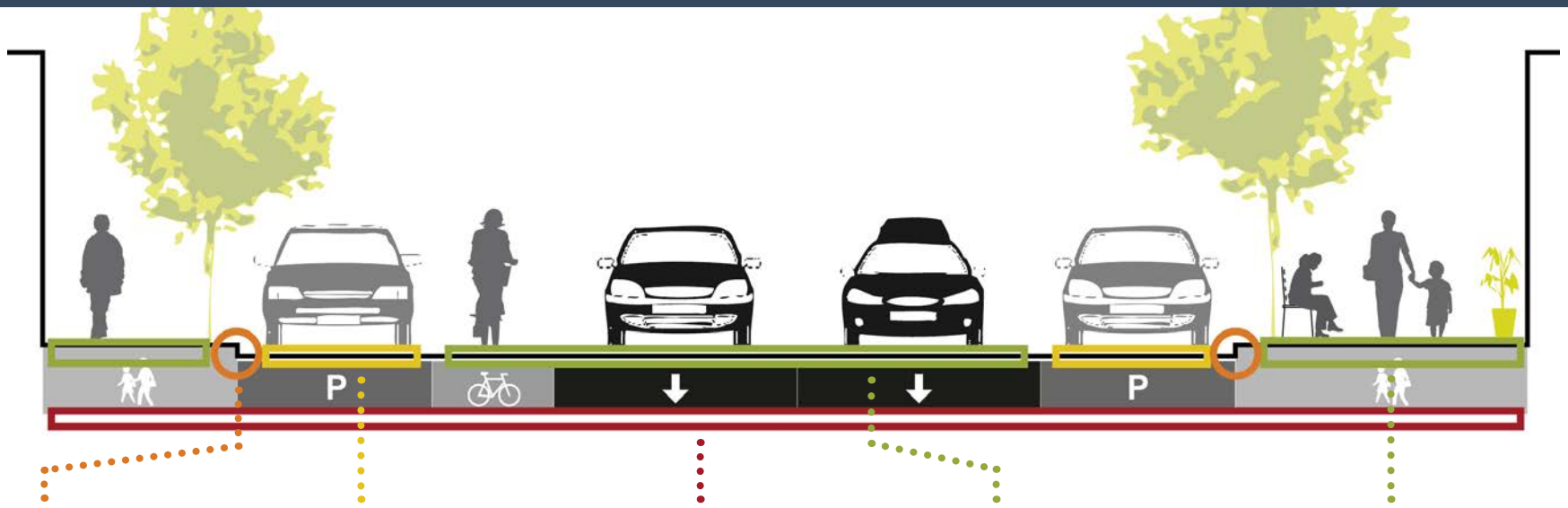
Cycle tracks are like bike lanes, but are physically separated from the motorized traffic. The barrier further protects cyclists from cars and dooring (collisions between cyclists and the open doors of parked cars). Cycle tracks may be one way or two way, and are sometimes lined with posts or painted green for added visibility.

Buffered bike lanes are a hybrid design that widens the strip of paint between a bike lane and motorized vehicle lanes. This extra buffer, often 2-3 feet, provides extra space and comfort to a wider range of people on bikes. Like bike lanes, buffered lanes and cycle tracks are generally located on busier streets that have destinations where people want to go.

For a more detailed explanation of bicycle facilities and design guidance, see the NACTO Urban Bikeway Design Guide.



The Street Cross Section



Curbs
$$$

The curb provides a clear distinction between the sidewalk and the street, but is also important for the street's function. Changing the curb line impacts the drainage system on the street, and requires re-engineering the street system, which can become costly. Construction may be lengthy and result in partial closure of the street. Thus, street designs that include moving curbs often require a greater investment of time and resources.

Parking
$

Although changes to parking may only require restriping or painting the curb, changing parking is often the most controversial and discussed aspect of redesigning streets. On-street parking typically is located next to the curb, although in some cases bike lanes are located between curb and parking to give cyclists protection from moving vehicles. In addition to cars, parking strips can contain bike parking (12 bikes = 1 car), leaving sidewalks to pedestrians.

Right of Way
$$$$$

The right of way is the strip of land that accommodates all the elements of the street, including lanes and sidewalks. Expanding the right of way can be a complicated, lengthy and expensive process. In order to expand the right of way, the City typically must purchase the land along the roadway from individual citizens and businesses. In many cases, structures and other obstacles may exist in this area.

Travel Lanes
$

Though re-striping lanes may require a traffic study, the cost to grind off old paint and repaint the lines is generally very low. Additionally, there is minimal disruption to traffic because the construction process is simple and can be done in phases. Cities can also test out new street designs with temporary restriping because of its low cost. Auto travel lanes can range from 9-12' in commercial areas. Current standards recommend minimum 6' bike lanes.

Streetscape Elements
$$

Streetscape elements include benches, bike parking, trees, and other furnishings on the sidewalk. Though the city may have standards to maintain a clear walking zone, there are a variety of ways to improve the streetscape. Installing streetscape elements can improve the sense of place of a street and create pleasant pedestrian environments.

How to Use This Guide

Location and Population

After

Before

Telegraph Avenue

OAKLAND, CALIFORNIA
Metro pop: 4,335,391 | City pop: 420,005

Source: City of Oakland

Source: Google Maps

One-way protected bike lanes through Downtown Oakland increases safety for all users.

- In 2016, the City of Oakland removed one travel lane in each direction on Telegraph Avenue between 19th Street and 41st Street to create space for cyclist and pedestrian safety improvements.
- Low-cost parking-protected bicycle lanes serve as an interim solution while the City seeks funding for future capital improvements along the corridor.

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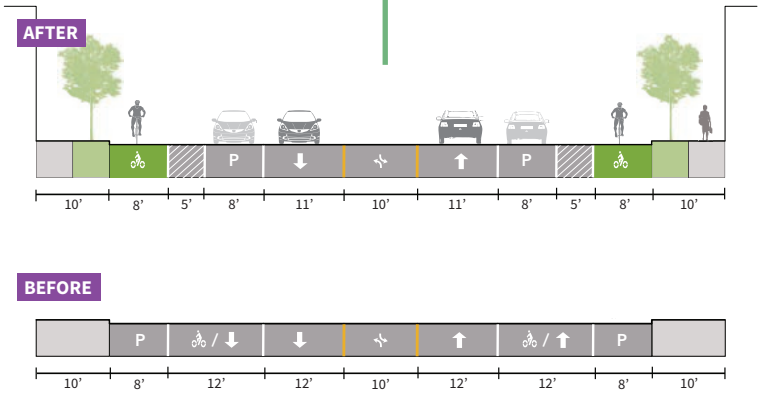
Key Interventions

Street Section Before and After

Facts and Figures

ONE-WAY PROTECTED BIKE LANE



STREET CLASSIFICATION
Principal Arterial

RIGHT OF WAY
Varies

LENGTH
0.65 miles

SPEED

SPEED LIMIT 25	SPEED LIMIT 25
BEFORE	AFTER

AVERAGE DAILY TRAFFIC
13,900
BEFORE

RESPONSIBLE AGENCY
City of Oakland

Key Outcomes

Safe and Attractive for all Users
Not only has the previously “high-injury” corridor seen a decrease in the crash rate, but the narrowed vehicle right-of-way has reduced speeding and increased overall corridor safety.

Building Neighborhood Vitality
As part of a phased complete streets plan, bicycle and pedestrian traffic have almost doubled since implementation of the first redesigns. This may have helped boost retail sales in the adjacent KONO district, which have increased since the installation of the protected bike lanes.

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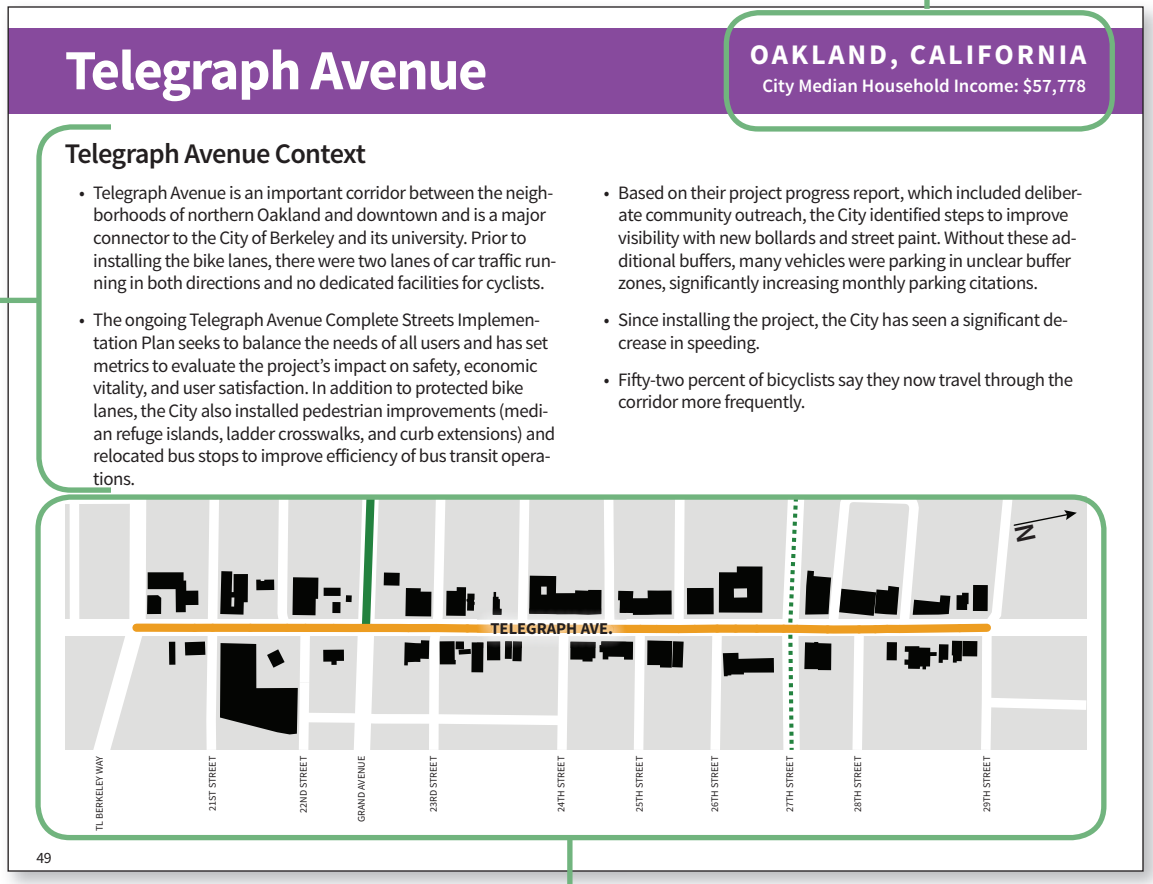
Evidence of Change

How to Use This Guide

Location and Median Income

Additional Information on the Street and its Context



Telegraph Avenue

OAKLAND, CALIFORNIA
City Median Household Income: $57,778

Telegraph Avenue Context

- Telegraph Avenue is an important corridor between the neighborhoods of northern Oakland and downtown and is a major connector to the City of Berkeley and its university. Prior to installing the bike lanes, there were two lanes of car traffic running in both directions and no dedicated facilities for cyclists.
- The ongoing Telegraph Avenue Complete Streets Implementation Plan seeks to balance the needs of all users and has set metrics to evaluate the project's impact on safety, economic vitality, and user satisfaction. In addition to protected bike lanes, the City also installed pedestrian improvements (median refuge islands, ladder crosswalks, and curb extensions) and relocated bus stops to improve efficiency of bus transit operations.
- Based on their project progress report, which included deliberate community outreach, the City identified steps to improve visibility with new bollards and street paint. Without these additional buffers, many vehicles were parking in unclear buffer zones, significantly increasing monthly parking citations.
- Since installing the project, the City has seen a significant decrease in speeding.
- Fifty-two percent of bicyclists say they now travel through the corridor more frequently.

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Map of the Street and the Surrounding Area

ONE-WAY PROTECTED BIKE LANE

Source: City of Oakland

Aerial view of Telegraph Avenue.

Source: City of Oakland

New City of Oakland bike share program riders on protected bike lanes.

Source: Bike East Bay

Low-cost planters provided a demonstration of the future project during early project outreach.

Source: City of Oakland

Protected bike lanes increased ridership and accessibility on this busy downtown corridor.

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PAUL FRANK

Two-Way Cycle Tracks

A cycle track is a dedicated bicycle facility that combines the high-comfort user experience of a separated path with the on-street infrastructure of a conventional bike lane. Cycle tracks are physically separated from automobile traffic and are distinct from the pedestrian space of the sidewalk.

Source: City of Atlanta

N Street

LINCOLN, NEBRASKA

Metro pop: 326,921 | City pop: 280,364

Source: Alta Planning + Design

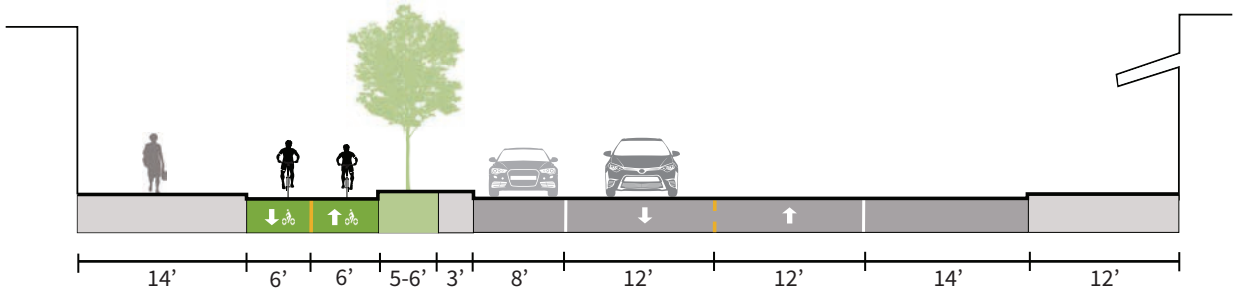
Source: Google Maps

The state's first cycle track bridges gaps in city's bicycle access through a downtown corridor.

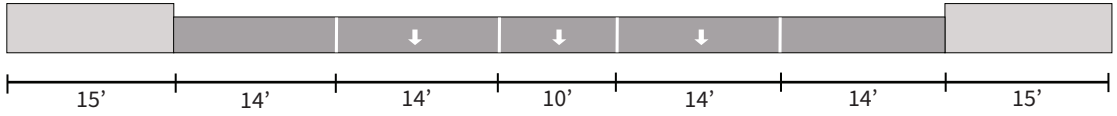
- In 2015, the City of Lincoln installed a curb-protected two-way cycle track between 23rd Street and Arena Drive that includes bioswale planter beds in some sections.
- Green paint clearly highlights the cycle track where it crosses intersections as well as turn boxes to provide an extra level of protection for cyclists.

TWO-WAY CYCLE TRACK

AFTER



BEFORE



Key Outcomes

Road Diet
The ample pre-existing right of way left significant room for the addition of the cycle-track whose wide buffer allowed for the inclusion of green bioswales and planter beds. Additionally, the inclusion of refuge islands in the median reduces crossing distance for pedestrians across N Street.

Consistent Ridership
The cycle track had an average daily ridership of 278 between September 2016 and August 2017, and even maintained more than 200 daily riders during winter months. Summer months averaged more than 300 daily riders.

STREET CLASSIFICATION

Collector

RIGHT OF WAY

47-71 feet

LENGTH

1.25 miles

SPEED

SPEED LIMIT 25	SPEED LIMIT 25
BEFORE	AFTER

AVERAGE DAILY TRAFFIC

7,500	4,500
BEFORE	AFTER

RESPONSIBLE AGENCY

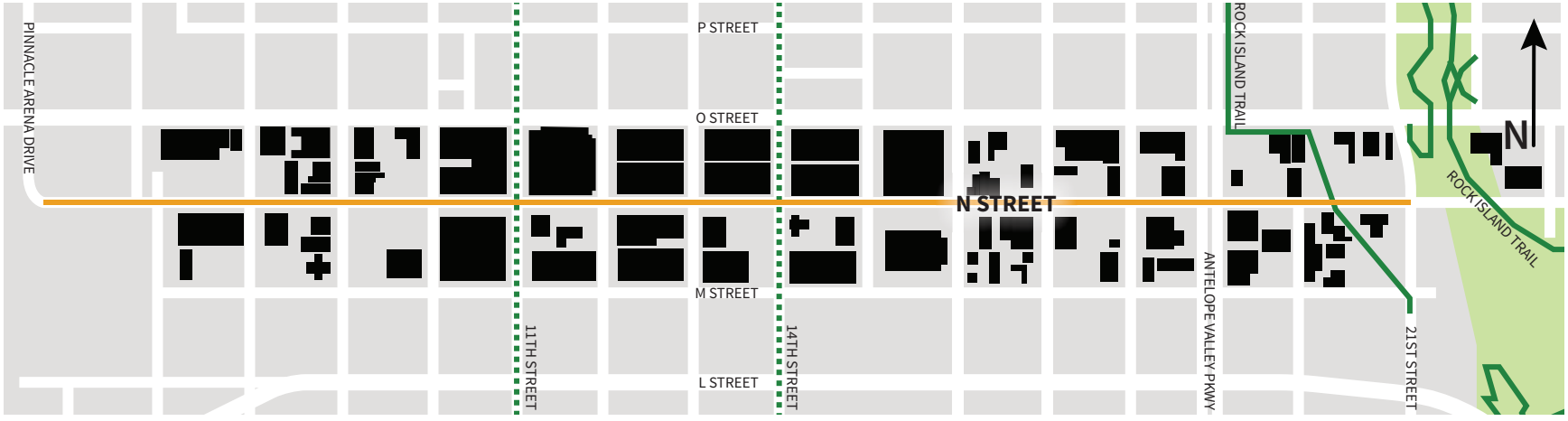
City of Lincoln

N Street

LINCOLN, NEBRASKA
City Median Household Income: $51,126

N Street Context

- N Street is a major collector that runs east-west through downtown Lincoln. Prior to the project, some blocks were three one-way lanes with diagonal parking, others were two-way with on-street parking, and there was no bicycle infrastructure. In 2012, the Downtown Master Plan Update identified the corridor as the "last mile" to connect the City's bike trails (Jamaica North and Billy Wolff) that run north-south on opposite ends of downtown. Bike lanes serve as connections with the corridor to the University of Nebraska three blocks to the north.
- After a disappointing first bid, the City spent much of the summer of 2015 educating potential bidders and expanding the original funding sources. The project was assisted by over $200,000 in funding by a local bicycling group, Great Plains Bicycling Club, as well as strong support from the Mayor's office.
- Throughout the design process, community meetings were held with groups of stakeholders separated by blocks so that local businesses and property owners were involved in the project sections that would most impact them. There was also targeted education for businesses that would have frequent delivery trucks crossing the track into driveways. The City relied on PSAs in local news outlets to educate the community. After construction, there were some problems with drivers turning onto the facility so the City added bollards at those locations. The City also evaluated the timing of the bicycle signals and adjusted them after several months of operation to better suit the needs of cyclists.
- Bioswales and planter beds were incorporated as a buffer between 10th and 16th Streets, addressing stormwater needs and adding a green median to the N Street corridor.



Source: City of Lincoln

Turn boxes provide an additional measure of safety and priority for cyclists.

Source: City of Lincoln

Bicycle signals were tested and timed to prioritize cyclists.

Source: Alta Planning + Design

Reduction of traffic lanes made pedestrian crossings shorter and safer.

Source: Alta Planning + Design

Bioswales were a key design element to provide safety as well as ecological services.

North Ninth Street

MODESTO, CALIFORNIA

Metro pop: 518,321 | City pop: 212,175

Source: City of Modesto

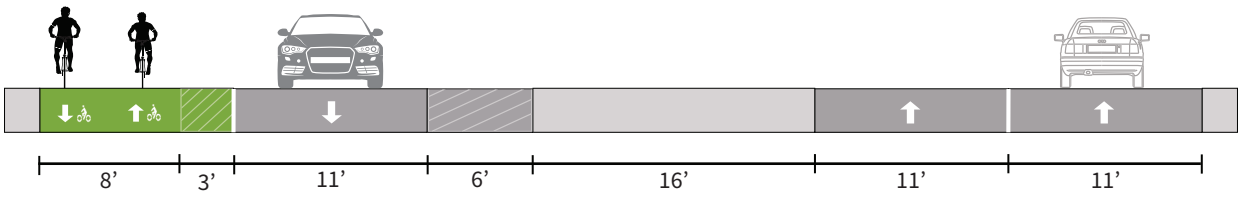
Source: City of Modesto

A rural arterial's two-way cycle track provides an important connection between Modesto's community college campuses.

- In 2015, the City of Modesto used striping, concrete parking stops, and plastic posts to create a two-way cycle track along Ninth Avenue as well as Carpenter Road.
- On the Carpenter Road bridge, which carries high volumes of trucks and cars, the cycle track is completely separated from the road with concrete curbs.

TWO-WAY CYCLE TRACK

AFTER



BEFORE

Key Outcomes

Overcoming Obstacles
Modesto’s two community college campuses are two miles apart and divided by a freeway and railway. While pre-existing infrastructure severely limited transportation options, the new cycle track provides cyclists with safe, comfortable connectivity.

Cost-Effective Solution
Initial multi-million dollar estimates meant this project almost didn’t get off the ground. After being on the non-motorized plan for many years, the City managed to find creative solutions to get the project completed for only $300,000 by utilizing roads with extra width and capacity.

STREET CLASSIFICATION

Minor/Principal Arterial

RIGHT OF WAY

110-122 feet

LENGTH

2.2 miles

SPEED

SPEED LIMIT 40	SPEED LIMIT 40
BEFORE	AFTER

AVERAGE DAILY TRAFFIC

10,000
BEFORE

RESPONSIBLE AGENCY

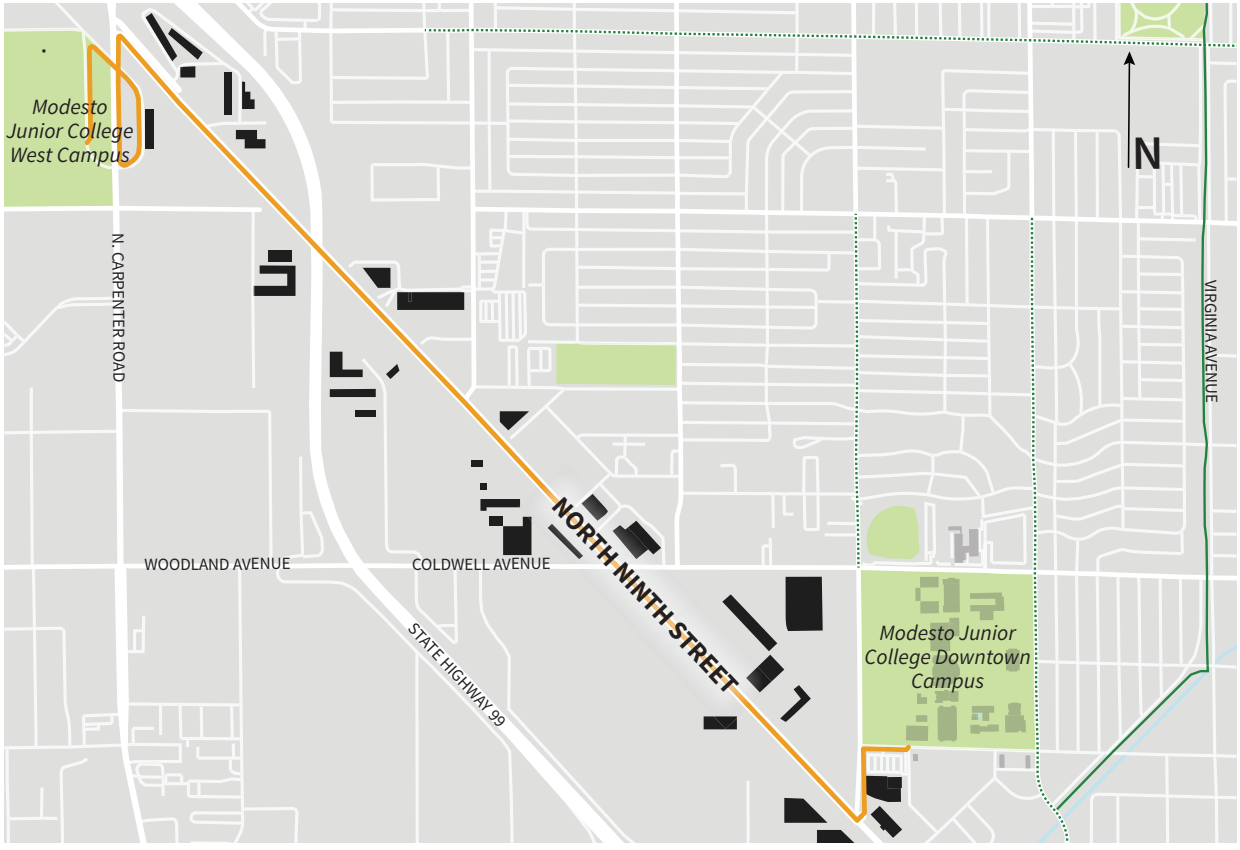
City of Modesto

North Ninth Street

MODESTO, CALIFORNIA
City Median Household Income: $50,996

North Ninth Street Context

- Prior to the project, North Ninth Street was a four-lane arterial divided by hedges with no bicycle or pedestrian infrastructure. Cyclists attempting to commute from Modesto Junior College's Downtown Campus to West Campus were forced onto a busy arterial street without designated bike lanes. The City identified North Ninth Street as having extra capacity to allow for a redesign that included the buffered cycle track. In this way, the bike route crosses over Highway-99 without the need to build a bike-specific bridge.
- The project's success was due in part to the involvement of bicycle clubs and advocates that drew the attention of officials in city hall.



- The project was part of a larger initiative to rehabilitate collector and arterial streets for active transportation usages, diversifying options and routes for commutes across the city.
- Approximately 25 to 30 percent of Modesto residents do not own cars, a fact that led to the recent emphasis on improving the bike network. Modesto is a low-density, central California town, and this development patterns adds challenges to building a network usable by cyclists.

Source: Minerva Perez

A variety of users on the North Ninth Street cycle track.

Source: Michael Sacuskie

Workers apply paint at the Woodland Avenue intersection.

Source: Michael Sacuskie

The buffered section of the cycle track where it uses the pre-existing bridge to go over the railroad tracks.

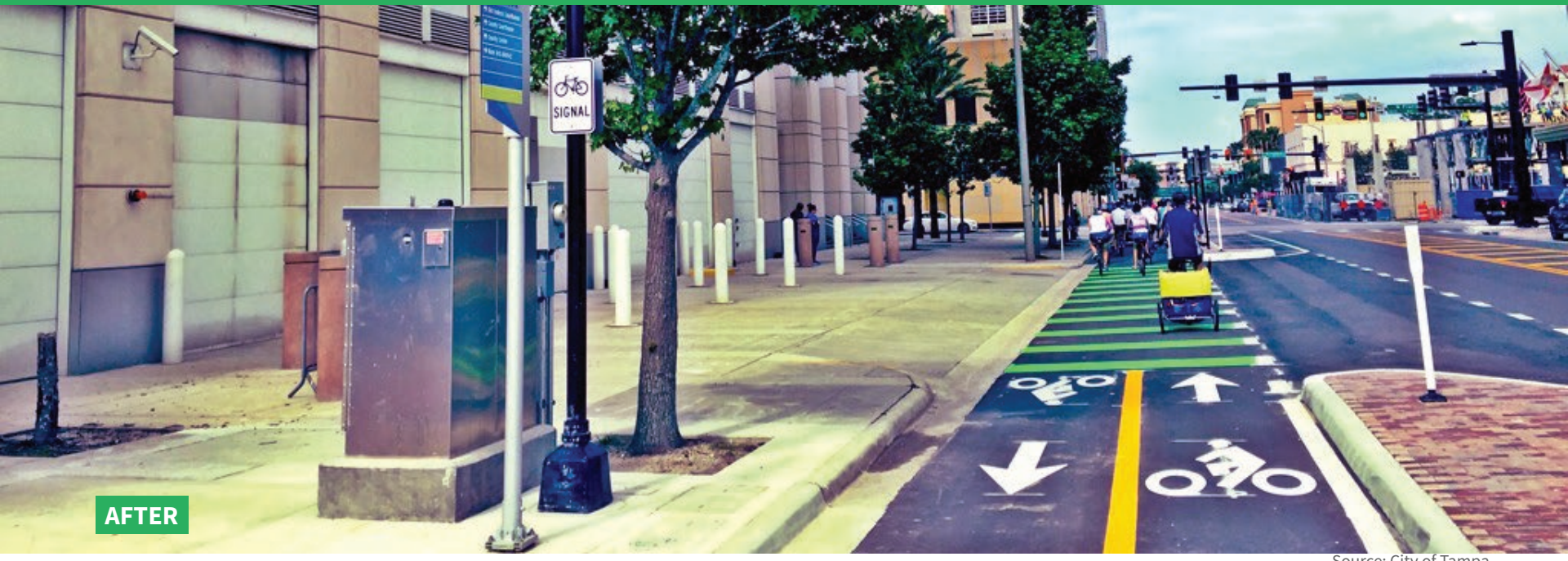
Source: Michael Sacuskie

Protected bike lanes on College Avenue connect to the North Ninth Street cycle track.

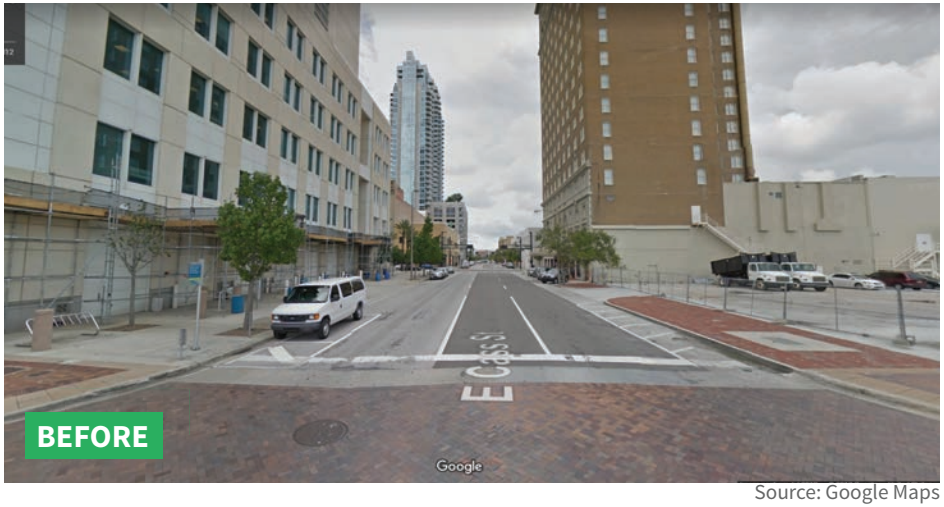
East Cass Street

TAMPA, FLORIDA

Metro pop: 2,975,225 | City pop: 335,709



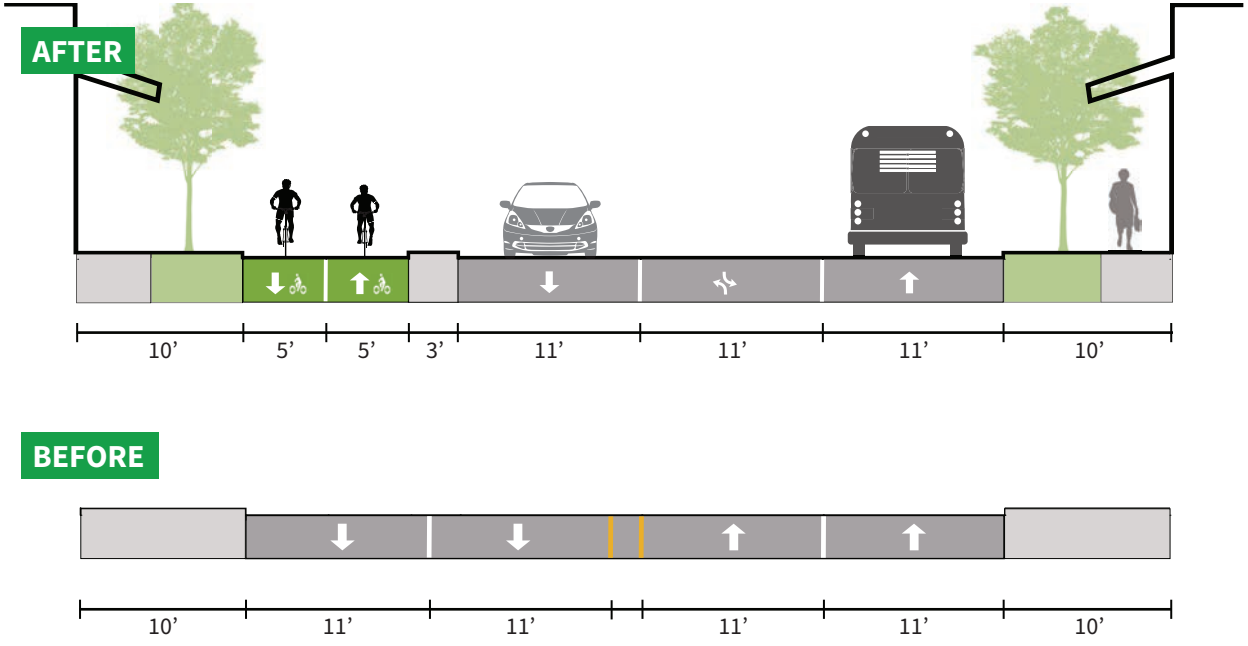
Source: City of Tampa



Source: Google Maps

Tampa's 'green spine' project seeks to increase accessibility to downtown for cyclists and pedestrians.

- In 2016, the City of Tampa converted the East Cass Street/East Tyler Street one-way couplet into two-way streets and installed a curb-protected cycle track along East Cass Street.



Key Outcomes

Downtown connectivity
The East Cass Street/East Tyler Street two-way conversion is only one part of a broader project to connect and expand existing greenways in downtown Tampa to provide increased mobility and spur economic investment.

First steps
The facility represents only one part of a planned 3.4 mile cycle-track that will extend east and west linking two historic neighborhoods.

STREET CLASSIFICATION

Collector

RIGHT OF WAY

66 feet

LENGTH

0.8 miles

SPEED

SPEED LIMIT 30	SPEED LIMIT 30
BEFORE	AFTER

AVERAGE DAILY TRAFFIC

6,100	7,300
BEFORE	AFTER

RESPONSIBLE AGENCY

City of Tampa

East Cass Street

TAMPA, FLORIDA
City Median Household Income: $45,874

East Cass Street Context

- Prior to the protected facility, the Cass/Tyler couplet streets were each broad one-way, three-lane corridors with high traffic volume during peak hours that discouraged bicycle travel. In 2011, the City's InVision Center City Plan highlighted the waterfront and Hillsborough River as key elements to creating a vibrant downtown district that could be integrated into surrounding neighborhoods through an enhanced multimodal environment.
- East Cass Street serves as a central east-west corridor that links downtown to West Tampa and historic Ybor City. While the current segment serves as a safe passage through the central business district, the entire proposed facility (including phases 2 and 3) would connect a number of destinations along a single bicycle corridor, including University of Tampa, Hillsborough Riverwalk, Curtis Hixon Park, and the Meridian Avenue Greenway.

TWO-WAY CYCLE TRACK

Source: Tampa Magazine

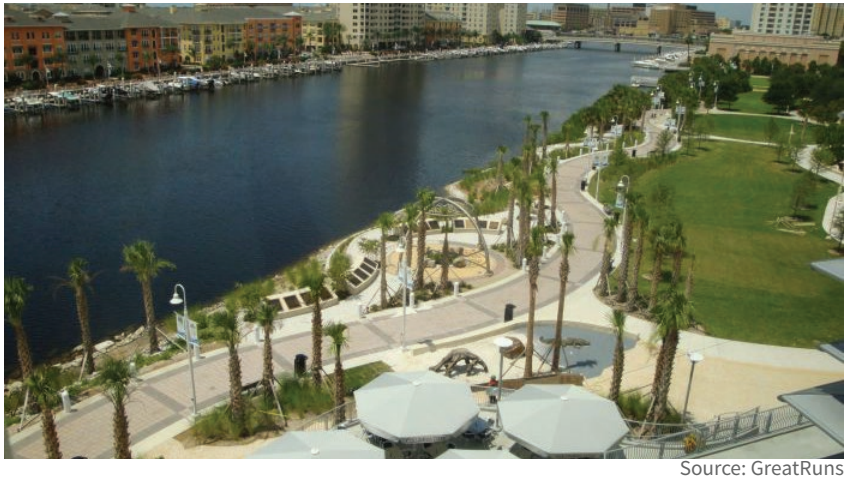
Cyclist in downtown Tampa, where previous facilities did not provide a safe space for bikes.

Source: City of Tampa

Green paint and signage at driveways provide visibility.

Source: City of Tampa

Traffic separators were installed in several sections with street parking to provide an additional level of protection.



Source: GreatRuns

Tampa Riverwalk is one of many city center amenities not previously easily accessible by bike.

Alder Street

EUGENE, OREGON

Metro pop: 369,519 | City pop: 161,649

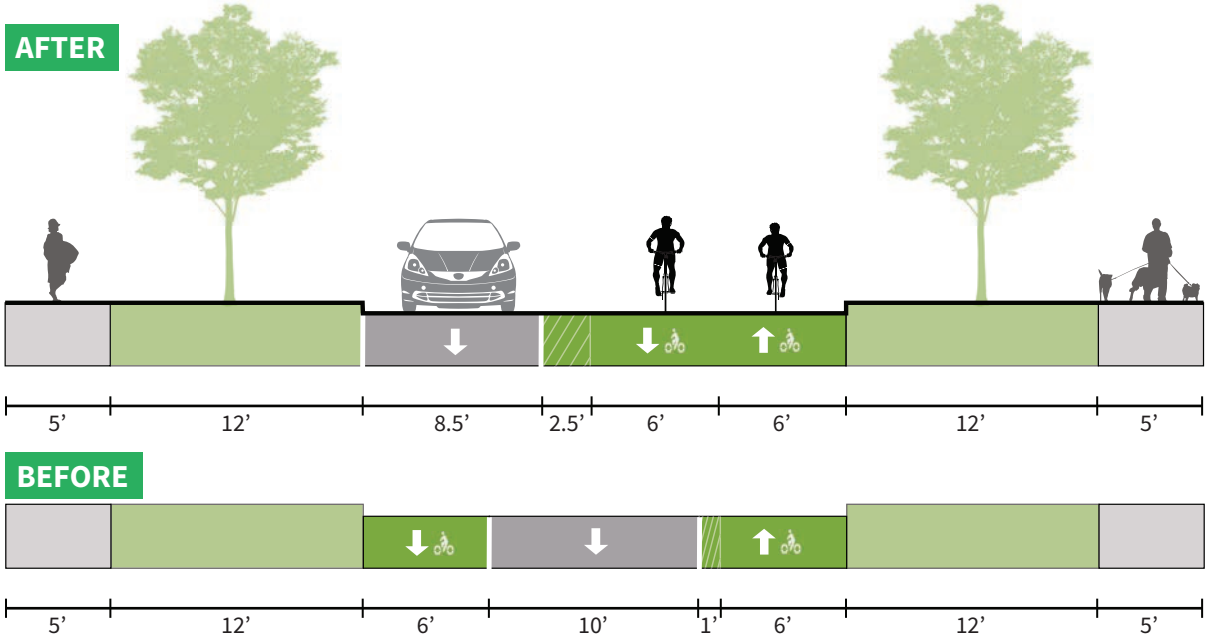
Source: David Sotelo Escobedo

Source: Google Maps

Alder Street prioritizes walking, cycling, and transit in a university district.

- In 2011, the City of Eugene installed a buffered two-way cycle track along a wide one-way street.
- Additional protection was provided between 13th and 11th streets with parking stalls between the cycle track and vehicle traffic.
- Separately phased traffic signals for cyclists were installed at the intersection of East 18th Avenue and Alder Street.

TWO-WAY CYCLE TRACK



Key Outcomes

More connectivity
This project created direct, comfortable bicycle connectivity with Eugene’s extensive river path system, creating the first on-street bikeway that connects to and matches the comfort of the well utilized off-street system. The cycle track also serves as an important corridor for those accessing campus from the north and south.

Consolidated right of way
The re-design was primarily a matter of reorganizing the preexisting right of way. The southbound and northbound bike lanes were combined into a two-way cycle track throughout the corridor, with a portion being protected by car parking and the rest separated by a painted buffer area.

STREET CLASSIFICATION
Major Collector

RIGHT OF WAY
50’-60’

LENGTH
0.7 miles

SPEED

SPEED LIMIT 20	SPEED LIMIT 20
BEFORE	AFTER

AVERAGE DAILY TRAFFIC

5,000	5,000
BEFORE	AFTER

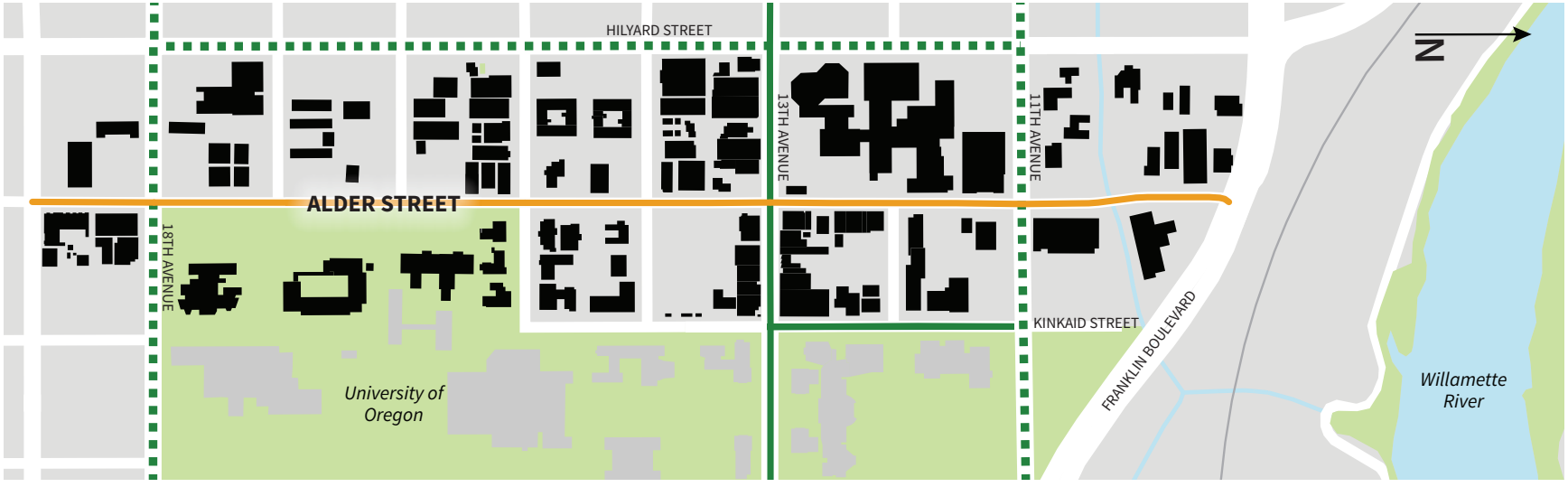
RESPONSIBLE AGENCY
City of Eugene

Alder Street

EUGENE, OREGON
City Median Household Income: $44,859

Alder Street Context

- Alder Street serves as a primary north-south transportation corridor on the west side of the University of Oregon campus, providing access though a heavily pedestrian-trafficked area of student residences and a retail district. Prior to the redesign, the one-way street had two curbside bike lanes, including one of the nation's first contraflow bike lanes, south of 13th Avenue.
- Originally slated as a repaving project, the City leveraged funding from Oregon Department of Transportation's Pedestrian and Bicycle Grant Program to increase the livability and functionality of the street as a premium-level bike corridor. South of 13th Avenue, the cycle track takes up more right of way than the vehicle lane creating a safe, comfortable environment for cyclists traveling in either direction. The City was able to maintain most of the on-street parking, while providing greatly enhanced bicycle connectivity and comfort.
- The project also included a significant one-block redesign of 13th Avenue between Alder Street and the University of Oregon campus that widened sidewalks, switched parallel parking on both sides to one-sided, back-in angled parking, widened a contraflow bike lane, and instituted other design features that reinforced slow vehicular speeds in this campus-adjacent commercial block.



Source: David Sotelo Escobedo

The cycle track takes up more right of way that the vehicle lane, making cyclists feel like they have the priority.

Source: David Sotelo Escobedo

Entrance to the Alder Street cycle track from 19th Avenue.

Source: David Sotelo Escobedo

Adjacent 13th street redesign with the contraflow bike lane, sharrows, and back-in angles parking to slow vehicle movement and increase visibility of people on bikes by drivers.

Source: David Sotelo Escobedo

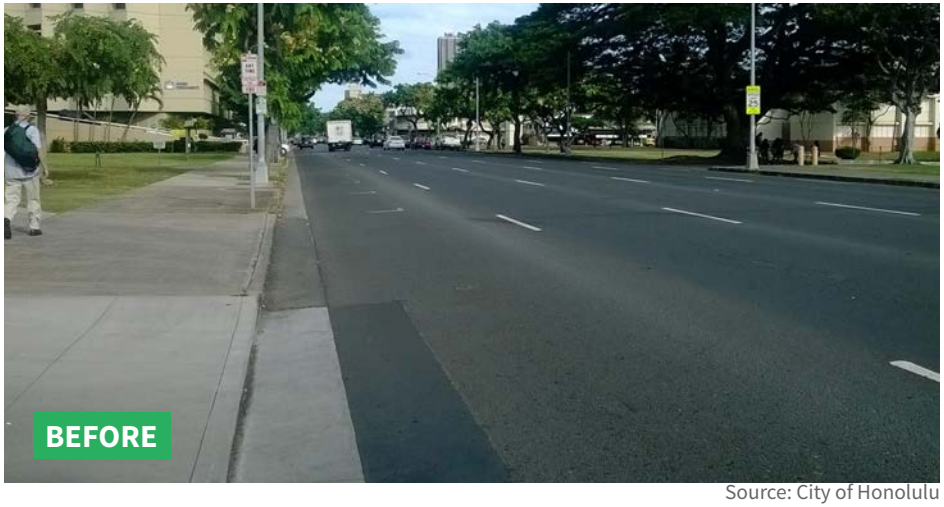
Green pavement markings make the cycle track more visible for vehicles crossing Alder Street.

King Street

HONOLULU, HAWAII

Metro pop: 992,605 | City pop: 351,792

Source: City of Honolulu

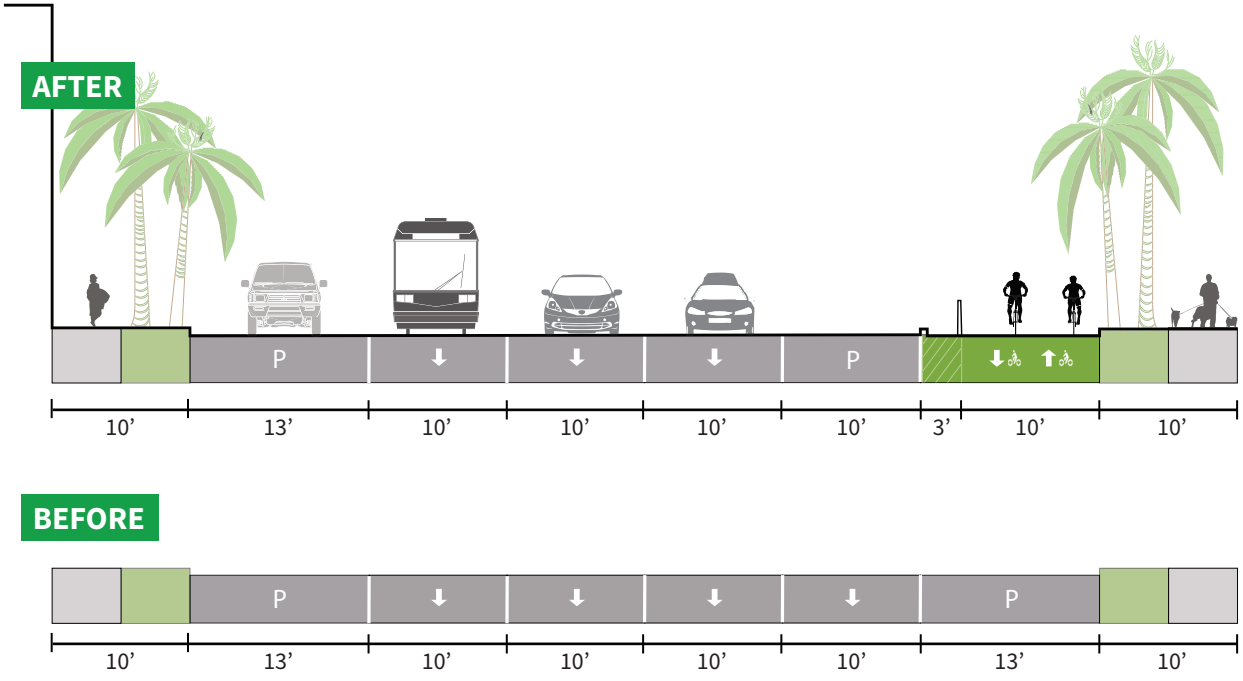


Source: City of Honolulu

Hawaii's first protected bike lanes create a bike corridor between downtown Honolulu and the university.

- In 2014, the City of Honolulu installed a one-way protected bike lane, relocating the curbside parking and added a buffer to protect cyclists from busy traffic lanes.
- A few months later, the project was converted into a two-way cycle track to serve as a pilot project for many other proposed facilities around the city.

TWO-WAY CYCLE TRACK



STREET CLASSIFICATION

Principal Arterial

RIGHT OF WAY

86 feet

LENGTH

2.0 miles

SPEED

SPEED LIMIT 30	SPEED LIMIT 30
BEFORE	AFTER

AVERAGE DAILY TRAFFIC

27,800	27,000
BEFORE	AFTER

RESPONSIBLE AGENCY

City of Honolulu

Key Outcomes

Increased Ridership

Bike counts were conducted before, during, and after the project, noting an 88 percent increase in average daily ridership from 384 to 745 cyclists.

Safer Facilities

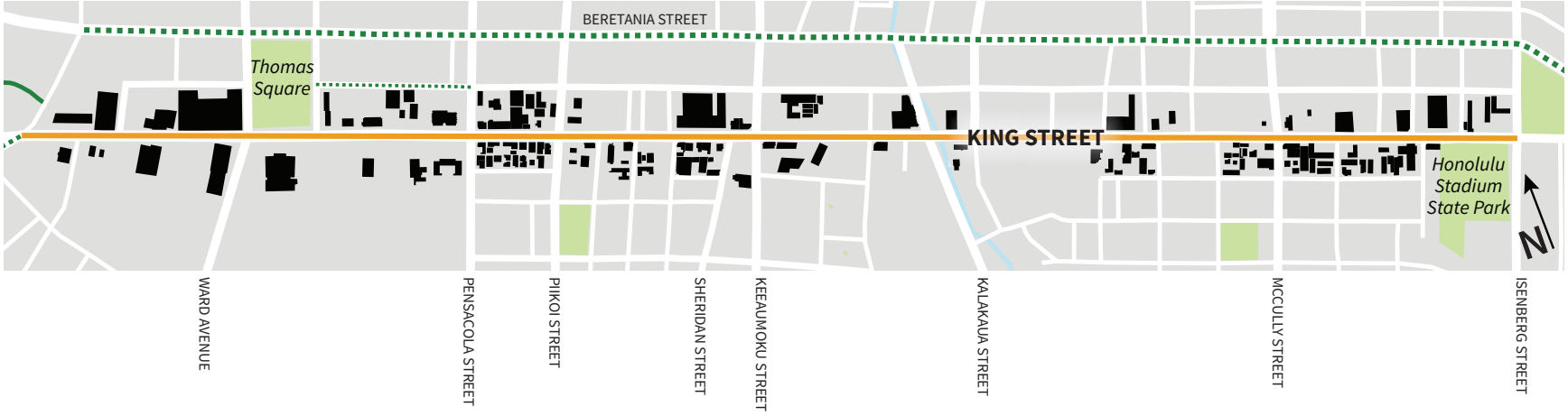
One main goal of the project was to move cyclists off the sidewalk where they typically rode prior to the installation of the facility. While an average of 67 percent of cyclists rode on the sidewalk prior to construction only 4 percent did so after the conversion to a two-way cycle track.

King Street

HONOLULU, HAWAII
City Median Household Income: $63,631

King Street Context

- The two-mile stretch of King Street is a principal corridor in urban Honolulu. Prior to reconstruction, the street had four lanes for one-way vehicle traffic, curb-side parking on both sides, and no bicycle lanes. The University of Hawaii at Manoa lies on the eastern end of the corridor and both a high school and middle school are located along King Street. The facility was designed in-house and used low-cost materials like curbs and delineators.
- As a pilot project, the preliminary findings collected from the King Street protected cycle track have been encouraging. Improvements to the project since installation have included the posting of signs at driveways to look both ways, bicycle signal heads, and the removal of some parking stalls near driveways to improve visibility. After the success of this pilot project, the City designed more cycle tracks, the first of which is the South Street project.
- Several travel time studies were conducted since the cycle track was installed. Data show the new bike lane has very little impact on through traffic from Alapai Street to University Avenue as travel times are consistent with pre-construction figures.



TWO-WAY CYCLE TRACK

Source: Honolulu 4K

Inaugural bike ride on King Street in December 2014. These pictures are from the first phase, when the cycle track was only one way.

Source: City of Honolulu

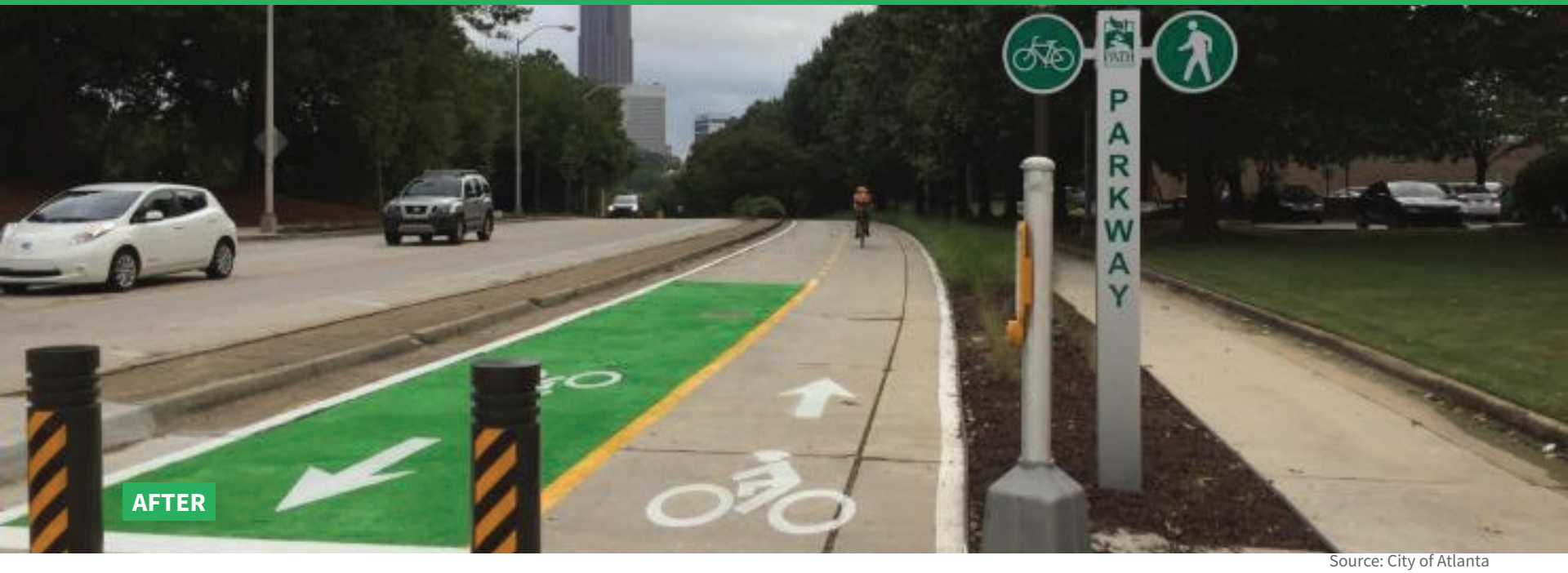
Three foot wide buffers keep car doors from opening into the cycle track.

A combination of posts, curbs, and parked cars provide a barrier separating bikes from automobile traffic.

Tech Parkway

ATLANTA, GEORGIA

Metro pop: 5,789,700 | City pop: 472,522



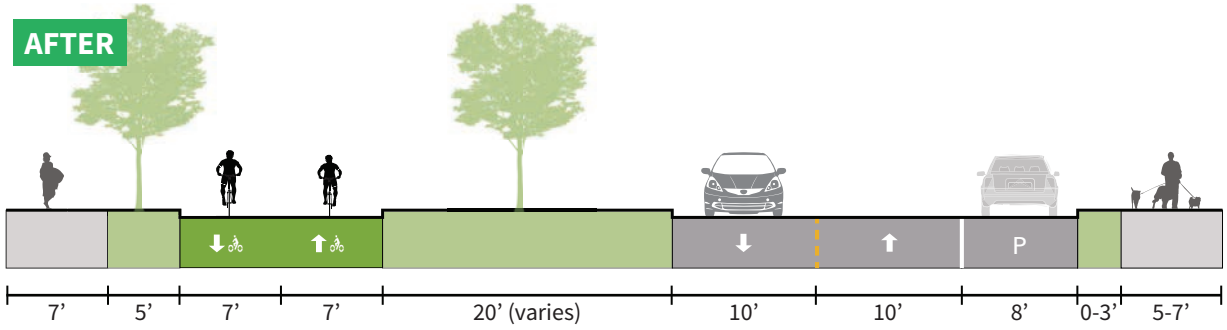
Source: City of Atlanta

Source: Google Maps

Multi-partner project yields new bikeway connecting Georgia Tech campus to downtown network.

- The project, installed in late 2017, repurposed two traffic lanes and 150 parking spaces into a separated two-way cycle track with an adjacent separated pedestrian walkway.

TWO-WAY CYCLE TRACK



Key Outcomes

No Impact on Travel Time
Despite some fears of major traffic congestion, the City’s Chief Bicycle Officer stated that vehicle travel time along the corridor did not decrease, while the addition of a high quality bicycle corridor increased comfort and speed of travel for people on bike.

Positive Impact on Bike Share Usage
Ridership as part of the City’s bicycle share program increased by 100% after the cycle track was completed, boosting transit options for commutes to downtown.

STREET CLASSIFICATION

Collector

RIGHT OF WAY

50 - 68 feet

LENGTH

1.3 miles

SPEED

SPEED LIMIT 25	SPEED LIMIT 25
BEFORE	AFTER

AVERAGE DAILY TRAFFIC

7,540	6,990
BEFORE	AFTER

RESPONSIBLE AGENCY

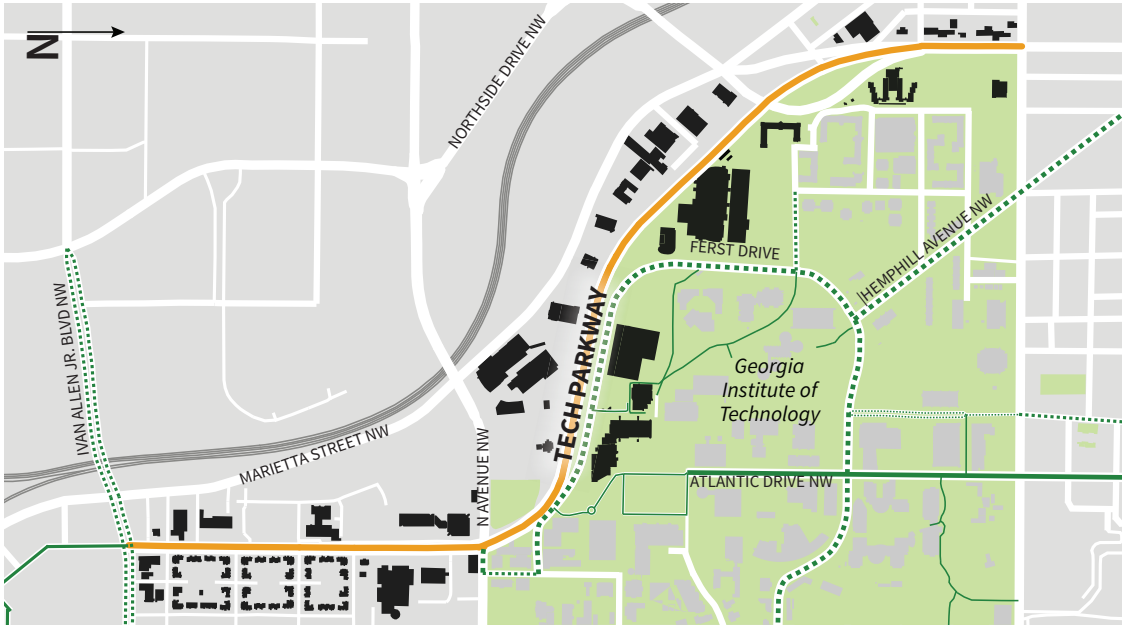
City of Atlanta

Tech Parkway

ATLANTA, GEORGIA
City Median Household Income: $49,398

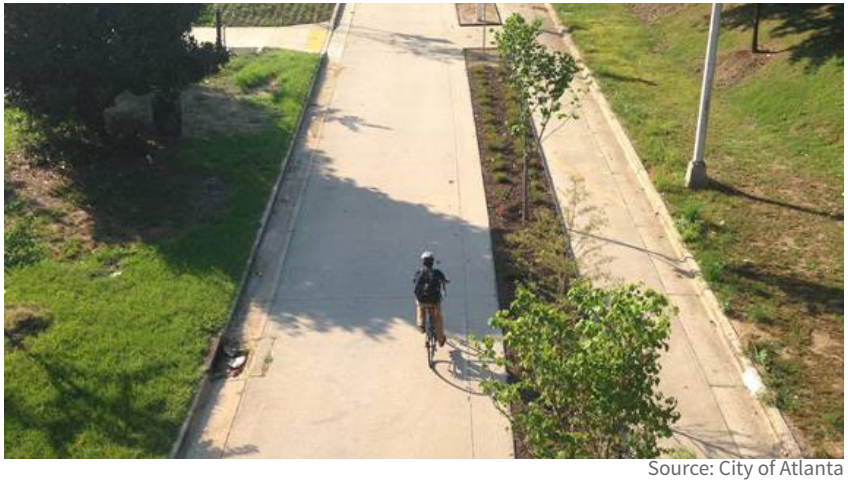
Tech Parkway Context

- The repurposed section of Tech Parkway runs along the southern and western edge of the Georgia Tech campus and is part of an increasingly connected network of bicycle facilities in downtown. Prior to the facility, the street was a median-divided, four-lane corridor with no designated bike facilities and an incomplete sidewalk system. The project was carried out in partnership between the City of Atlanta, the PATH Foundation (which has been helping fund the creation of an off-street bike network around the City), and Georgia Tech.
- The dedicated bicycle and pedestrian facilities repurposed both southbound lanes, converting the remaining northbound lanes into a two-way street. The facility connects to another recently installed cycle track along Luckie Street and connects to the City's downtown centennial park, which is the process of major renovations that will include a bike depot.
- In creating a more connected, multi-modal transportation system, the Tech Parkway cycle track has already had a positive impact on private investment downtown. Coca Cola, whose headquarters sits along the new cycle-track recently remodeled its street-facing entrance citing what it saw as "better experiences for our employees than getting in your car and trying to drive through Atlanta traffic."



Source: City of Atlanta

Atlanta's bike share program has helped facilitate increases in ridership.



Source: City of Atlanta

Excess roadway capacity was repurposed for separate facilities for cyclists and pedestrians.

Source: City of Atlanta

Before: Tech Parkway where it intersected with Northside Drive prior to the facility.

Source: City of Atlanta

After: Installation of intersection for cyclists and crosswalk for pedestrians.

One-Way Protected Bike Lane

Protected bike lanes are a simple, yet highly effective way of providing dedicated cycling space on our streets. The “protection” may take the form of curbs, posts, planters, or even parked cars. Protected lanes lower the stress and increase the safety for bicyclists of all ages and skill levels and they are an essential part of creating bike-friendly networks.

Telegraph Avenue

OAKLAND, CALIFORNIA

Metro pop: 4,335,391 | City pop: 420,005

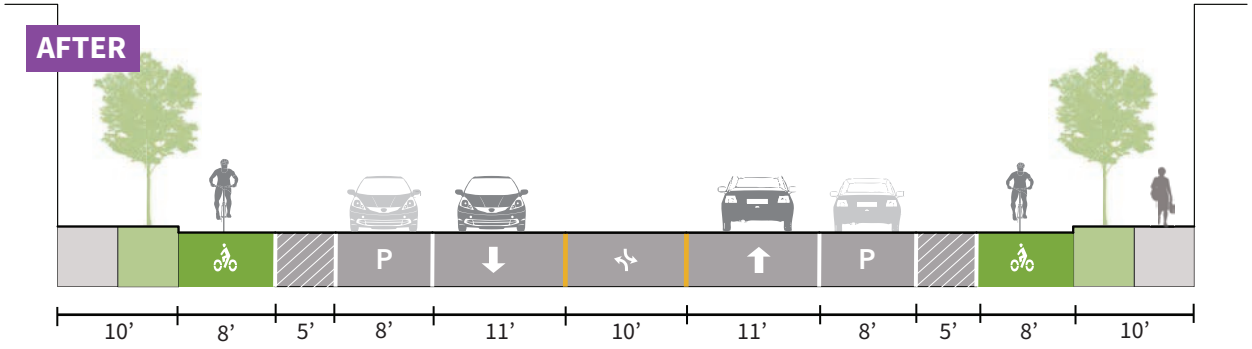
Source: City of Oakland

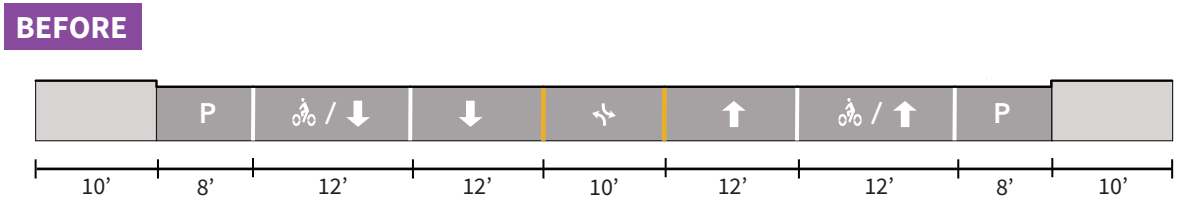
Source: Google Maps

One-way protected bike lanes through Downtown Oakland increases safety for all users.

- In 2016, the City of Oakland removed one travel lane in each direction on Telegraph Avenue between 19th Street and 41st Street to create space for cyclist and pedestrian safety improvements.
- Low-cost parking-protected bicycle lanes serve as an interim solution while the City seeks funding for future capital improvements along the corridor.

ONE-WAY PROTECTED BIKE LANE





Key Outcomes

Safe and Attractive for all Users
Not only has the previously “high-injury” corridor seen a decrease in the crash rate, but the narrowed vehicle right-of-way has reduced speeding and increased overall corridor safety.

Building Neighborhood Vitality
As part of a phased complete streets plan, bicycle and pedestrian traffic have almost doubled since implementation of the first redesigns. This may have helped boost retail sales in the adjacent KONO district, which have increased since the installation of the protected bike lanes.

STREET CLASSIFICATION
Principal Arterial

RIGHT OF WAY
Varies

LENGTH
0.65 miles

SPEED

SPEED LIMIT 25	SPEED LIMIT 25
BEFORE	AFTER

AVERAGE DAILY TRAFFIC
13,900
BEFORE

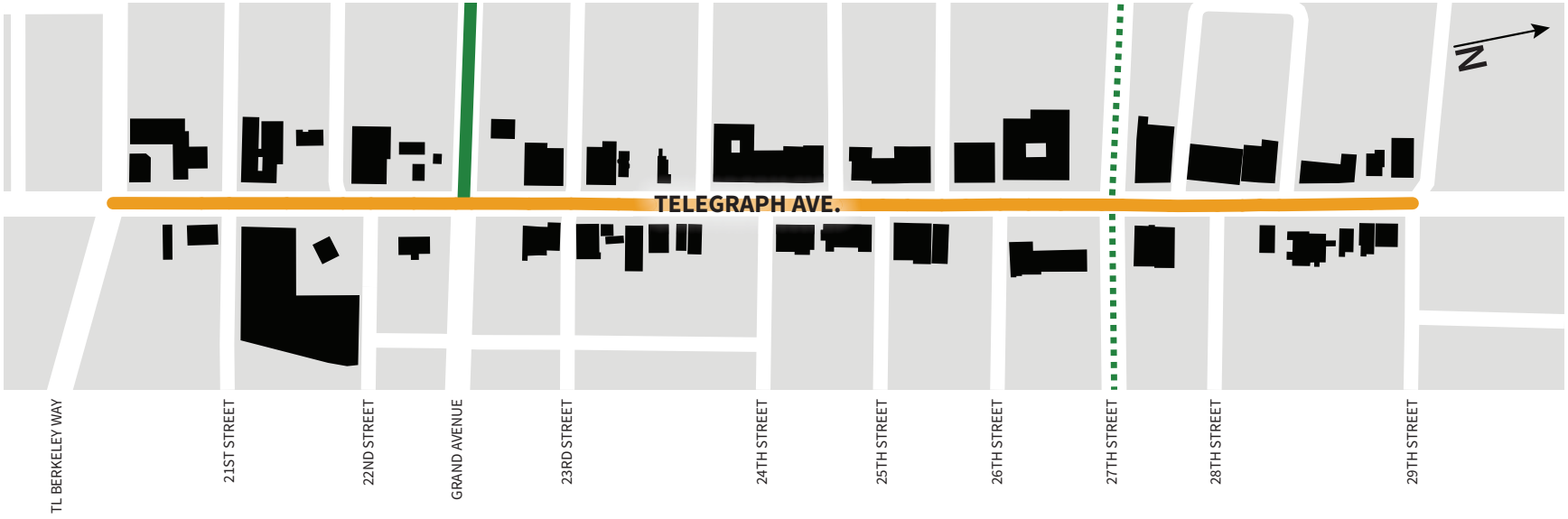
RESPONSIBLE AGENCY
City of Oakland

Telegraph Avenue

OAKLAND, CALIFORNIA
City Median Household Income: $57,778

Telegraph Avenue Context

- Telegraph Avenue is an important corridor between the neighborhoods of northern Oakland and downtown and is a major connector to the City of Berkeley and its university. Prior to installing the bike lanes, there were two lanes of car traffic running in both directions and no dedicated facilities for cyclists.
- The ongoing Telegraph Avenue Complete Streets Implementation Plan seeks to balance the needs of all users and has set metrics to evaluate the project's impact on safety, economic vitality, and user satisfaction. In addition to protected bike lanes, the City also installed pedestrian improvements (median refuge islands, ladder crosswalks, and curb extensions) and relocated bus stops to improve efficiency of bus transit operations.
- Based on their project progress report, which included deliberate community outreach, the City identified steps to improve visibility with new bollards and street paint. Without these additional buffers, many vehicles were parking in unclear buffer zones, significantly increasing monthly parking citations.
- Since installing the project, the City has seen a significant decrease in speeding.
- Fifty-two percent of bicyclists say they now travel through the corridor more frequently.



ONE-WAY PROTECTED BIKE LANE

Source: City of Oakland

Aerial view of Telegraph Avenue.

Source: City of Oakland

New City of Oakland bike share program riders on protected bike lanes.

Source: Bike East Bay

Low-cost planters provided a demonstration of the future project during early project outreach.

Source: City of Oakland

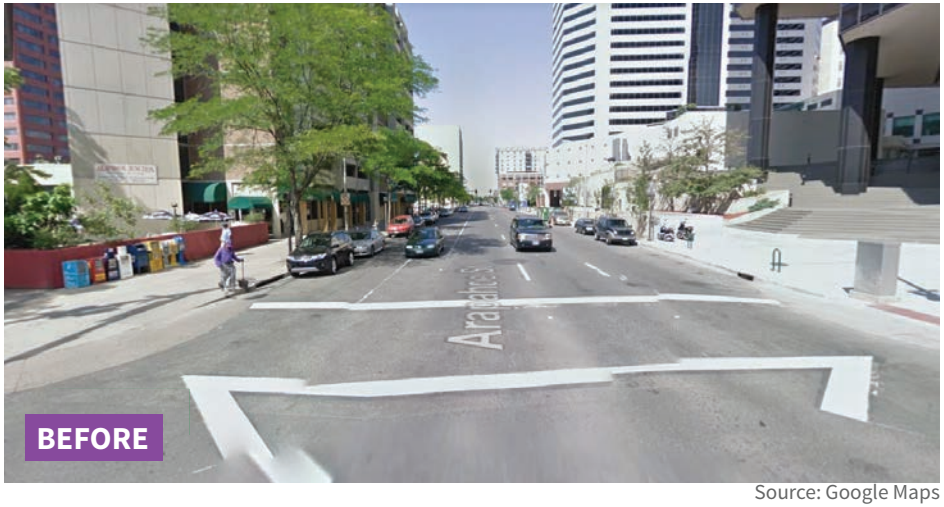
Protected bike lanes increased ridership and accessibility on this busy downtown corridor.

Lawrence & Arapahoe Streets

DENVER, COLORADO

Metro pop: 3,116,501 | City pop: 704,621

Source: Kimley-Horn

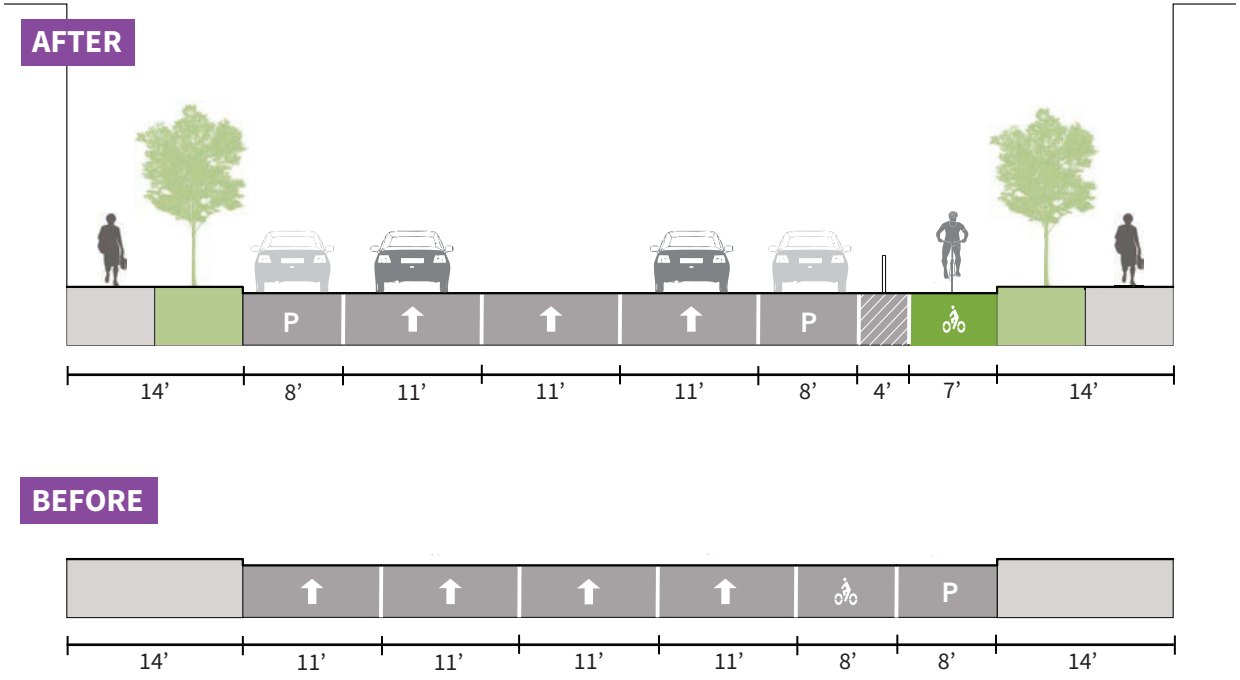


Source: Google Maps

First parking-protected bike lanes in downtown Denver increase connectivity with Auraria education center.

- One west-bound bike lane on Arapahoe Street and one eastbound bike lane on Lawrence Street were moved alongside the curb such that parked cars provide a safe barrier from vehicle traffic.

ONE-WAY PROTECTED BIKE LANE



Key Outcomes

Doubled Ridership
The City’s ongoing enhanced bikeway treatment evaluation study found that after the implementation of the project the number of people cycling on Lawrence and Arapahoe Streets increased 135 percent and 128 percent, respectively. This is compared to a two percent increase between 2011 and 2014, prior to the project.

Overall Community Support
The City has been carrying out surveys to evaluate community support of the project. 52% of respondents said they loved the new protected lanes and 83% agreed that they felt safer riding on them compared with conventional bike lanes.

STREET CLASSIFICATION
Arterial

RIGHT OF WAY
Varies

LENGTH
2.0 miles

SPEED

SPEED LIMIT 25	SPEED LIMIT 25
BEFORE	AFTER

AVERAGE DAILY TRAFFIC
5,200 - 6,700
BEFORE

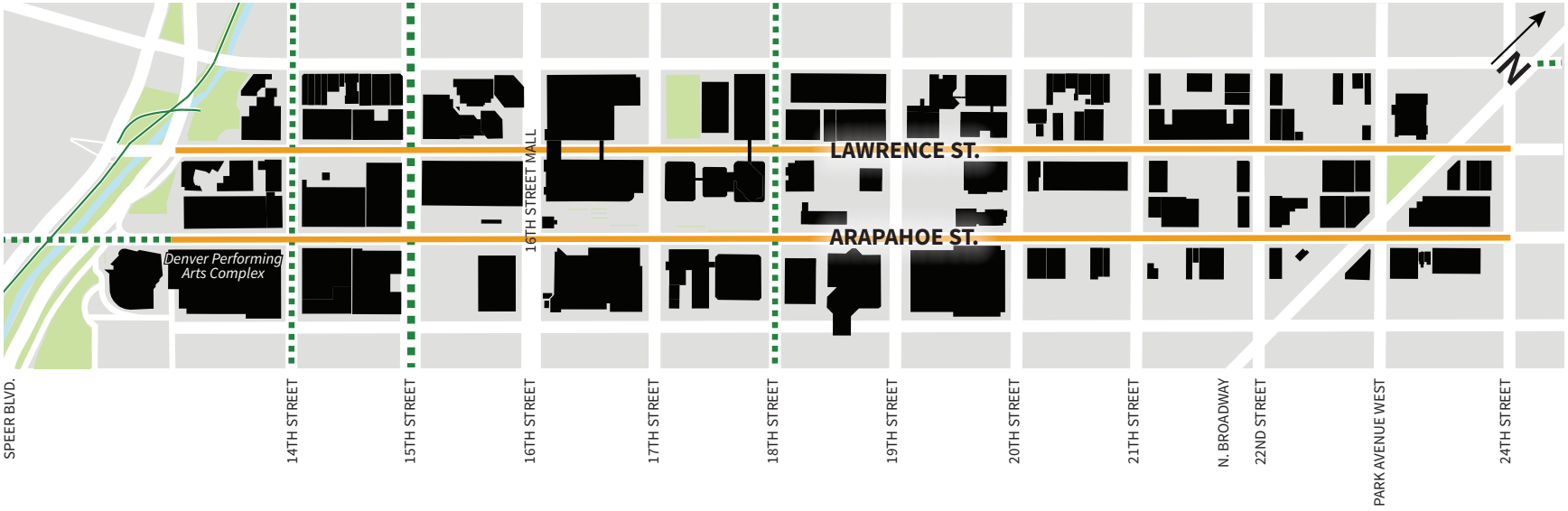
RESPONSIBLE AGENCY
City of Denver

Lawrence & Arapahoe Streets

DENVER, COLORADO
City Median Household Income: $56,258

Lawrence & Arapahoe Streets Context

- The Arapahoe/Lawrence protected bike lane project was mainly a matter of reorganizing the pre-existing transportation lanes. Conventional bicycle lanes existed on both streets, but they were alongside busy three-lane, one-way streets. Moreover, the complicated crossings at busy intersections made transitioning from downtown streets to neighborhood bikeways difficult for cyclists. By moving the bike lane alongside the curb, parked cars created a sizeable buffer from traffic.
- The protected bike lane couplet connects the neighborhoods to the northeast of downtown with the Auraria campus (Community College of Denver, Metropolitan State University of Denver, and University of Colorado Denver) which lies to the southwest of downtown. Experimental treatments at intersections at Broadway/Park Avenue, Speer Avenue, and 18th Street added important protections for cyclists commuting through downtown.



ONE-WAY PROTECTED BIKE LANE

Source: Kimley-Horn

Parked cars protecting the bike lane.

Source: Kimley-Horn

Bicycle signals at intersections.

Source: Kimley-Horn

By moving the parking lane to the outside of the bike lane, new accessible transit islands for bus loading and alighting became possible.

Source: City of Denver

The space and physical barrier created by the parking lane helps parents feel much safer cycling with their children.

Linden Road

WEST SACRAMENTO, CALIFORNIA

Metro pop: 2,296,418 | City pop: 48,744

Source: Dave Amos

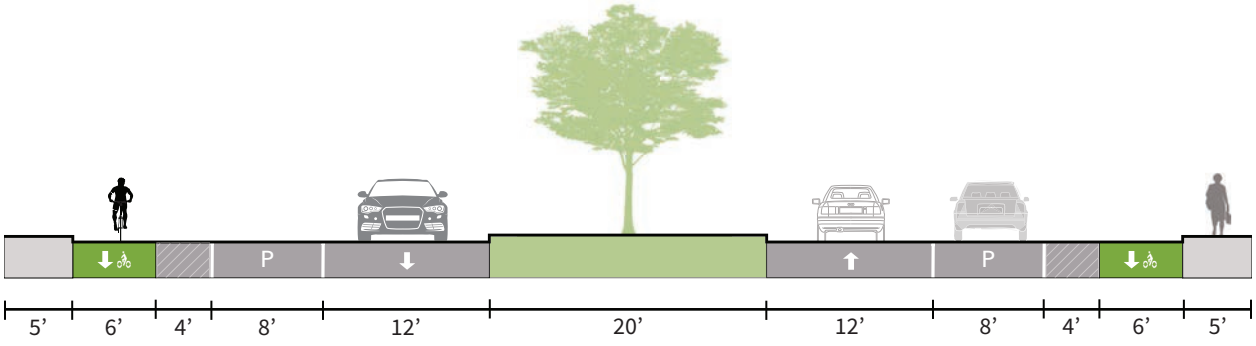
Source: Google Maps

A traffic lane to buffered bike lane conversion "right-sizes" this road

- This suburban arterial street had two wide lanes for cars in each direction, but the redesign converted one lane in each direction into a parking lane and buffer for the bike lane.
- Cyclists can now travel down Linden Road with a 12 foot buffer from car traffic.

ONE-WAY PROTECTED BIKE LANE

AFTER



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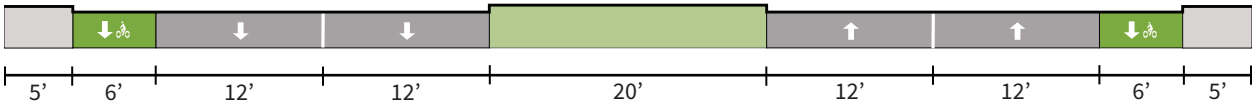


Key Outcomes

Slower traffic speeds
Drivers on Linden Road often exceeded the speed limit, as the road had more lanes than traffic volumes warranted. The City reduced the amount of car lanes and initial results show that drivers are slowing down.

Changes made after initial confusion
Immediately after the City re-striped Linden Loop, some drivers parked in the areas with diagonal lines meant to indicate no parking. The City added more diagonal lines to ensure the areas did not look like parking spaces. They also added small concrete curbs to discourage curb-side parking in the bike lane.

STREET CLASSIFICATION

Arterial

RIGHT OF WAY

100 feet

LENGTH

1.8 miles

SPEED

SPEED LIMIT 35	SPEED LIMIT 35
BEFORE	AFTER

AVERAGE DAILY TRAFFIC

7,500	7,500
BEFORE	AFTER

RESPONSIBLE AGENCY

City of West Sacramento

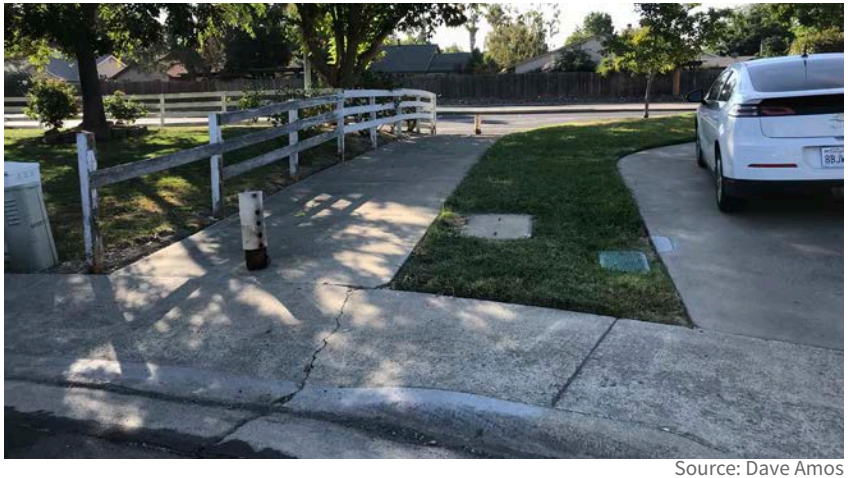
Linden Road

WEST SACRAMENTO, CALIFORNIA

City Median Household Income: $57,023

Linden Road Context

- Linden Road, known to many residents as Linden Loop, is an arterial street that provides access to suburban homes, Southport Elementary School, and adjacent parks. The original design of the street anticipated a higher amount of car traffic than traffic engineers observed, meaning there was an opportunity to re-purpose lanes for bikes.
- The project is part of the City of West Sacramento's Bike Lane Gap Closure Project, which aims to add over seven miles of new or improved bike routes to the city.
- The Linden Road protected bike lanes connect to a regional trail via a bike lane that crosses Jefferson Boulevard. The City of West Sacramento plans on creating more trails to connect residents with all major destinations in the community.



Source: Dave Amos

Multi-use paths connect cul-de-sacs to the bike lane. This allows people to bike from their homes to school and parks more easily.

Source: Dave Amos

The parking lane transforms into a long right turn lane for parents dropping students off at the elementary school along the route.

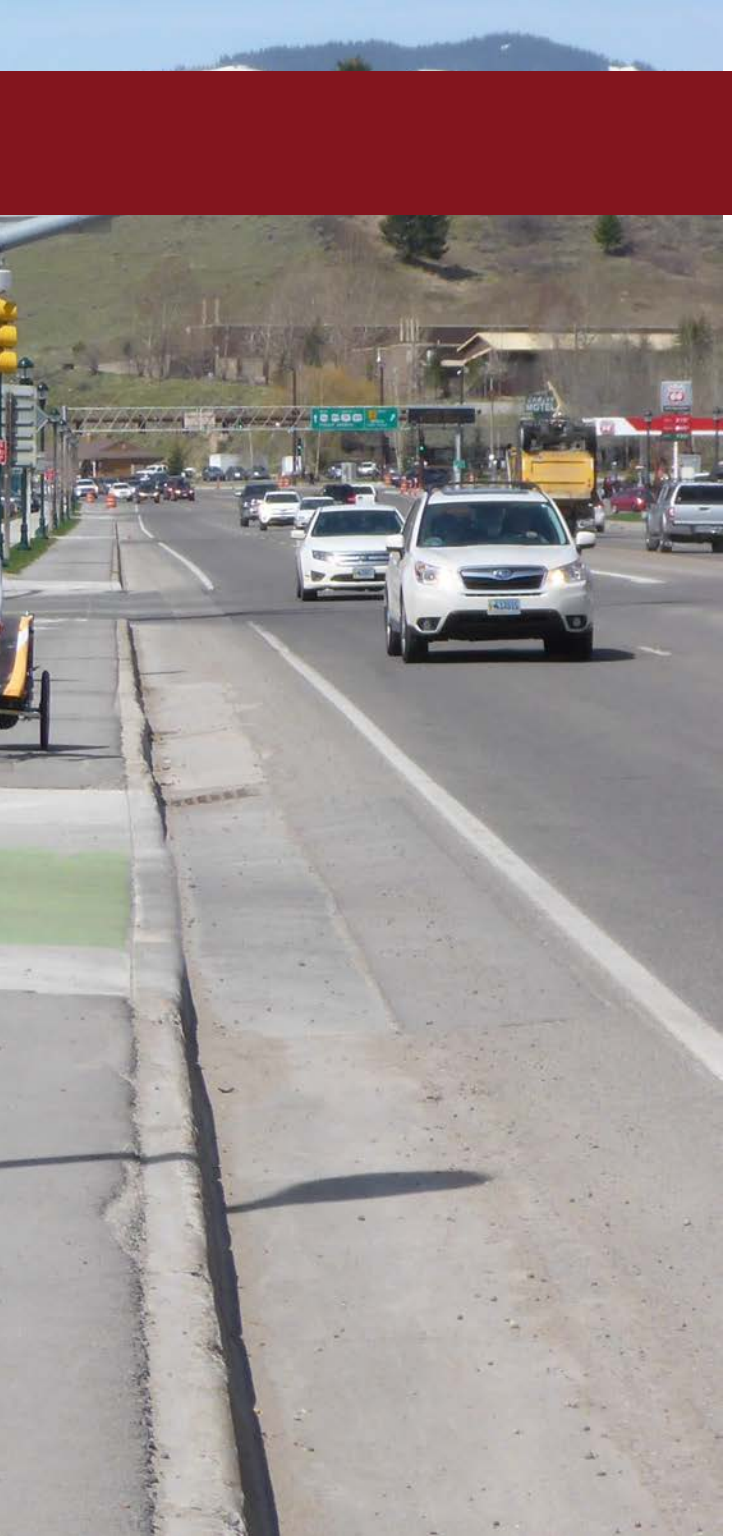
Source: Dave Amos

These small barriers provide a small amount of protection for the bicycle lanes.

Source: Dave Amos

A significant portion of the parking lane is hashed to disallow parking and promote visibility at intersections and driveways.


ROCKY
MOUNTAIN
BANK



Raised Bike Lanes

Raised bike lanes are vertically separated from automobile traffic and provide protection via this differential in height. Rising a few inches above the vehicular street level, raised facilities are sometimes level with adjacent sidewalks and other times slightly lower in order to further differentiate uses across a right of way.

Source: Brian Schilling

Western Avenue

CAMBRIDGE, MASSACHUSETTS

Metro pop: 4,794,447 | City pop: 110,651

Source: City of Cambridge

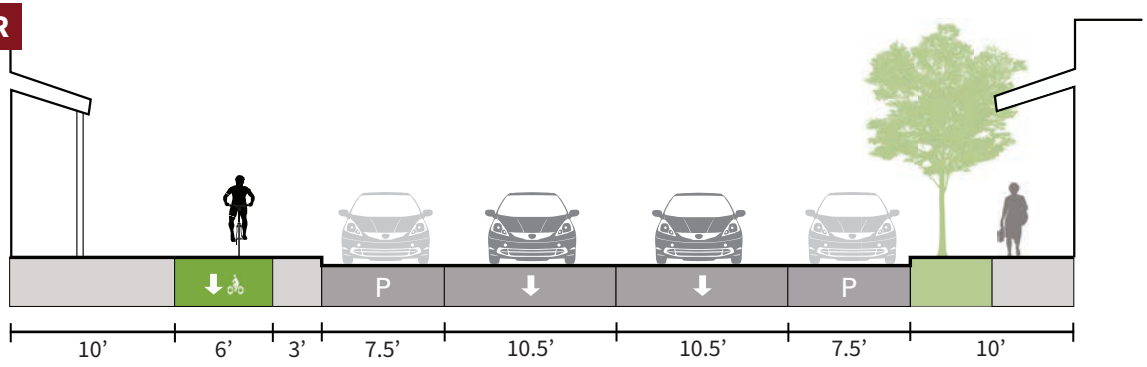
Source: Google Maps

This connection from a major commercial square to the Charles River and Boston resulted in benefits for all modes of transportation.

- A six foot wide raised cycle track with a three foot wide buffer and pervious pavement was constructed.
- Planted curb extensions help address stormwater management and improve aesthetics.
- Transit stops were improved with new shelters or benches.

RAISED BIKE LANE

AFTER



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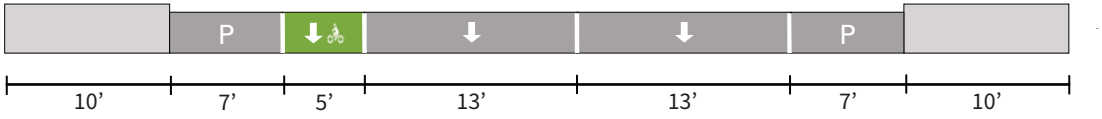


Key Outcomes

Decreased Speeding

Vehicle speeds have decreased from 7 mph above the posted speed limit to 3 mph above and 1 mph below.

Sustainable Transportation Use

After construction, evening peak volumes increased 122 percent for bicyclists and 32 percent for pedestrians and transit riders. Vehicle volumes decreased by 13 percent.

Improved Access

Pedestrian curb extensions, raised pedestrian crossings and cycle tracks across minor side streets and two-stage bike boxes improve access and comfort for people walking and cycling. Dedicated signals at intersections give cyclists and pedestrians a head start.

National Recognition

Western Avenue placed first in “America’s 10 Best Bike Lanes” from People for Bikes in 2015.

STREET CLASSIFICATION

Principal Arterial

RIGHT OF WAY

65’

LENGTH

0.6 miles

SPEED

SPEED LIMIT 25	SPEED LIMIT 25
BEFORE	AFTER

AVERAGE DAILY TRAFFIC

15,000	13,100
BEFORE	AFTER

RESPONSIBLE AGENCY

City of Cambridge

Western Avenue

CAMBRIDGE, MASSACHUSETTS
City Median Household Income: $83,110

Western Avenue Context

- Bicycle commuting in Cambridge has grown in popularity over the last two decades. Combined bicycle counts conducted at 17 major intersections during peak hours show that the number of bicyclists tripled from 3,000 in 2002 to 9,000 in 2012.
- Due to their emphasis on increasing all sustainable modes of transportation, the City of Cambridge chose to conduct a "complete streets" redesign of Western Ave. Some of the project goals included improving safety and facilities for all users, ensuring access and parking for businesses, replacing the aging stormwater management system, and adding aesthetic elements.
- Since drainage was a major concern for the project, the City added rain gardens to the landscaping for Cronin Park and along Western Avenue.

RAISED BIKE LANE

Source: City of Cambridge

New landscaping and drainage was added to Cronin Park along Western Avenue.

Source: City of Cambridge

Crosswalks draw attention to pedestrians crossing both the bike lane and the street.

Source: City of Cambridge

Pedestrian crosswalks opposite the cycle track were also raised.

Source: City of Cambridge

Dedicated signals give crossing bicyclists a head start.

West Broadway Avenue

JACKSON, WYOMING

Metro pop: 31,464 | City pop: 9,577

Source: Brian Schilling

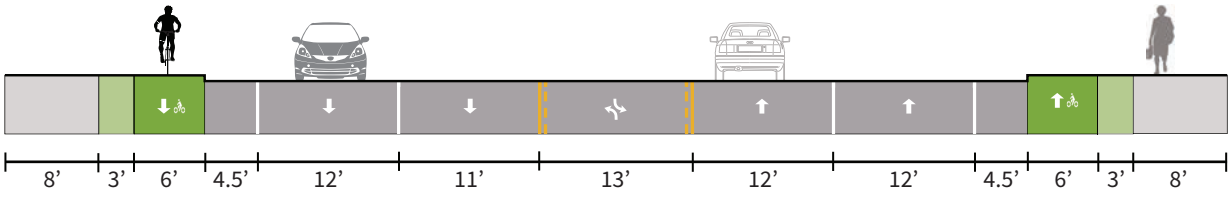
Source: Brian Schilling

Raising the cycle track created a key active transportation connection in Jackson.

- A raised cycle track and sidewalk transformed West Broadway from a typical auto-oriented roadway that was unsafe and uninviting for bicyclists and pedestrians.
- Jackson was able to add this high quality, raised, and therefore separated facility without impacting existing volume of vehicular traffic.

RAISED BIKE LANE

AFTER



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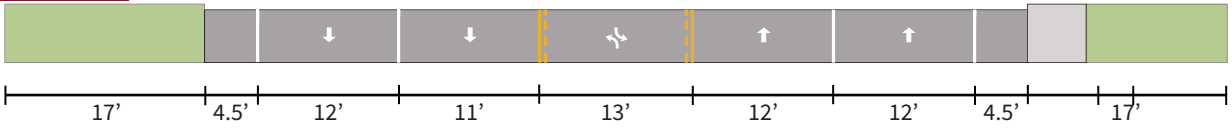


Key Outcomes

Systemwide Increase in Bicycling
Not only has there been an increase in recreational cyclists along West Broadway, but the cycle track has also encouraged residents to use the facility as part of their daily commute. As a result, other bike lanes in the community are also seeing increased ridership.

Adds the Missing Link
The West Broadway improvements were part of a larger project along the West Broadway and WY Highway 22 corridors that was considered the ‘missing link’ in Teton County’s bicycle transportation network.

STREET CLASSIFICATION
Minor Arterial

RIGHT OF WAY
130 feet

LENGTH
1.3 miles

SPEED

SPEED LIMIT	SPEED LIMIT
35	30-35
BEFORE	AFTER

AVERAGE DAILY TRAFFIC

17,500	17,300
BEFORE	AFTER

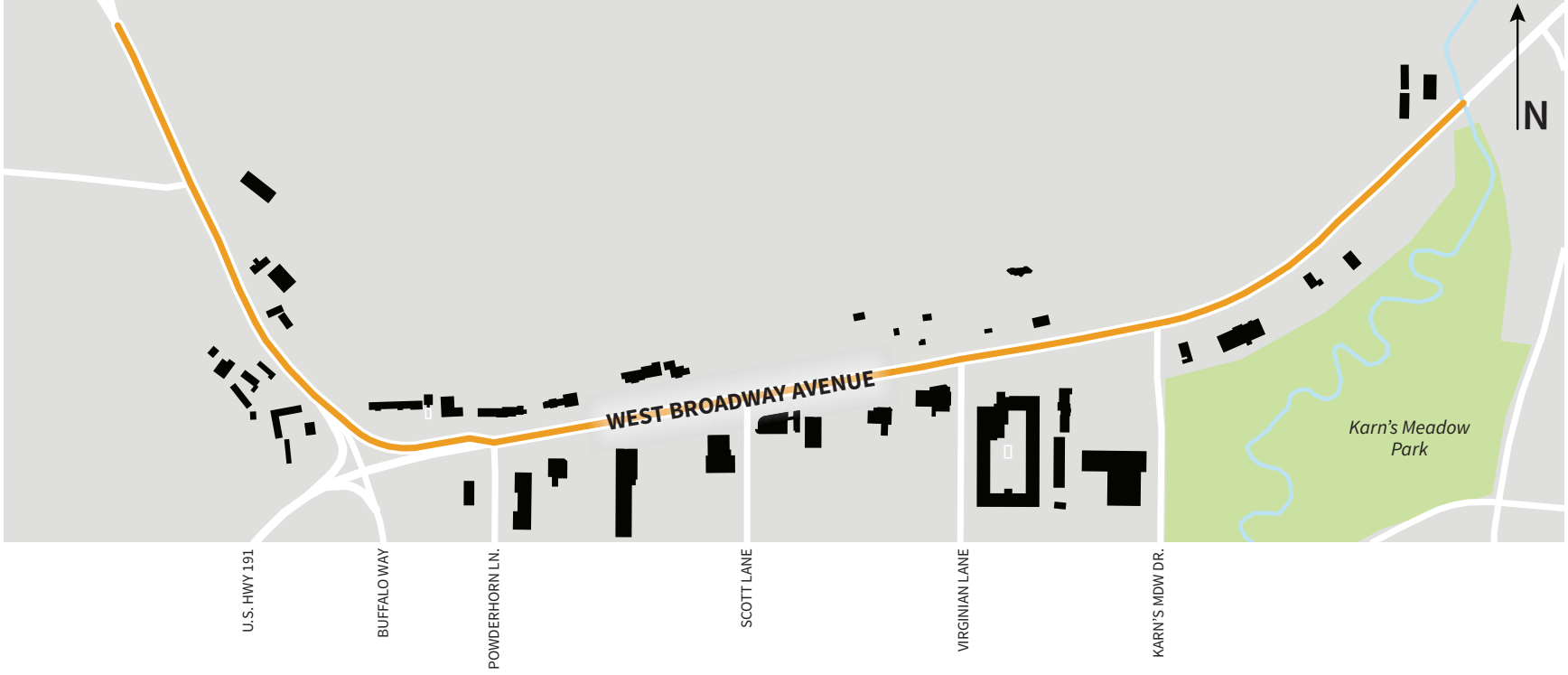
RESPONSIBLE AGENCY
Town of Jackson/ Wyoming DOT

West Broadway Avenue

JACKSON, WYOMING
City Median Household Income: $70,517

West Broadway Avenue Context

- This one-mile stretch of West Broadway between the intersection of Hwy 89/WY22 and downtown Jackson is a five-lane semi-urban arterial road with major commercial activity. It serves as Jackson's "Main Street," with a mix of visitor and local commercial services,
- Immediately south of West Broadway is the primary mixed-use area of Jackson that features higher density housing, restaurants, grocery stores, the main post office, library, and neighborhood parks.
- These neighborhoods are dense enough that destinations can be accessed by walking and biking, and there is a relatively high concentration of lower-middle income residents that benefit from increased travel options.



RAISED BIKE LANE

Source: Brian Schilling

Colored pavement was installed at conflict points like driveways.

Source: Brian Schilling

The previous bike lane offered no physical separation from traffic.

Source: Brian Schilling

Cyclists and pedestrians benefit from dedicated space in the right-of-way.

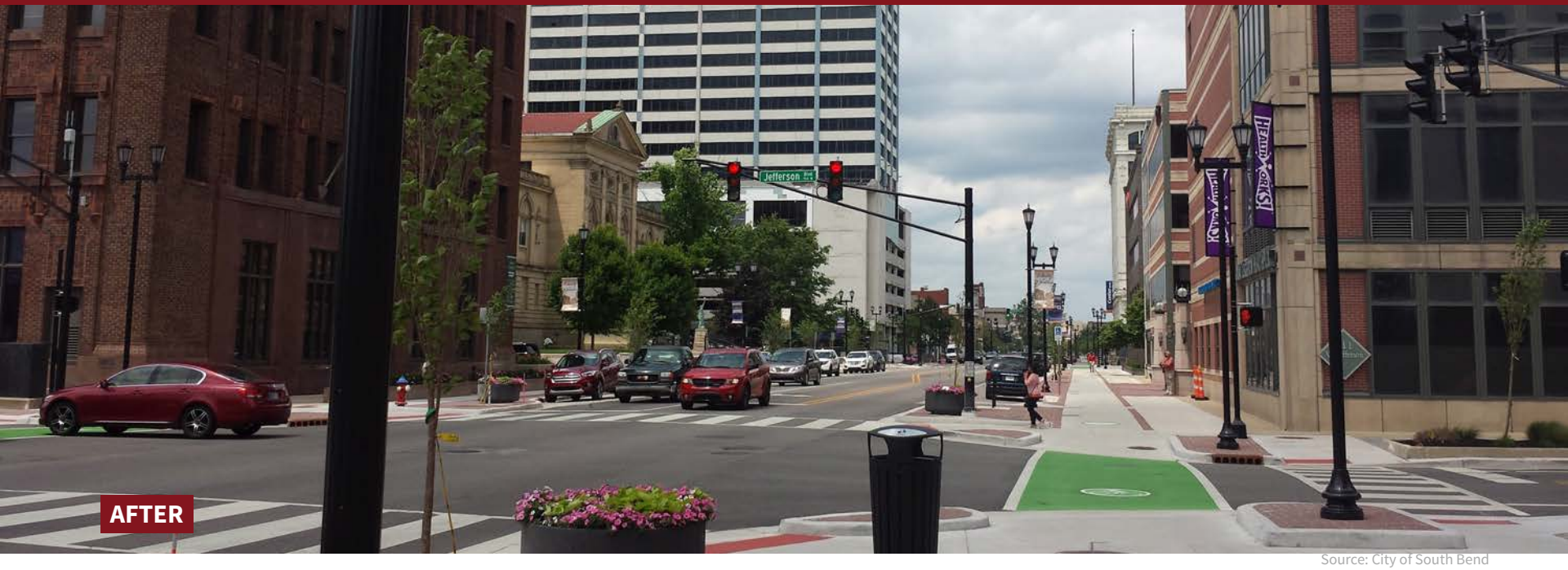
Source: Brian Schilling

Since construction, both recreational and commuter cycling has increased.

Main Street & Dr. Martin Luther King Jr. Boulevard

SOUTH BEND, INDIANA

Metro pop: 320,098 | City pop: 101,735



AFTER

Source: City of South Bend

BEFORE

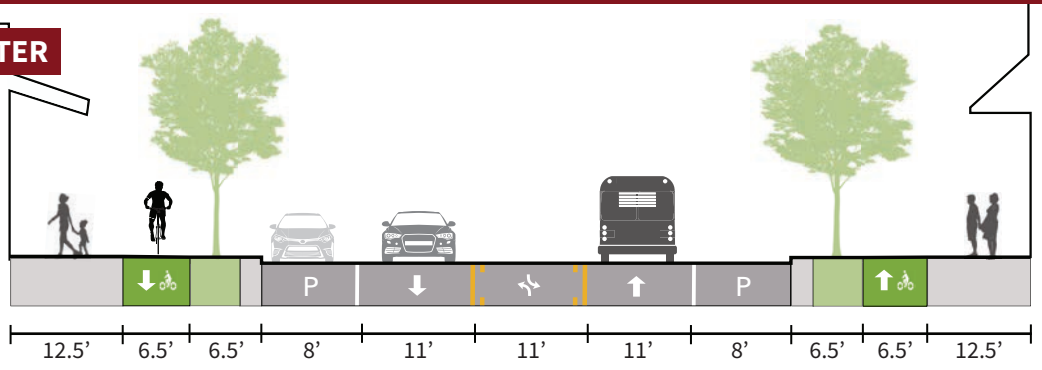
Source: City of South Bend

A Smart Streets project converts city's largest one-way couplet into multi-modal downtown main streets.

- In 2016, the City of South Bend installed raised bicycle facilities on both sides of the newly configured two-way Main Street.
- A cycle track was also installed on adjacent Dr. Martin Luther King Jr. Boulevard to expand the connected bike network beyond one street.

RAISED BIKE LANE

AFTER



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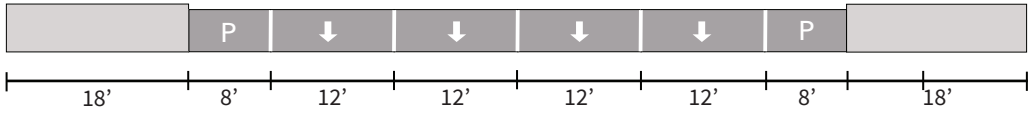


Key Outcomes

Complete Streets
The new roadway design not only prioritizes cyclists, but also pedestrians as well by installing bumpouts, crosswalks, pedestrian signal push buttons control signals, bus pull-outs, curb cuts, raised crosswalks, median refuges, ramps, and traffic calming measures.

Restoring Downtown Vibrancy
Previously, the major four-lane corridor through downtown functioned more like a highway for motorists, now multimodal systems provide safe infrastructure for cyclists and pedestrians while increasing economic activity.

STREET CLASSIFICATION
Principal Arterial

RIGHT OF WAY
100’

LENGTH
0.7 miles

SPEED

SPEED LIMIT 30	SPEED LIMIT 25
BEFORE	AFTER

AVERAGE DAILY TRAFFIC

19,000	10,700
BEFORE	AFTER

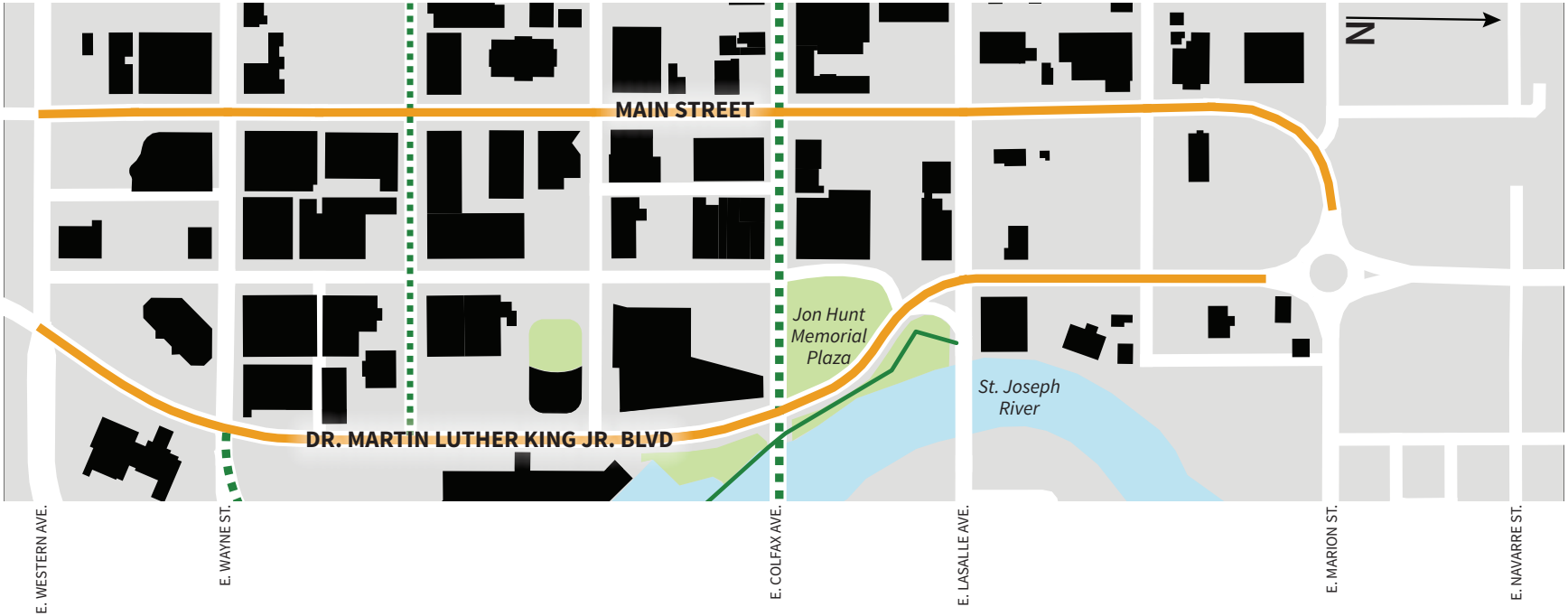
RESPONSIBLE AGENCY
City of South Bend

Main Street & Dr. Martin Luther King Jr. Boulevard

SOUTH BEND, INDIANA
City Median Household Income: $35,758

Main Street & Dr. Martin Luther King Jr. Boulevard Context

- The project began in 2015 as the City's response to the Mayor's Challenge for Safer People and Safer Streets. A strong push came from City Hall to create safer and more efficient transportation infrastructure, particularly targeting South Bend's extra capacity on wide one-way corridors. Creating streets that incorporated bicycle and pedestrian safety was part of a larger effort to enhance of attractiveness of the downtown.
- Prior to the Smart Streets initiative, both northbound Dr. Martin Luther King Jr. Boulevard and southbound Main Street were four-lane, one-way corridors that moved traffic quickly through downtown. The project eliminated vehicle lanes and converted both streets into two-ways. This left ample space for much needed protected bicycle infrastructure.
- A tree-lined buffer offers separation between the raised track and street.
- This was only one part of the overall beautification of downtown with new street lamps, benches, curbs, and sidewalks. This investment in improvements to the public realm has already been cited as a factor in over $100 million in new private investment downtown within two years of its completion.



Source: City of South Bend

Dr. Martin Luther King Jr. Boulevard Before: Wide one-way streets characterized South Bend's previous downtown streetscape.

Source: City of South Bend

Dr. Martin Luther King Jr. Boulevard After: Conversion to two-way streets and expansion of pedestrian and bicycle right of ways transform downtown into a walkable environment.

Source: City of South Bend

Dr. Martin Luther King Jr. Boulevard Before: With bicycle infrastructure absent, narrow sidewalks did not offer an attractive alternative.

Source: City of South Bend

Dr. Martin Luther King Jr. Boulevard After: Improved streetscape with median, tree coverage, and streetlamps make downtown a safer place.

Brian Schilling

Brian Schilling is the Pathways Coordinator for the Town of Jackson, as well as Teton County, Wyoming.

As a Pathways Coordinator, Brian plans and manages the design, construction, and operation of the town and county's joint shared-use Pathways System. He also is involved with sidewalk, bike lane, and protected bike lane projects, as well as street reconstruction and new road projects.

What does your job encompass as a Pathways Coordinator?
My job is the equivalent to a bicycle-pedestrian coordinator in most cities, but I work for the Town of Jackson and Teton County in a jointly-funded program. I'm primarily in charge of our Pathways System, which includes about 50 miles of multi-use bike/pedestrian pathways.

In the last 10 years or so, we've completed the valley-wide connections to make it a really functional system. We also consider the Pathway System to include our on-street bike lanes, sidewalks, and even some National Forest trails that connect neighborhoods or pathways.

It's a pretty broad job, especially since I'm the only Pathways Coordinator in my department. I end up relying on my colleagues a lot: people at public works, parks and rec, the street crews, and maintenance staff, to name a few.

What are some of the advantages and disadvantages of being a "one-man show" in a small-town environment?

Source: Brian Schilling

The big advantage of being in a small town is that you have really good access to the other agencies in the town and county. I interface with public works, the engineering department, transit, planning, and the police department. Being a small town helps a lot in terms of working cooperatively towards common goals.

Sometimes it's great being a one-person show because I have a strong influence on where the program is going and what initiatives we are pushing for. A challenging aspect of working alone is

Source: Brian Schilling

dealing with an agency that's resistant to what I'm trying to do, which is changing people's travel behaviors. It's nice when you've got some comrades in arms to support you when you're dealing with others! When you're just one person trying to talk with other agencies, it can be really challenging. I'm lucky that we have really good support from the community, from the other agencies within the town and the county, from the town manager, and from our elected officials.

What are your some of your goals for Jackson and Teton County?

I'd say focusing on the next level of biking infrastructure. I ask myself "what would the Dutch do in this situation?" For example, I hired a Dutch firm to take a look at Snow King Ave and tell me what they would do to make the street more comfortable if it were in the Netherlands. They gave me a long-term implementation plan as well as a short term plan, which we could do cheaply over the summer. It was a great way to test out some of the new techniques.

What I'm trying to do in the Town of Jackson is ask the question, "what is the next level of infrastructure?" with the intent that the next level is super high-quality, super comfortable, super convenient, and will be really effective in getting people to make trips by bike or walking that they would have otherwise have made by cars.

I want to focus on some of the key routes first; dialing in on the quality of the infrastructure, and making it so comfortable that it's the obvious choice. It's the little amenities and encouragements that can entice a lot of people in that "interested but concerned" category of cyclists. People who say "I'd like to ride my bike more but I've got this obstacle, I've got this barrier" and helping them get around that barrier can help with mode shift. Things like ebikes and cargo bikes have also caused a large local shift for people using bikes for utilitarian trips and making them part of their everyday lives.

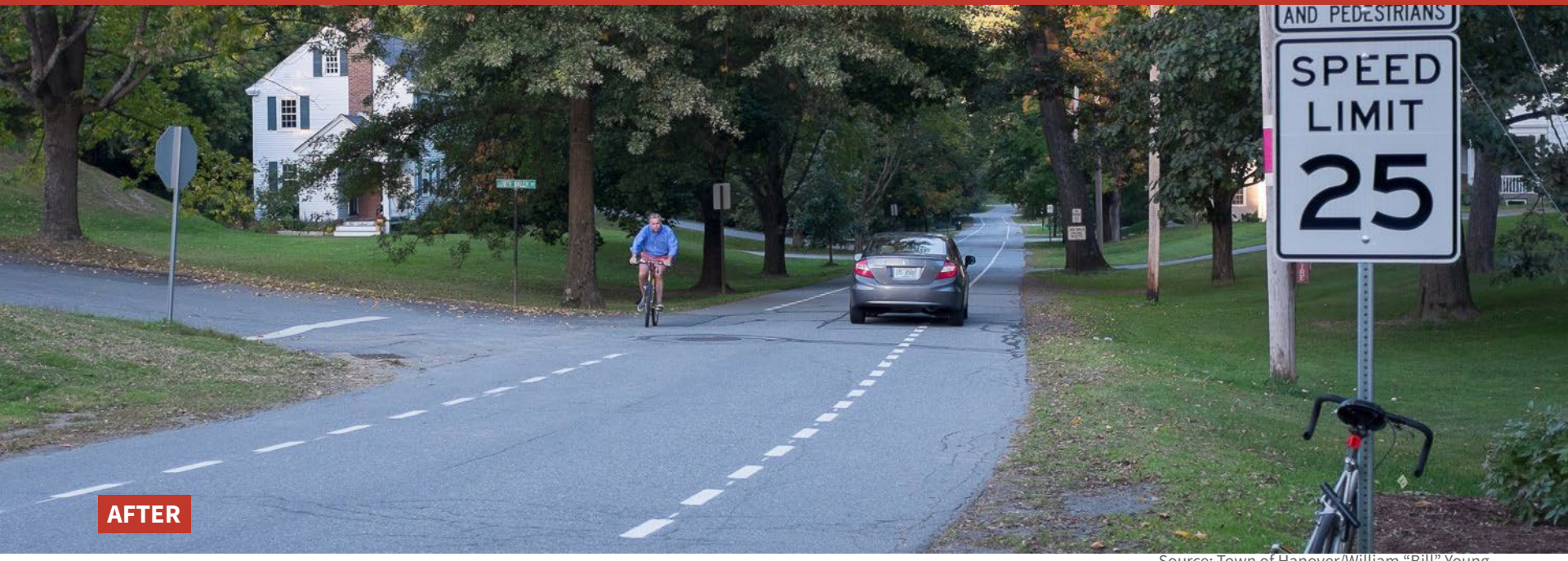
Advisory Bike Lanes

Advisory bike lanes provide a priority, although not exclusive, space for cyclists on each side of relatively narrow and low traffic volume roadways. Automobile traffic travels in a single, bi-directional center traffic lane that is typically too narrow to provide full two-direction traffic. When two cars meet, they are permitted to enter the advisory bike lane after yielding to cyclists. This roadway treatment can be effective in both urban and rural settings.

Valley Road

HANOVER, NEW HAMPSHIRE

Metro pop: 216,537 | City pop: 11,371



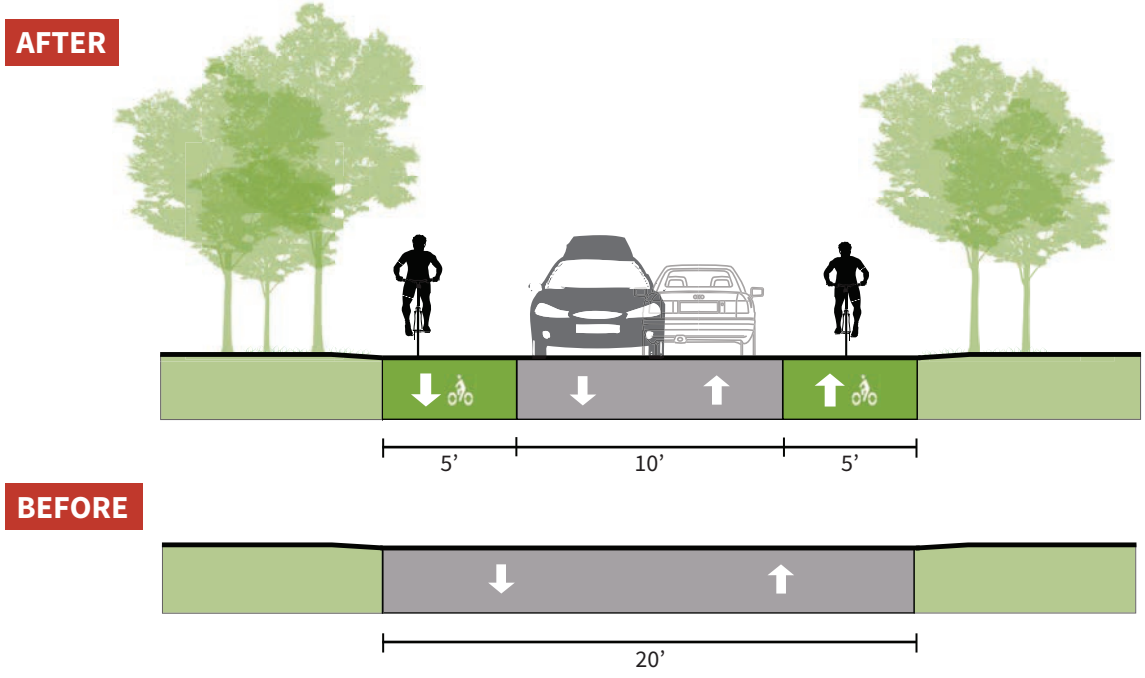
Source: Town of Hanover/William "Bill" Young

Source: Town of Hanover/William "Bill" Young

Advisory bike lanes provide a safer commute for cyclists and pedestrians along rural streets in Hanover.

- Advisory bike lanes on the left and right sides of the road act as a safe zone while cars use a central, shared lane.
- The Town of Hanover's pilot project demonstrated how a narrow street could have bike lanes.

ADVISORY BIKE LANES



STREET CLASSIFICATION

Local Road

RIGHT OF WAY

20 feet

LENGTH

0.24 miles

SPEED

SPEED LIMIT	SPEED LIMIT
25	25
BEFORE	AFTER

AVERAGE DAILY TRAFFIC

N/A	N/A
BEFORE	AFTER

RESPONSIBLE AGENCY

Town of Hanover

Key Outcomes

Safer Streets

The primary goal of this project was to determine if advisory bike lanes increased safety for cyclists and pedestrians. Before the implementation of the bike lanes, 40 percent of vehicles were recorded going over the speed limit along Valley Road. Since the implementation, Hanover’s police department has reported less speeding along this road. Community members say they “love them” and that the “lanes wake people up and slow them down.”

Increased Bike Network

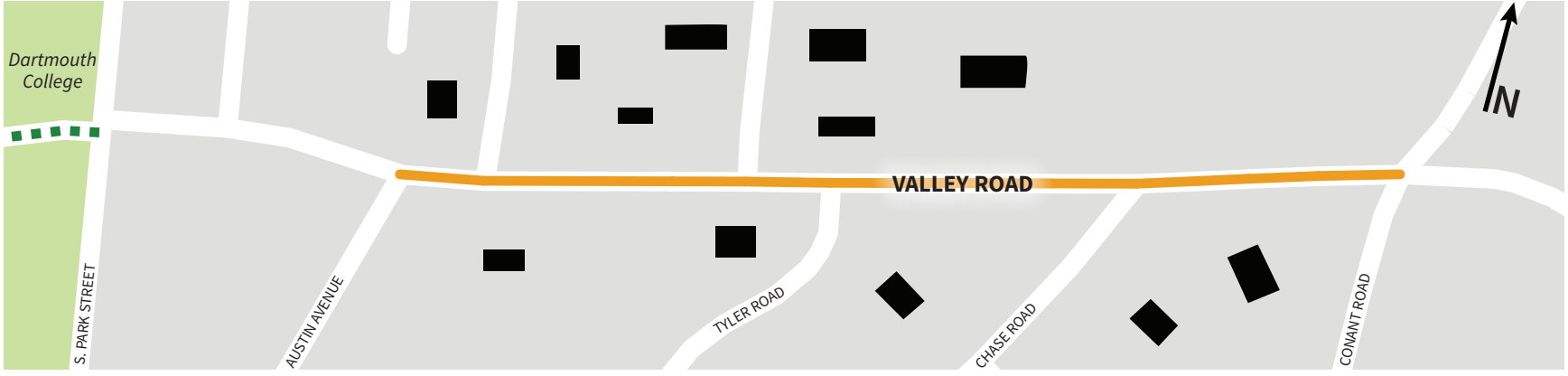
The success of the pilot advisory bike lanes along Valley Road led to the decision to approve permanent advisory bike lanes along this road. This success has spurred the planning for additional advisory bike lanes throughout Hanover to create a more connected bicycle transportation system.

Valley Road

HANOVER, NEW HAMPSHIRE
City Median Household Income: $113,925

Valley Road Context

- Valley Road is a local road in the Town of Hanover. It is located in a small neighborhood near community sports facilities, a high school, and Dartmouth College. This road serves as a connection between the surrounding neighborhoods, schools, downtown, and other facilities. People of all ages frequent Valley Road throughout the year. Prior to the implementation of advisory bike lanes, there were no dedicated spaces for cyclists and pedestrians along the road or markings of any kind on the pavement to distinguish lanes for opposing traffic.
- The goals of the project were to determine if advisory lanes could be a solution to speeding in the area, if they could be a way to implement biking infrastructure where there is limited right-of-way, and if the new lane markings would increase pedestrian and cyclist safety. Since there is not a designated space for pedestrians, nor sufficient right-of-way for the addition of sidewalks, cyclists and pedestrians share the advisory bike lanes.
- Evaluation studies of the Valley Road pilot concluded that the biking facility functioned safely. There were no vehicle/pedestrian conflicts recorded during the study period. A 12-hour traffic study also confirmed that walking and cycling along the road increased, while vehicle usage had decreased. Additionally, the Hanover Police Department confirmed that speeding had decreased on Valley Road.
- The success of the pilot advisory bike lanes along Valley Road led to the decision to implement permanent advisory lanes along the road, which was completed in the summer of 2018, after repaving. The Town and community members are in process of raising support for additional advisory bike lanes and a new town policy on advisory bike lanes that allows the Hanover Bicycle and Pedestrian Committee and neighborhoods to recommend additional advisory lanes.



Source: Town of Hanover

Valley Road carries significant volumes of commuter and recreational cyclists.

Source: Town of Hanover

Signs help road users understand the lane markings.

Source: Town of Hanover

Skateboarders and cyclists take advantage of the advisory bike lanes along Valley Road.

Source: Town of Hanover

Advisory bike lanes also give pedestrians a place to walk safely and separated from automobile traffic.

Potomac Greens Drive

ALEXANDRIA, VIRGINIA

Metro pop: 5,636,232 | City pop: 151,473

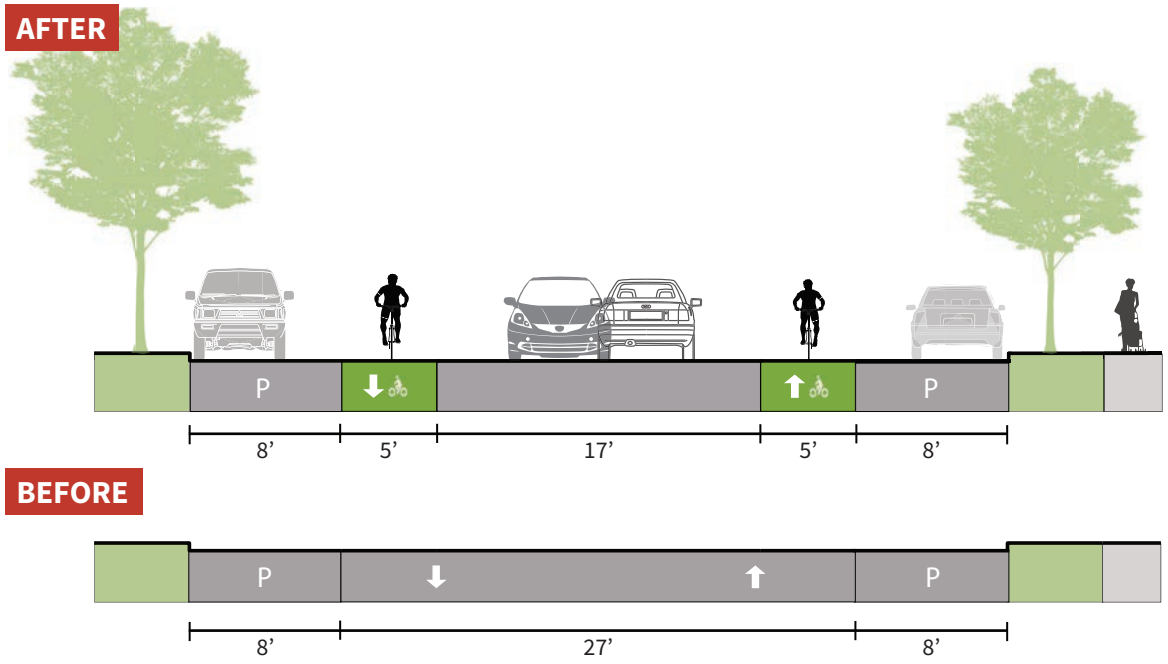
Source: City of Alexandria/Hillary Orr

Source: City of Alexandria/Hillary Orr

A residential community in northeastern Alexandria implemented the City's first advisory bike lane.

- In May 2015, the City of Alexandria Virginia installed the region's first advisory bike lanes along Potomac Greens Drive.
- The treatment design allowed the community to retain on-street parking while providing a safer space for cyclists.

ADVISORY BIKE LANES



STREET CLASSIFICATION

Local Road

RIGHT OF WAY

43 feet

LENGTH

0.3 miles

SPEED

SPEED LIMIT 25	SPEED LIMIT 25
BEFORE	AFTER

AVERAGE DAILY TRAFFIC

2,000	2,000
BEFORE	AFTER

RESPONSIBLE AGENCY

City of Alexandria

Key Outcomes

A space for cyclists
The addition of advisory bike lanes along Potomac Greens Drive provided cyclists a priority travel lane, thus removing cyclists from sidewalks and giving pedestrians, cyclists, and motorists their own space.

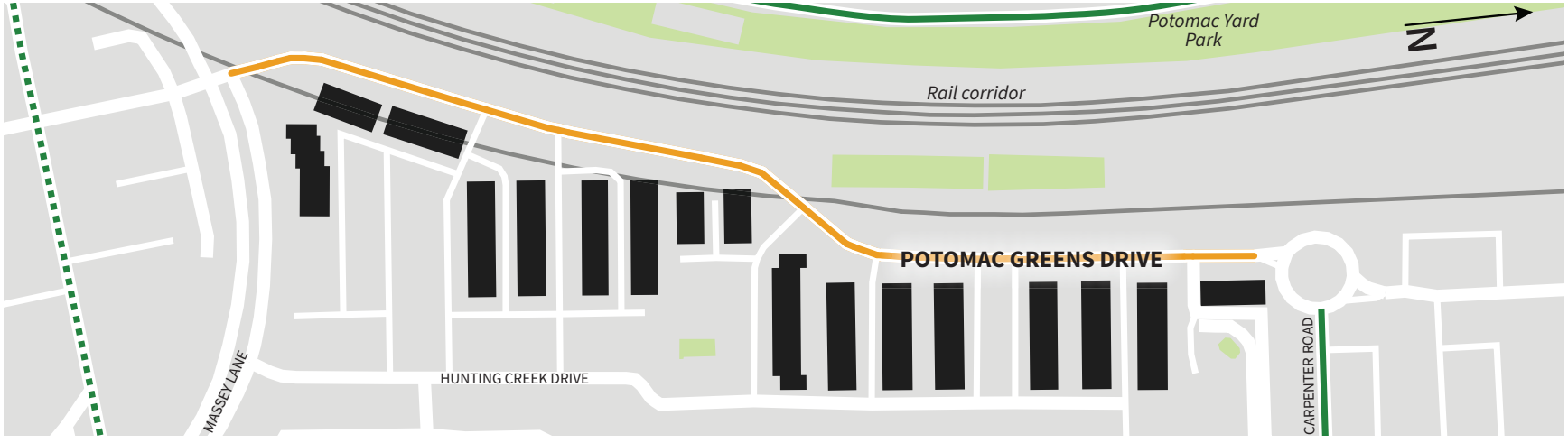
Traffic calming
Additional traffic markings and constricted space space naturally calmed traffic and help reduced vehicle speeds.

Potomac Greens Drive

ALEXANDRIA, VIRGINIA
City Median Household Income: $89,200

Potomac Greens Drive Context

- In May of 2015, the City of Alexandria added advisory bike lanes along Potomac Greens Drive, a local road that passes through a large condominium and townhouse community in northeastern Alexandria. The two-way street initially had no markings to distinguish travel lanes or on-street parking. Residents believed the lack of street markings encouraged excessive vehicle speeds in the area. As a way to address community concerns, advisory bike lanes were implemented. Advisory lanes allowed the community to keep on-street parking, which would have been removed if standard bike lanes were used, as well as decrease speeding. These facilities also gave cyclists their own space, which separated pedestrians, motorists, and cyclists completely, leaving sidewalks free from bike traffic.
- The Potomac Greens Drive advisory bike lanes were part of a larger complete streets project in the neighborhood. At a homeowner's association meeting for Old Town Greens and Potomac Greens residents in September 2014, transportation professionals proposed the addition of a new crosswalk with a pedestrian activated rapid flash beacon to allow safer access to a park on the west side of Potomac Greens Drive, as well as advisory bike lanes for traffic calming and reduction of bike riding on sidewalks. Old Town Greens utilized Transportation Management Plans (TMP) funding from the City of Alexandria, which helps finance projects that encourage the use of non-vehicular transportation modes.
- The city is currently looking for more locations to implement advisory bike lanes that meet the city's criteria and believes that the addition of the new Potomac Yard Metro station will increase future bicycle traffic along Potomac Greens Drive.



Source: City of Alexandria

A high-visibility crosswalk intersects the advisory bike lanes across Potomac Greens Drive.

Source: City of Alexandria

On-street parking remains on both sides of the street.

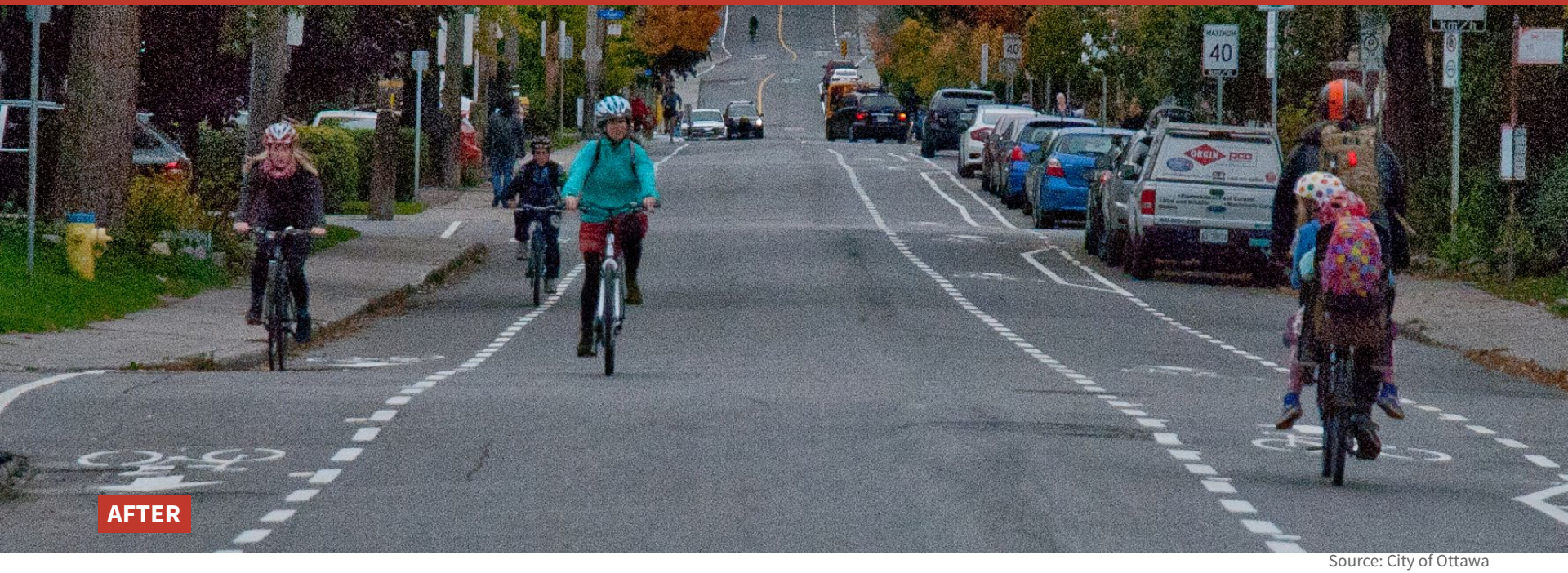
Source: City of Alexandria

The wide, bi-directional center lane still offers plenty of space for low-speed vehicles to pass one another.

Somerset Street East

OTTAWA, ONTARIO

Metro pop: 1,323,783 | City pop: 934,243



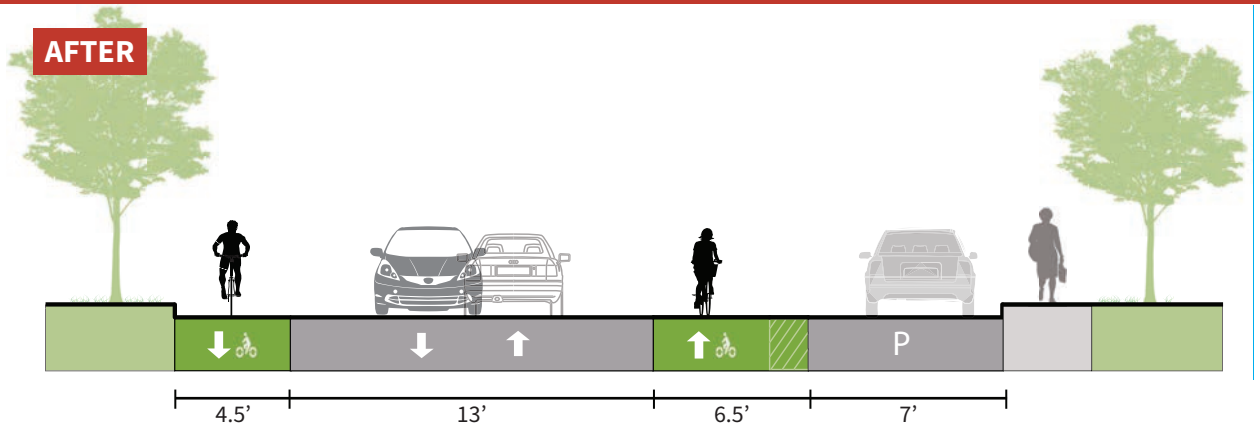
Source: City of Ottawa

Source: Google Maps

The City of Ottawa tested out advisory bike lanes as a way to expand the city's cycling network along narrower roads.

- In October 2016, the City of Ottawa installed its first advisory bike lane along Somerset Street East, from Chapel Avenue to Range Road.
- Somerset was able to keep on-street parking on one side of the street, provide two-way traffic, and add priority bike facilities through the addition of advisory bike lanes.

ADVISORY BIKE LANES



Key Outcomes

Increasing Ottawa’s cycling network
Cyclists make up about 65 percent of the daily traffic on Somerset Street East. The main goal for the Somerset Street East advisory bike lanes pilot project was to support these cyclists by adding to Ottawa’s already growing cycling network, which contained 1,133.5 km (704.3 miles) of cycling routes as of 2017. In 2017 alone, The City of Ottawa budgeted $60-million in cycling infrastructure.

An affordable option
The city didn’t want to remove all on-street parking nor make Somerset Street East a one-way road, and completely rebuilding the road would have been prohibitively expensive. By implementing advisory bike lanes, the city was able to maintain two-way automobile traffic, provide on-street parking on one side of the street, provide cyclists with lanes on both sides of the street, and avoid the cost of reconstructing the street.

STREET CLASSIFICATION
Collector

RIGHT OF WAY
32 feet

LENGTH
0.2 miles

SPEED

SPEED LIMIT 25	SPEED LIMIT 25
BEFORE	AFTER

AVERAGE DAILY TRAFFIC

1,000	1,000
BEFORE	AFTER

RESPONSIBLE AGENCY
City of Ottawa

Somerset Street East

OTTAWA, ONTARIO
City Median Household Income: $78,433

Somerset Street East Context

- Somerset Street East is a collector street in the Sandy Hill neighborhood, located in northeastern Ottawa. It serves as a connection for the community to the University of Ottawa campus and downtown. Prior to the implementation of advisory bike lanes, Somerset Street East was a fully built-out road with two opposing travel lanes and on-street parking located on both sides. Somerset Street East experiences relatively low vehicle volumes and speeds compared to other streets in Ottawa, making it an ideal location for advisory lanes.
- The project is part of a larger advisory bike lane pilot project in the city, which will also feature Byron Avenue, a similar street in Ottawa with slightly higher speeds and traffic volumes, and lower bike traffic; as well as two other undetermined locations in Ottawa. The results from these pilots will help guide the design standards for advisory bike lane facilities in the future.
- In 2017, the city expanded the advisory bike lanes along Somerset Street East by two blocks, from Sweetland Avenue to Range Road.

Source: City of Ottawa

There is demand for cycling facilities in all weather in this northern climate.

Source: City of Ottawa

On-street parking is retained on one side of the street.

Source: City of Ottawa

Cars and buses pass safely by using the bike lanes.

Source: City of Ottawa

In the peak hour, bikes on Somerset Street East make up 53 percent of total traffic.

Cara Seiderman

Cara Seiderman is the Transportation Program Manager of the Community Development Department for the City of Cambridge, Massachusetts.

As a transportation program manager, Cara oversees transportation planning projects and policy implementations, as well managing the City's bicycle and pedestrian mobility program, street redesign projects, and Bluebikes, Cambridge's public bike share program.

How did you become involved with urban bikeway design?
I spent a summer in Denmark and later received a Fulbright scholarship to study pedestrian street planning and urban design. While there, I expanded my areas of exploration, including observing how traffic calming was done and experiencing high-quality bicycle facilities firsthand.

Upon my return to the States, I was not originally engaged in bicycle/pedestrian work directly, but when the City started a bicycle and pedestrian program in the early 1990s, I was the only person working in the city government offices who was knowledgeable about bicycle planning. It was a meandering route, but there were bits and pieces along the way that all tied together.

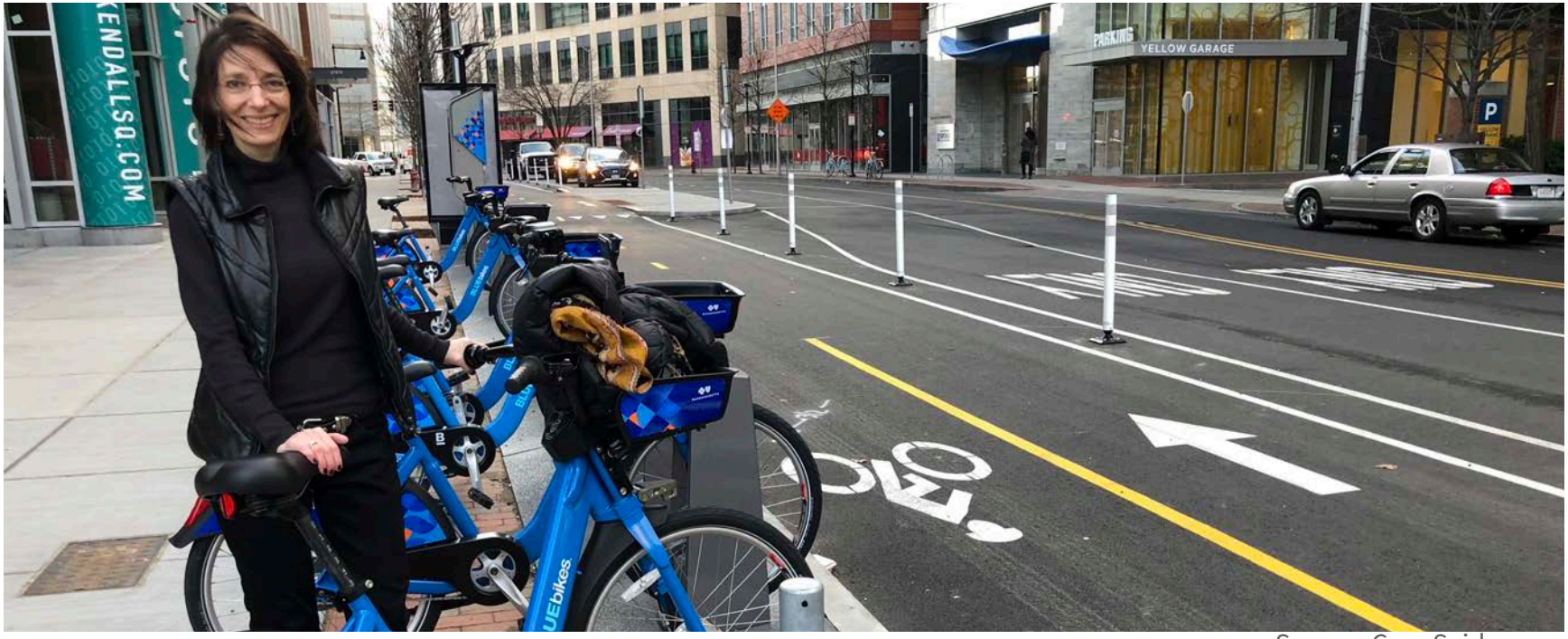
Do you have any role models or mentors who you look up to or have helped you get to where you are today?
As a student I was inspired by people who taught me what it really means to see and evaluate the built environment: John Stilgoe at Harvard, and Allan Jacobs and Peter Bosselmann at UC Berkeley (College of Environmental Design). While at Berkeley, I worked as an assistant for Professor Jacobs (on his book *Great Streets*, and my graduate thesis focused on "Good Streets." This work was formative for my thinking about how we see the role of the street as a public space.

The ground-breaking work of Danish urban designer Jan Gehl was a major inspiration,I had the great pleasure of studying and working with him in Denmark.

Another inspiring person I would mention is Dan Burden. He is someone who has taken the idea of "How do you get people excited in communities?" to its greatest extent. He's sort of a "pied piper" figure, in the most positive sense. He talks to everyone and just gets people enthused about working on transforming their cities and communities into something even better.

What is your primary goal as Transportation Program Manager?
Making cities great places in which to live!

What is the most rewarding part of your work?
Seeing people use the facilities when they're done, and the fact that there are more people traveling by bike. The changes that I've seen are not just the pure numbers of people who are using bikes in the city but the different groups of people who are using bikes. I love to see people on bikes with their children. There are so many more bike trailers, tag-alongs, and bike seats one sees parked at schools now, compared with 10 or 15 years ago! If people can travel with their kids, that to me is the indicator of success.



Source: Cara Seiderman

And when I'm riding myself, which I do a lot, it's nice to engage face-to-face with other riders, for example, at a stoplight, or picking up a bike at one of our Bluebikes (bike share) stations.

What are some aspects that were integral to the completion of Western Avenue and Third Street bike facility projects?

In the work that we do, much of it is collaborative, interdepartmental, and integrated. There are certainly challenges to making change within a community; some people advocate for more rapid change, and others are resistant to change altogether. Our goal is to create improvements that reflect our priorities and vision. For Western Avenue, we had an advisory committee and a robust public participation process to get feedback and educate the public. My particular role was helping to think through what are the best bike facilities that we can design with the amount of space that we have. It was a complicated project. The primary purpose was a major sewer separation project and had nothing to do with bike facilities. The Third Street contraflow bike lane project was also a very complicated redesign and it wasn't a standalone project. Much of what we do is taking advantage of opportunities when streets are being reconstructed. This makes for more holistic planning and design, which is very effective.

Off-Street Paths

An off-street path is a separate paved facility intended for either exclusive use by bicyclists or for a combination of bike riders and pedestrians. While some off-street paths parallel vehicle roadways, others exist in an exclusive right-of-way.

Source: Marc Schlossberg

California Route 44

REDDING, CALIFORNIA

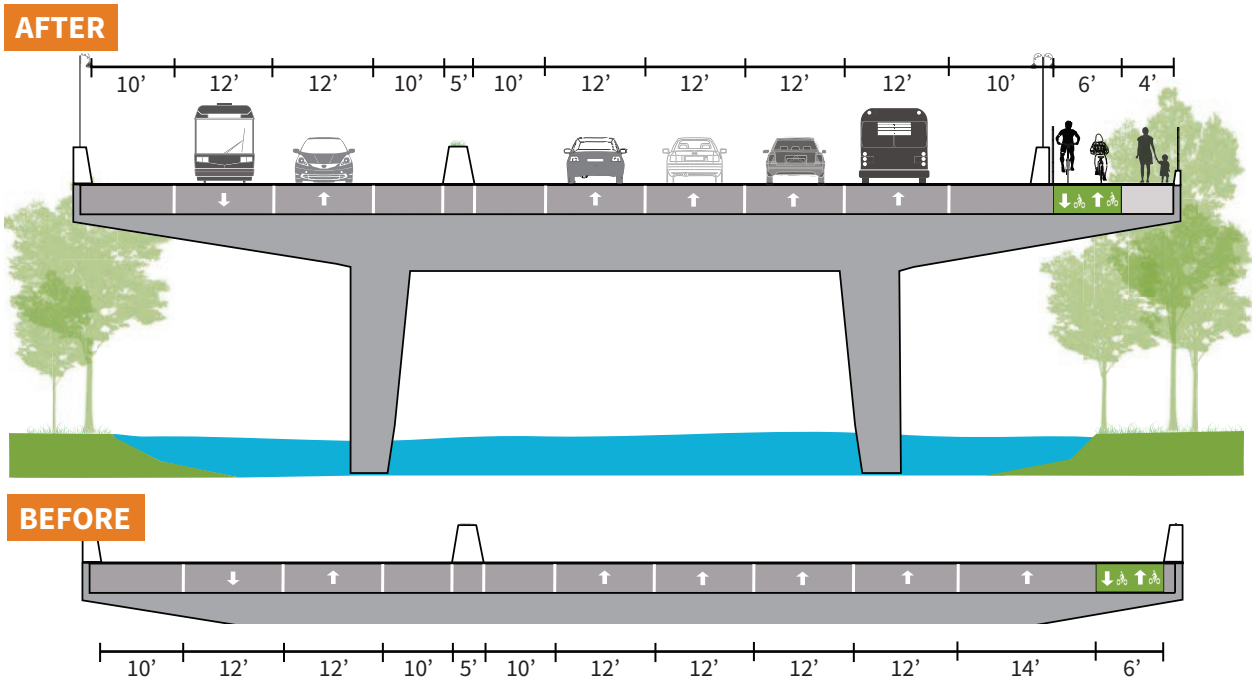
Metro pop: 177,223 | City pop: 89,861

Source: North State Super Region

Source: Caltrans

Environmental considerations and local bicycle and pedestrian advocacy helped birth an extension of the Sacramento River Trail during a bridge reconstruction project.

- A maintenance path was widened to provide room for cyclists and pedestrians.



Key Outcomes

Inspiring Healthy Activity
Residents are using the trail more often. In a recent survey, 62 percent of respondents report biking more often while 30 percent report walking more often since the pathway extension was opened.

Further Improvement
Recent updates to both the City of Redding and Shasta Regional Active Transportation Plans listed an extension from the Turtle Bay terminus to the downtown core as a top priority.

Major Bicyclist Crossings
The Dana to Downtown Extension allows bicyclists to safely cross both the Sacramento River and I-5. Prior to construction, this bridge was the only one in Redding to cross the Sacramento River without a separate lane for bicyclists.

STREET CLASSIFICATION
Freeway

RIGHT OF WAY
Varies

LENGTH
1.1 miles

SPEED

SPEED LIMIT 65	SPEED LIMIT 65
BEFORE	AFTER

AVERAGE DAILY TRAFFIC

53,000	55,000
BEFORE	AFTER

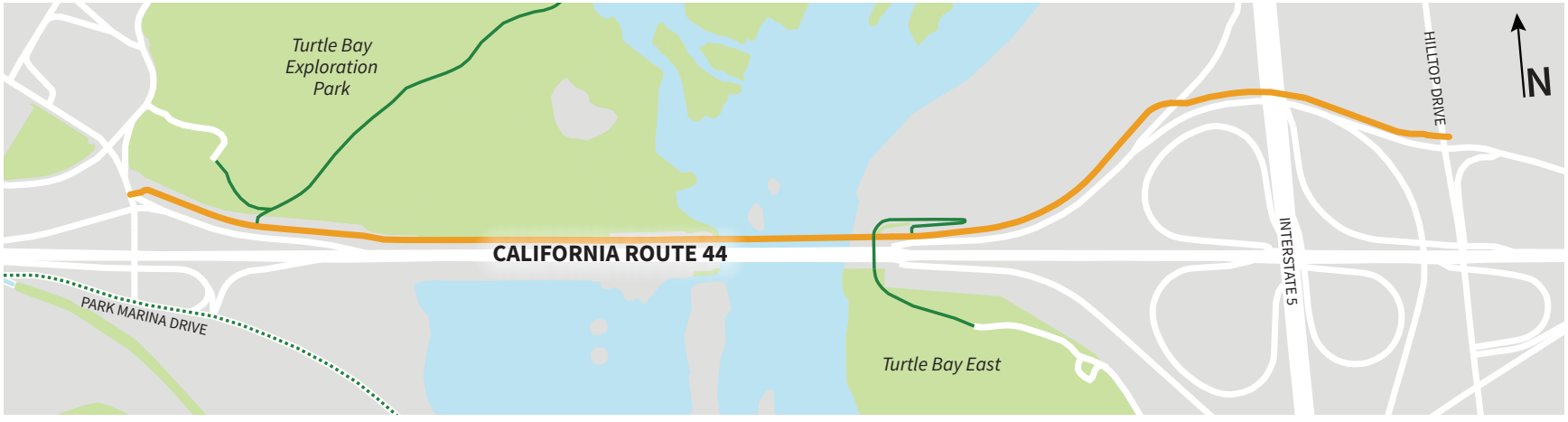
RESPONSIBLE AGENCY
Caltrans

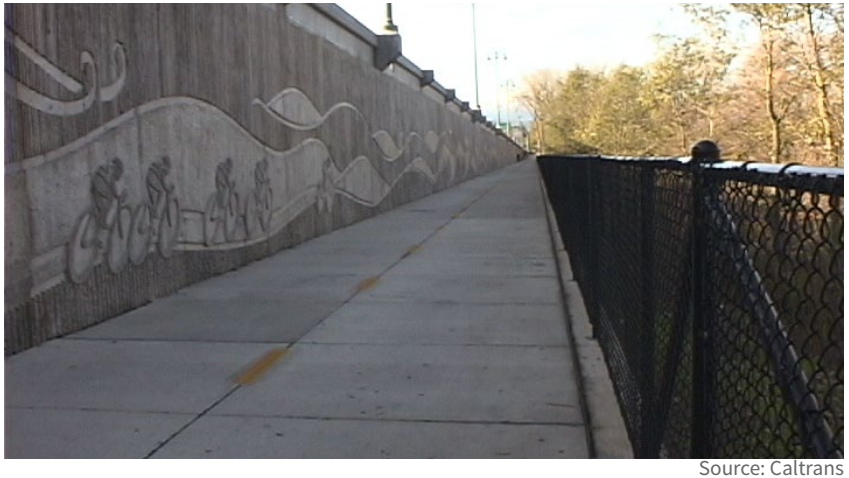
California Route 44

REDDING, CALIFORNIA
City Median Household Income: $44,573

California Route 44 Context

- The old Highway 44 bridge over the Sacramento River was aging and no longer able to withstand the effects of anticipated earthquakes. The river had also severely eroded the soil around the bridge supports. When Caltrans conducted a Major Investment Study, they determined that these issues, meant that a total replacement of the bridge would be more cost effective.
- Initially, a bike and pedestrian trail was not included in the project since the automobile travel lanes were the priority. However, the wetlands on the north side of the bridge required a retaining wall with a maintenance path to keep them protected. When it became apparent the bridge reconstruction would come in under budget, Caltrans made the decision to widen the maintenance path and place a barrier-protected section for cyclists and pedestrians on the bridge.
- The community was highly involved in the creation of this so-called Dana to Downtown Extension. Since the Caltrans budget was not able to completely fund the trail, the local community participated in fundraising efforts.
- Since the completed trail travels through a wetland area, users catch sight of local wildlife. Beaver, herons, turtles, and ducks are common, and a few of Redding's nesting bald eagles have been known to inhabit the area.





Source: Caltrans

A concrete mural along the 12 ft high retaining wall gives a nod to the trail's purpose.

Source: Caltrans

An undercrossing allows bicyclists to connect to Bechelli Lane on the south side of the bridge.

Source: Caltrans

Many details increase the aesthetic quality of the walkway.

Source: Caltrans

Trail users might glimpse Liberty or Spirit, two local bald eagles, nesting in the trees.

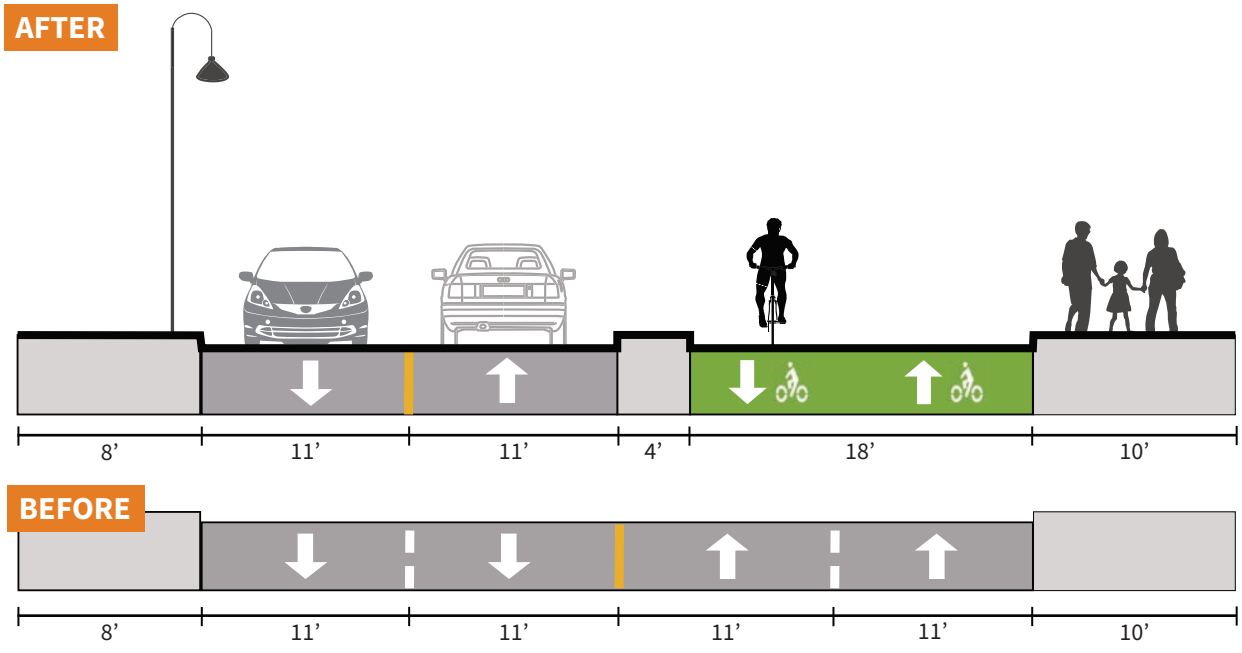
Point Grey Rd. & York Ave.

VANCOUVER, BC, CANADA

Metro pop: 2,463,431 | City pop: 631,486

This project completes the missing link in Vancouver's Seaside Greenway

- The Point Grey Road and York Avenue segments of the Seaside Greenway use separated bikeways, traffic control intersections, and the establishment of low-volume neighborhood streets to complete the 17.4 mile path between the Convention Center at Coal Harbor and Spanish Banks Park.



Key Outcomes

Increase in Bicycle Commuters
Point Grey Road once carried 10,000 vehicles per day, but after closing a portion of the street to through car traffic, there has been an increase in bicycle traffic. There are now 300 vehicles, 2,700 biking trips, and up to 900 pedestrian trips per weekday.

Complex Project
The entire project includes many different phases with different treatments, including protected bike lanes, raised facilities, regular bike lanes, and sharrows, taking advantage of different opportunities to create a high-quality, connected bicycle system.

STREET CLASSIFICATION
Varies

RIGHT OF WAY
Varies

LENGTH
17.4 miles

SPEED

SPEED LIMIT 20	SPEED LIMIT 20
BEFORE	AFTER

AVERAGE DAILY TRAFFIC

N/A	N/A
BEFORE	AFTER

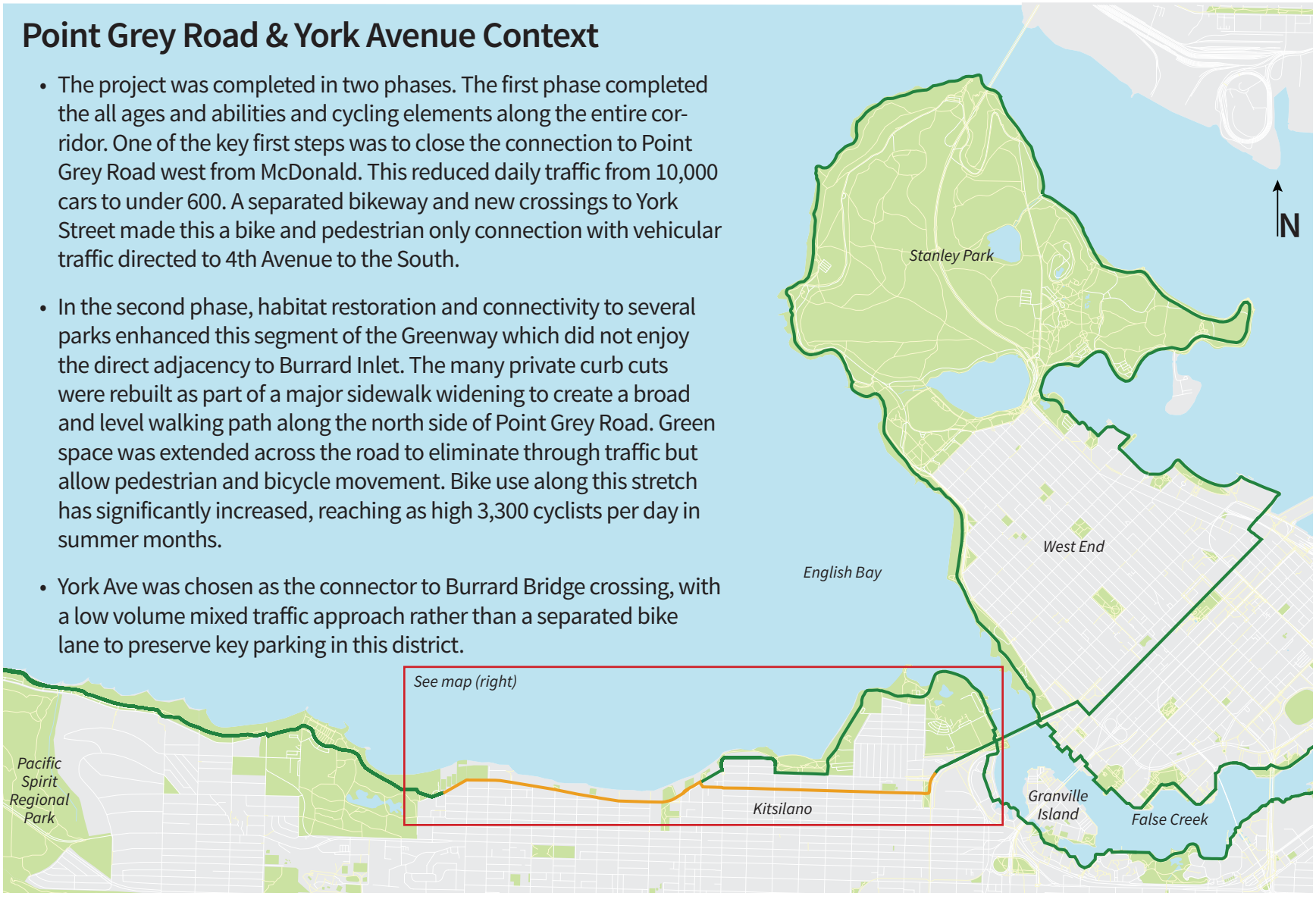
RESPONSIBLE AGENCY
City of Vancouver

Point Grey Rd. & York Ave.

VANCOUVER, BC, CANADA
City Median Household Income: $49,671 (USD)

Point Grey Road & York Avenue Context

- The project was completed in two phases. The first phase completed the all ages and abilities and cycling elements along the entire corridor. One of the key first steps was to close the connection to Point Grey Road west from McDonald. This reduced daily traffic from 10,000 cars to under 600. A separated bikeway and new crossings to York Street made this a bike and pedestrian only connection with vehicular traffic directed to 4th Avenue to the South.
- In the second phase, habitat restoration and connectivity to several parks enhanced this segment of the Greenway which did not enjoy the direct adjacency to Burrard Inlet. The many private curb cuts were rebuilt as part of a major sidewalk widening to create a broad and level walking path along the north side of Point Grey Road. Green space was extended across the road to eliminate through traffic but allow pedestrian and bicycle movement. Bike use along this stretch has significantly increased, reaching as high 3,300 cyclists per day in summer months.
- York Ave was chosen as the connector to Burrard Bridge crossing, with a low volume mixed traffic approach rather than a separated bike lane to preserve key parking in this district.

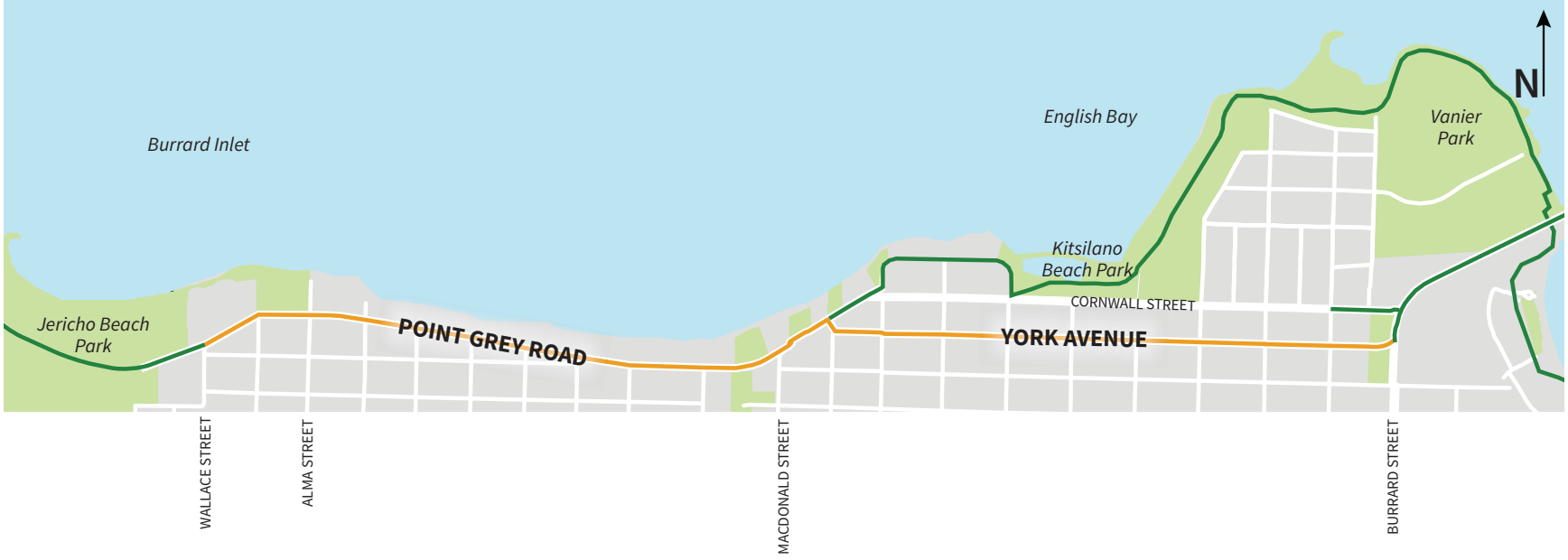


Source: Marc Schlossberg

Eliminating through traffic for cars on Point Grey Road created controversy, but substantially increased the amount of people cycling along the route.

Source: Google Earth

Green space extends from the water to across the street, enhancing ecological connections, and creating a bike and pedestrian only through route in the neighborhood.



Tamy Quigley

Tamy Quigley is an Active Transportation Program Manager and Complete Streets Liaison for the California Department of Transportation (Caltrans) District 2.

Tamy is responsible for helping the agencies in her mostly rural district leverage funding for active transportation infrastructure.

How did you become an active transportation program manager?
It's just who I need to be! It was back in 2003 or so that we coined the term "Bicycle Coordinators" and so I wore that hat. At that time, it was mostly helping to manage the bike and pedestrian funding that was available through federal and state programs. I guess I didn't mess it up too bad, and then because I worked in a division conducting long-range planning and had recently moved to a division called Local Assistance, working with our city and town partners, I literally had a relationship with all of the partners that reside in our district.

And then the ATP (Active Transportation Program) came on—it's a beast of a program. Given how I was already program advisor on the current non-motorized programs, I just jumped in and became a subject matter expert on active transportation. I was able to help people understand it from the rural and implementation side, even people at the Caltrans headquarters office in Sacramento who mostly handle the program, I was able to assist in understanding project funding and implementation.

Source: Tamy Quigley

What does active transportation look like in a largely rural area?
Our district has 80 "main streets" in which a highway bisects the main town. The active transportation funding is limited. It's very important to me to leverage funding for the rural areas of our state so that everyone has a space, and that's for the vehicles as well; so we give vehicles a space and then we give bicycles a space, and then we give the pedestrians a space. We attempt to provide a space for cyclists of all ages and abilities and in rural areas that can be a simple shoulder space or a fully built environment. I think we're doing our job but it does take a set of eyes looking at all the projects being built and I am happy those eyes are mine.

How do you implement active transportation infrastructure?
A lot of public outreach. The people want to be heard, and they don't want us to tell them what *we* want—and this is something that we work really hard on—we listen and help them plan what *they* want. I work tremendously hard on the relationship with our Counties and Cities to ensure they are informed and ready to apply for funding. Rural agencies often have few staff and those staff wear many hats. I work to advocate on their behalf and keep them informed so they don't miss opportunities.

For instance, I'm working on a project in Happy Camp, which is a tiny town with an 85-foot swath of blacktop highway. Even though the speed limit is reduced through the town due to little to no pavement striping, vehicles often fly on through or park wherever they would like to. The folks there want changes, so we go to them instead of trying to plan this stuff in Redding or Sacramento; we go out there and talk to them and ask them "What do you guys need? What do you want?"

Have any of your smaller bike projects evolved into larger system-wide facilities?
A few times, yes. Because the community realizes that we're trying to connect, and Caltrans can't always take a project all the way through. Sometimes we have a wide right-of-way and we can do a full bike lane through the town on our highway, giving that bicyclist his or her own space. In some places, I've been able to work with the local town or county agency to improve their road's shoulders and partner with us to help that connectivity. Or it might be vice-versa like "Hey, were able to get some 8-foot shoulders out here", and the other group will come in and work to do a restripe on a surface street. I call it "erasing the blackboard." You take your right-of-way space, which is probably pretty generous, and then just do some restriping and find room for the all users to travel in their own space safely. Often these projects result in a lane width reduction, which is a traffic calming measure and can slow vehicle speeds providing a built-in safety countermeasure as well.

What's been the most rewarding part of your job?
Getting bike lanes and sidewalks in tiny little towns. Servicing the small, disadvantaged rural areas is really meaningful to me. My biggest accomplishment is helping some of these small areas not only get money to plan bike and pedestrian infrastructure but seeing some of their plans and their prioritized projects actually be built!


The Alameda

Protected Intersections

Protected intersections are a critical piece of high quality bicycle transportation systems, extending bicycle infrastructure along corridors into the intersection by providing well identified, priority bicycle movements in all directions, and minimizing or eliminating possible interactions with motorized vehicles.

Source: City of Davis

E. Covell Boulevard & J Street

DAVIS, CALIFORNIA

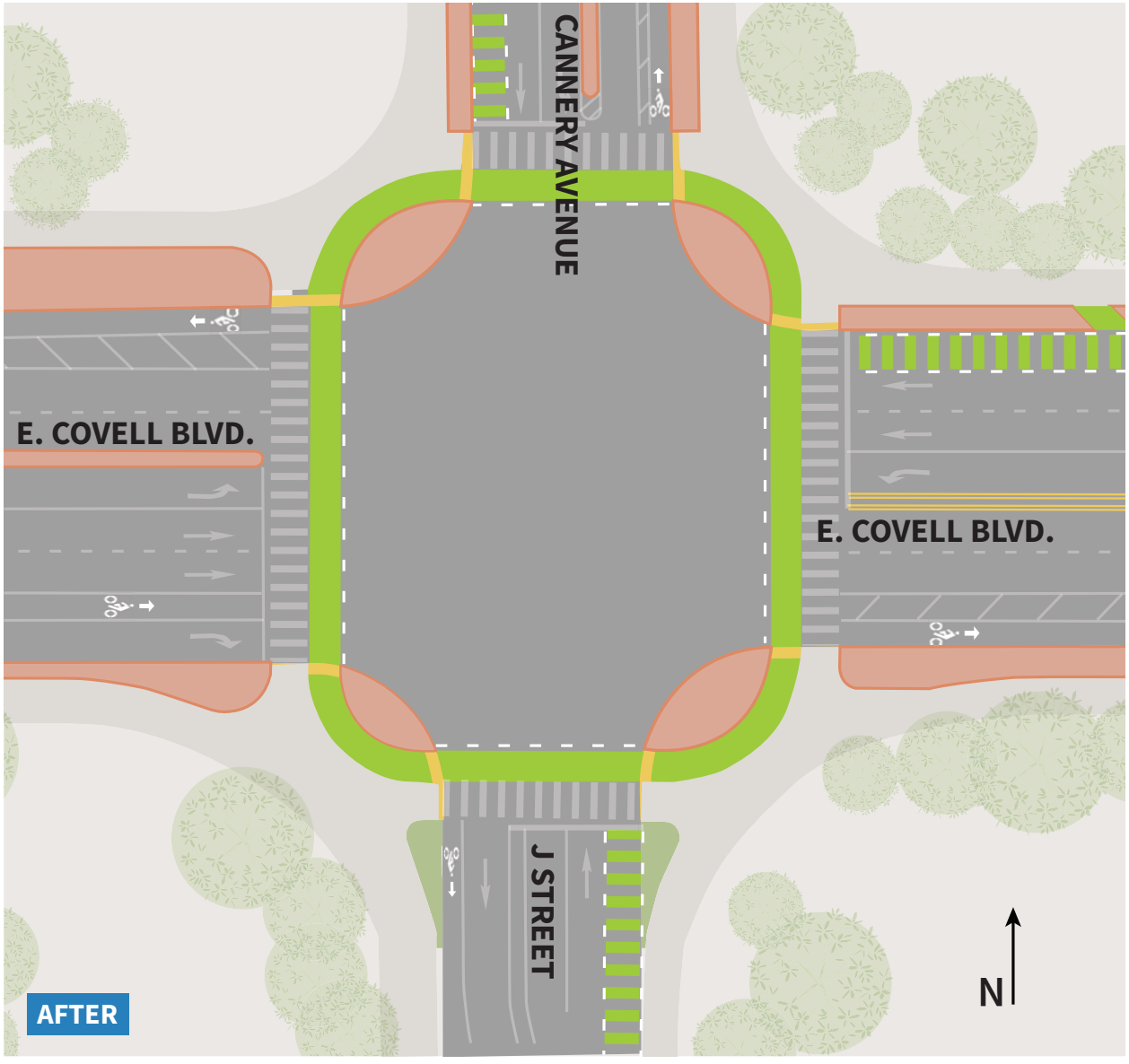
Metro pop: 219,116 | City pop: 68,111

Source: City of Davis

Source: Google Maps

The first U.S. signalized Dutch-style intersection doesn't require any special knowledge to navigate.

- The intersection's intuitive design allows cyclists to safely navigate without much signage or education.
- The intersection serves as an entrance to a large mixed-used development in northern Davis.



Key Outcomes

Increased Visibility
Due to the large pedestrian refuges at each corner of the intersection, both pedestrians and bicyclists are placed in front of right-turning drivers for better visibility.

Better Connectivity
The intersection is specifically designed to accommodate bicyclists both on the roadway and on the multi-use path to the south of intersection.

EAST COVELL BOULEVARD

- Arterial Street
- ADT: 21,500
- Speed: 35 mph

J STREET

- Collector Street
- ADT: 2,900
- Speed: 30 mph

RESPONSIBLE AGENCY

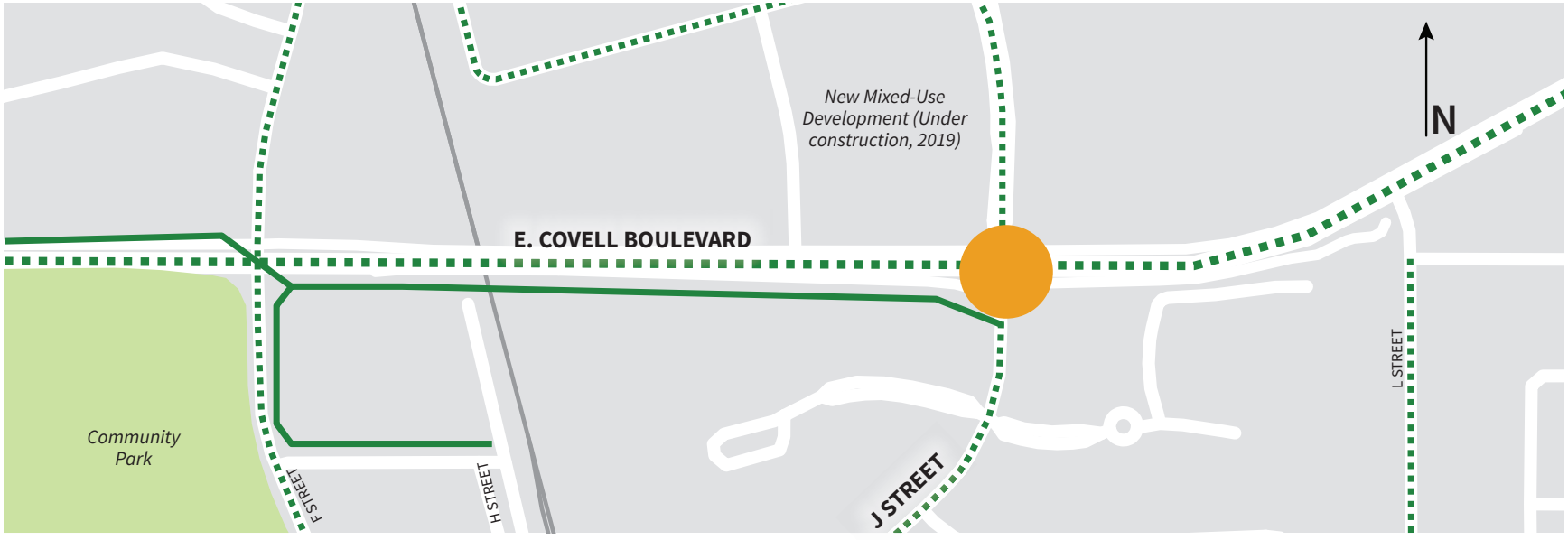
- City of Davis

E. Covell Boulevard & J Street

DAVIS, CALIFORNIA
City Median Household Income: $57,683

E. Covell Boulevard & J Street Context

- In 1967, Davis was the first American city to create "a lane for the preferential use of bicyclists." Fifty years later, Davis was also the first American city to open a protected intersection.
- The intersection was first identified as needing improvements by a corridor study along East Covell Boulevard. The study was prompted by the application for development of the Cannery Project, a proposed mixed use development located to the north of East Covell Boulevard.
- The intersection redesign was led by the City of Davis and The New Home Company, with The New Home Company funding the project for a total cost of $1 million.
- Some local residents expressed concerns, as the original plan for the intersection was to create an underpass for bicyclists and pedestrians. However, another location was eventually selected for an underpass and the City Council approved a Dutch style intersection for East Covell Boulevard and J Street.
- The City learned lessons they will apply to their next protected intersections. These include narrowing the crossing distance to make it safer for pedestrians and cyclists; tightening the turning radii on the barrier islands to slow right-turning vehicles; angling the ramps to allow for people on bikes to ride onto the ramp without having to greatly adjust their speed (50-foot radius); and making the ramps more visible through signage.



Source: City of Davis

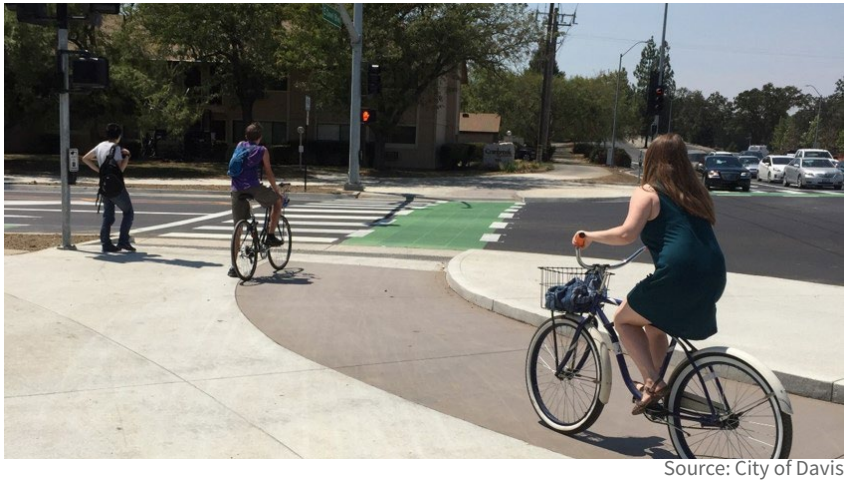
Cyclists comfortable with on-street bike lanes can cross the intersection as before construction.

Source: City of Davis

Less comfortable cyclists can take advantage of the protected mixed-use path.

Source: City of Davis

Ramps were installed to allow riders to transition between the bike lanes and the multi-use path located nearby.



Source: City of Davis

Protected intersections are more comfortable and less stressful for all users, including children and their parents.

200 West & 300 South (Broadway)

SALT LAKE CITY, UTAH

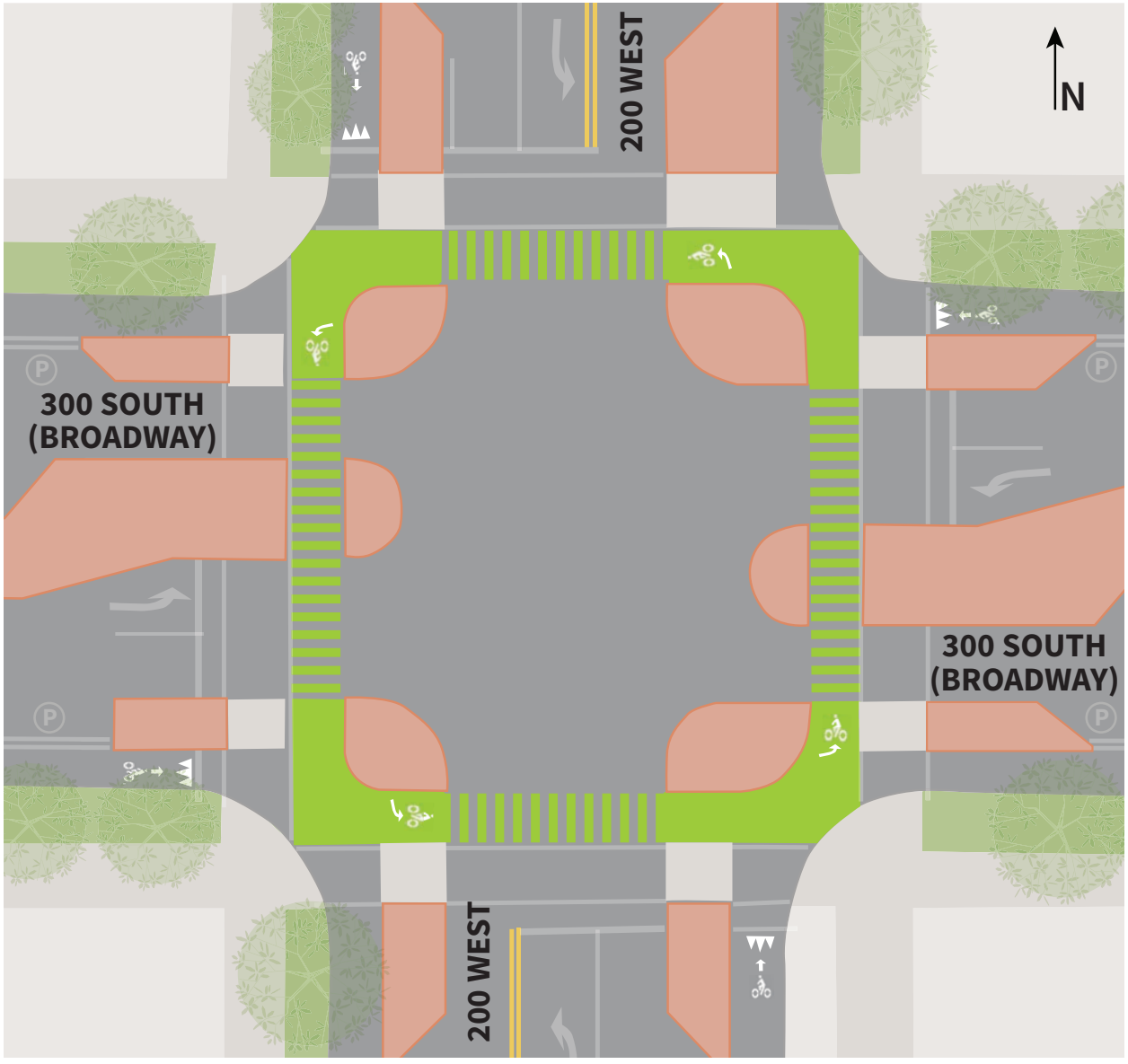
Metro pop: 1,186,187 | City pop: 193,744

Source: Alta Planning + Design

Source: City of Salt Lake City

A protected intersection allows for the continuous separation of protected bikes along two Salt Lake City bicycle corridors.

- The Dutch-style intersection establishes protected connections between two streets with bike facilities.
- The safe intersection helped increase cycling on the newly designed 300 West (Broadway) corridor.



Key Outcomes

Part of a Larger Project
The reconstruction of this intersection was part of the 200 West Protected Bike Lane Project in 2015. Protected bike lanes had been previously installed along 300 South (Broadway) in 2014.

Clear Design
Green paint was used in all bicycling areas, including those protected by curbs. This clearly separates the bicycle and pedestrian facilities from one another.

200 WEST

- Collector Street
- ADT: 2,200
- Speed: 25 mph

300 SOUTH (BROADWAY)

- Collector Street
- ADT: 6,500-8,000
- Speed: 20 mph

RESPONSIBLE AGENCY

- City of Salt Lake City

200 West & 300 South (Broadway)

SALT LAKE CITY, UTAH
City Median Household Income: $50,353

200 West & 300 South (Broadway) Context

- This was the second Dutch-style intersection built in the United States.
- The intersection redesign was generally supported by local businesses and gross receipts increased in the year after the installation of the protected bike lanes on 300 South (Broadway). Bicycle usage increased by nearly 30 percent along the corridor, including more family and casual cyclists.
- A similar design was proposed for the improvement of 200 West. During the design phase, the City met residents and businesses to address potential issues with the proposed design.
- The City of Salt Lake City has invested in increasing their bicycle network across the city through both infrastructure and outreach.

Source: KSL.com

The City closed the intersection for a celebratory "Biketoberfest" event.

Source: KSL.com

Residents were taught how to navigate the intersection by volunteers and temporary signage.

Source: City of Salt Lake City

Many businesses have seen more customers bicycling, even overflowing the parking provided.

Source: City of Salt Lake City

The bike lanes along 200 West and 300 South are protected by both curbs and parking.

15th Street NW, W Street NW, Florida Avenue NW & New Hampshire Avenue NW

WASHINGTON, D.C.

Metro pop: 6,011,752 | City pop: 601,723

AFTER

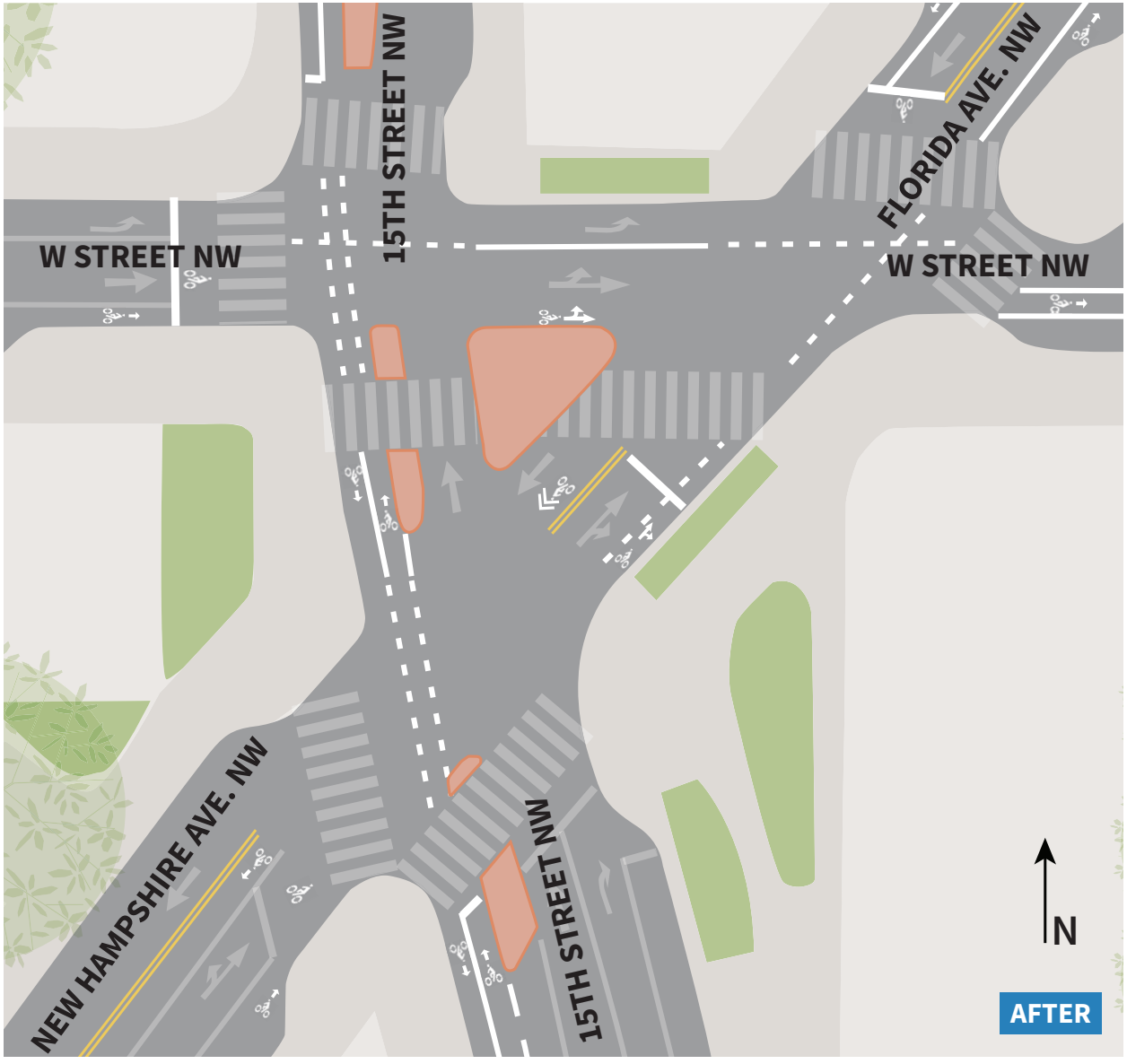
Source: DDOT

BEFORE

Source: DDOT

A complex starburst intersection was made safer for vehicles, bicyclists, and pedestrians.

- A pedestrian fatality in 2009 at this starburst intersection spurred safety improvements for all modes.
- The intersection re-design also lowered vehicular speeds, increasing safety for users of all modes.



Key Outcomes

Cycle Track Extension
By reducing 15th Street from 3 lanes to 2, Washington's District Department of Transportation (DDOT) was able to extend the 15th Street cycle track. Some 550 cyclists use the cycle track during the morning commute and nearly 600 bicyclists during the evening commute.

Reduced Illegal and Unsafe Maneuvers
Prior to the safety improvements, wide lanes and a lack of proper signage allowed drivers to make high-speed or illegal turns through the complicated intersection. Tighter curb radii, fewer and narrower lanes, and new signage all help reduce vehicle speed through the intersection.

INTERSECTION

- ADT: 31,200
- Speed: 25-35 mph

RESPONSIBLE AGENCY

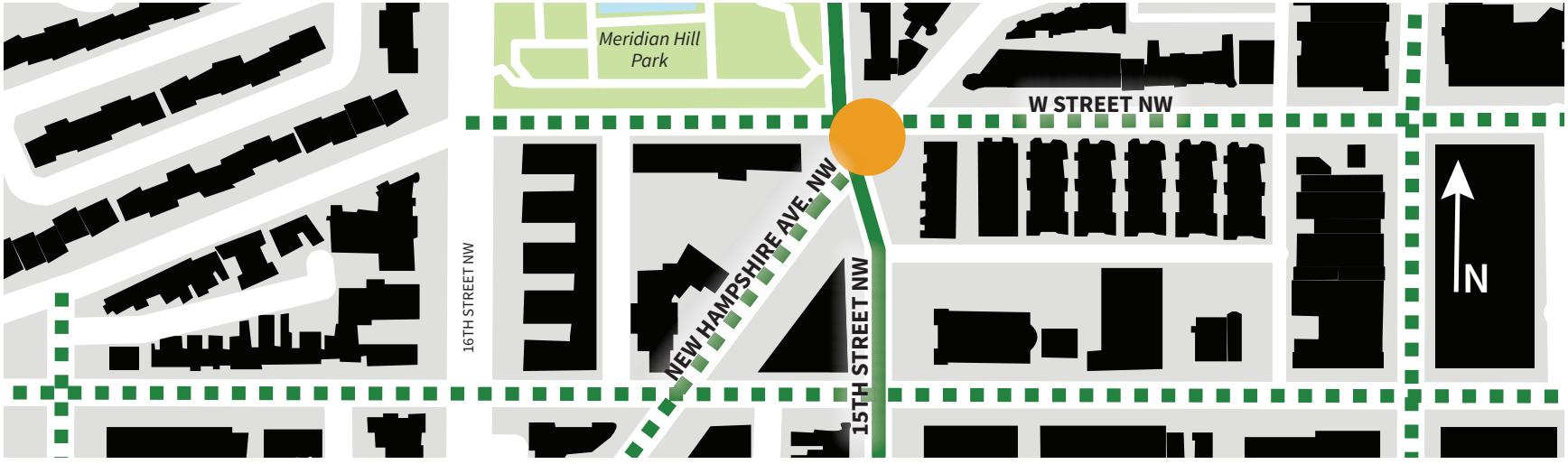
- District DOT

15th Street NW, W Street NW, Florida Avenue NW & New Hampshire Avenue NW

WASHINGTON, D.C.
City Median Household Income: $72,935

15th Street NW, W Street NW, Florida Avenue NW and New Hampshire Avenue NW Context

- In 2009, a pedestrian was struck and killed in a crosswalk at the intersection. Since speed was a contributing factor in the pedestrian fatality, DDOT placed temporary measures at the intersection to reduce vehicle speeds and clarify traffic patterns.
- Flexible channelization posts reduced turning speeds in the dedicated slip lane. Signage and pavement markings alerted drivers of a previously unmarked merge section. A one-way northbound bike lane on 15th Street narrowed the automobile lane and reduced speed through the intersection.
- With the temporary improvements in place, DDOT completed a study at the intersection for a permanent solution. Construction began in 2015.
- The final design reclaimed much of the unnecessarily generous area previously dedicated to vehicles and turned it over to bicyclists and pedestrians. The 15th Street NW cycle track was extended through the intersection and given dedicated signals. The high-speed slip lane was removed and turned into a pocket park that now houses a Capital Bike Share station. The reduced number of lanes and wider sidewalks decrease pedestrian crossing time in the crosswalks. Narrower streets and increased green space aid in stormwater management and improve the aesthetics of the intersection.
- Though some in the community were frustrated by the amount of time it took to finish construction, residents are pleased with the results. From a local blog on bicycle infrastructure: “It took a long time to come, but this is public space done right.”



Source: Washington Area Bicyclist Association

The 15th Street NW 2-way cycle track continues through the intersection.

Source: Washington Area Bicyclist Association

Parked cars and curbs provide protection for cyclists.

Source: DDOT

The area is home to a significant number of bicycle commuters.

Source: Washington Area Bicyclist Association

A high-speed turn lane became a spacious pedestrian plaza.

Source: Washington Area Bicyclist Association

Reclaimed street space allows room for bike share bicycles.

Hopkins Street & The Alameda

BERKELEY, CALIFORNIA

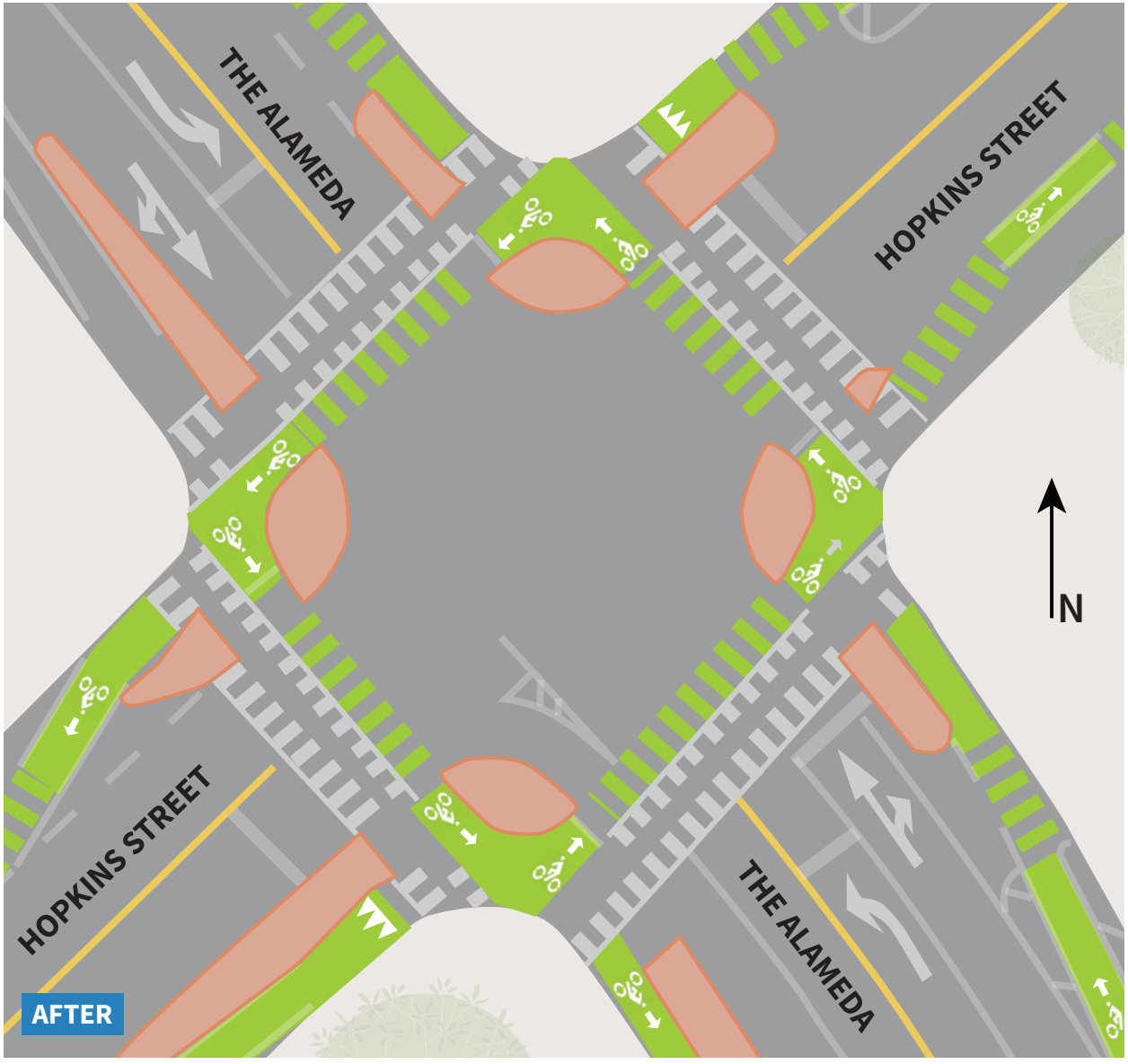
Metro pop: 4,727,357 | City pop: 118,585

Source: Amanda Leahy

Source: Google Maps

Drainage concerns in a Safe Routes to School improvement project resulted in a protected intersection for bicyclists in Berkeley.

- Concrete islands were installed in each corner of the intersection.
- One island was extended to accommodate a bus loading platform.
- Corner ramps were updated to current ADA standards.



Key Outcomes

Improved Pedestrian Safety Near School
The tighter turning radii resulted in a vehicle turning speed reduction from 19 mph to 14 mph, dropping the risk for severe pedestrian injuries by nearly 50 percent.

Reduced Costs
Construction of the corner islands and protected bike lanes cost less than the pedestrian curb extensions initially proposed at the intersection.

HOPKINS STREET

- Collector Street
- ADT: 5,100
- Speed: 25 mph

THE ALAMEDA

- Major Arterial
- ADT: 22,000
- Speed: 25 mph

RESPONSIBLE AGENCY

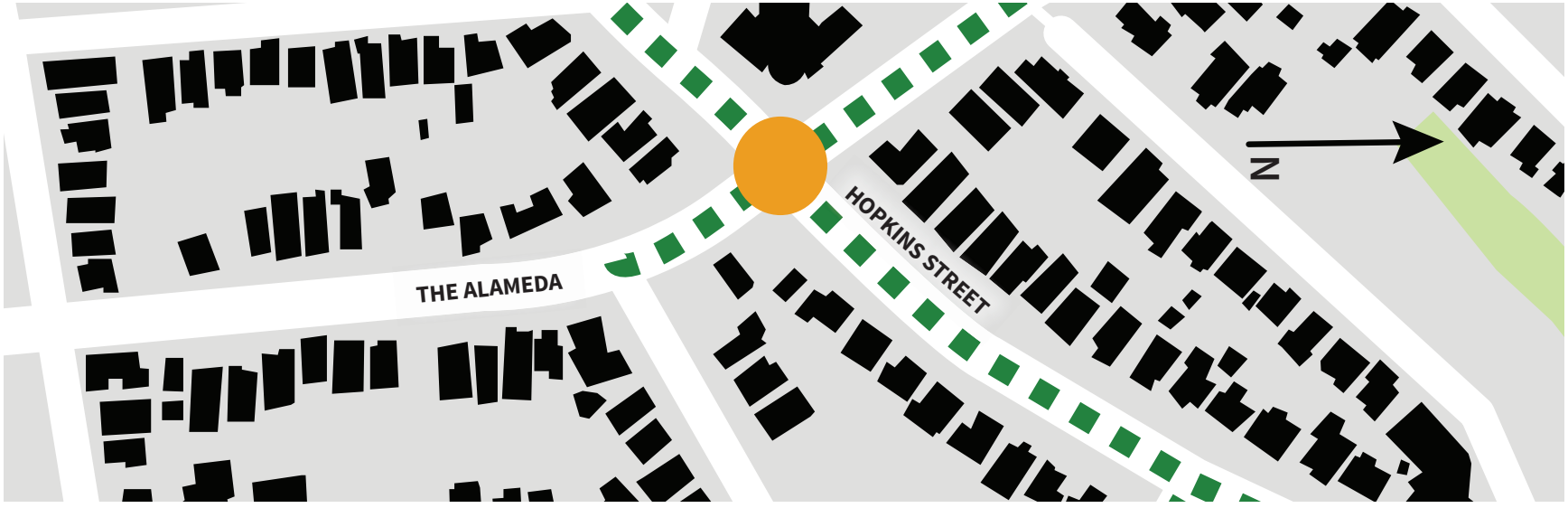
- City of Berkeley

Hopkins Street & The Alameda

BERKELEY, CALIFORNIA
City Median Household Income: $70,393

Hopkins Street and The Alameda Context

- The intersection received a Safe Routes to School grant in 2010 to add pedestrian curb extensions in an effort to make crossing the streets safer for children at the nearby school.
- Complications arose during the design process. Two legs extend uphill, two legs extend downhill, and the intersection is crowned in the center, which made drainage a concern. The City found that allowing drainage along the existing gutters was more cost effective than redesigning stormwater management. Creating the separate islands and widening the drainage routes allowed the protected bicycle lanes in the intersection.
- After implementation, many local residents sent concerns and comments to the City. In response to this, the City improved delineation during a scheduled resurfacing project the following summer. Curbs at islands were painted white, striping with raised, retroreflective crowns was placed around the islands, and the bike lanes were painted green to increase visibility of the new infrastructure to drivers unfamiliar with the intersection. Additional striping directs drivers along the intended routes.



Source: Dave Amos

Children often cross at the intersection to reach the public library on the northwest corner.

Source: Amanda Leahy

An extended island accommodates a bus stop.

Source: Amanda Leahy

The first phase added islands, protected bike lanes, and high-visibility crosswalk markings. After resurfacing, striping with raised, retroreflective crowns was added around the islands.

Source: Dave Amos

The City may upgrade the existing bike lanes to separated bike lanes or cycle tracks in the future.

Mike Goodno

Mike Goodno is a Bicycle Program Specialist for the District Department of Transportation (DDOT) in Washington D.C.

Mike is responsible for implementing biking infrastructure from the city's transportation master plan through planning, design, and community outreach.

What do you do as a Bicycle Program Specialist?
It's changed over the years. Right now, my focus is on the on-street bikeway side. Our transportation master plan has a bike element that outlines the bike network, so what I'm doing is trying to implement the planned bike facilities and looking for opportunities to put in bikeways throughout the city.

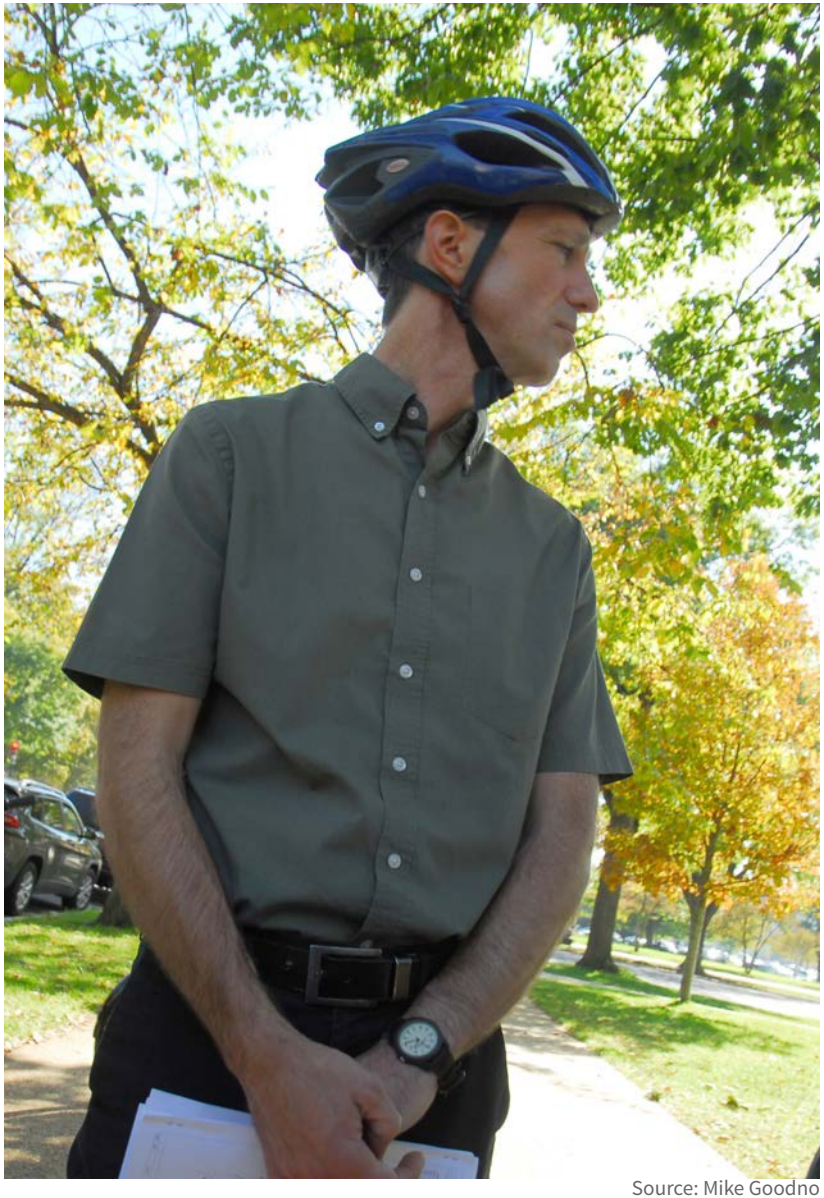
At first, we built the easier ones, where bikeways fit in the existing roadway without removing any parking or travel lanes. Then for the last few years, it's become more difficult. The protected bike lanes, for example, take more room on the street, so a big part of my job has been responding to the resulting community concerns.

In addition to the design, I do a lot of the planning and outreach for the bike network, attend meetings, and work with the bike advocates to understand their priorities and how they want to see the network built out. The feedback from bike advocates and community members is very useful. I receive many requests for streets we might not have thought about at the master plan stage.

Source: Mike Goodno

What are some of the struggles and challenges you've faced implementing new biking facilities in DC?
A big challenge is the roadway constraints, and parking is always an issue as well, especially when we put in protected bikeways. If we keep the parking on the street with a protected bike lane, that usually means removing a travel lane, so that's a really big balancing act.

Another struggle is educating the public about protected bike lanes. Some people don't know what they are and when they hear the word "bike", there can be some fear. But adding a protected bike lane doesn't always mean that vehicle travel lanes or parking lanes are going away, or that traffic is going to get worse. Often we are able to put in protected lanes after studying the vehicle and bike traffic thoroughly and we make other street improvements that actually improve the traffic flow for both vehicles and bikes.



Source: Mike Goodno

Another big issue is that certain parts of the city have street widths that make adding bike infrastructure challenging. Often in these areas there are changing demographics where historically there have been older people who don't necessarily ride a bike and then younger people come into the community who do bike and who want more bike infrastructure; and it's been tough to put in that infrastructure.

How have you handled public outreach for your bike projects? Historically, it's really been up to us. We've gone out and met with neighborhood-elected officials in the advisory neighborhood commissions. Whenever we're touching a certain area, we notify them of changes in the lane configuration. Typically I would go to a meeting, but it's always been the planner from DDOT trying to sell the project.

Starting last year, there's been a group called the Ward 3 Bicycle Advocates, and they've been helping promote bike projects in their area, which has been really great. They reach out to the advisory neighborhood commissioners and community groups before me. Plus, they comment on DDOT-planned projects and they have some of their own ideas. They've been warming up some of the local officials and council members to inform them about biking issues, which has been really great. This type of grassroots advocacy has really been helpful!

Small Investments

Sometimes the key to completing a system or turning a piece of the system from stressful to stress-free is a small intervention of size or budget and these examples show such creativity and problem-solving.

Source: City of Cambridge

SE Stark Street

PORTLAND, OREGON

Metro pop: 2,226,009 | City pop: 583,776

Source: Roger Geller

Source: Google Maps

A simple application of paint provides clearly delineated bike turning lanes for a major cycling boulevard in a Portland neighborhood.

- Neighborhood greenways, as bicycle boulevards in Portland are called, provide a well-marked cycling corridors on low-traffic, low-speed streets.

Source: John MacArthur

Key Outcomes

Maintains Connectivity on Major Bicycle Boulevard
The 40's Bikeway is a 7+ mile neighborhood greenway that runs north-south through the center of Portland. The primary route featured here is on SE 41st Avenue, but at the intersection with SE Stark Street, SE 41st Avenue becomes offset on either side. These center left-turn lanes help optimize the comfort and safety for people on bikes at this tricky section of the greenway.

Minimal Impact to Traffic
The bike turn lanes do not impact automobile traffic and all pre-existing movements are still permitted. Some on-street parking was eliminated to create enough room for the taper and slight re-alignment of the vehicle lanes.

STREET CLASSIFICATION

Arterial

RIGHT OF WAY

34 feet

LENGTH

62 feet

SPEED

SPEED LIMIT 25	SPEED LIMIT 25
BEFORE	AFTER

AVERAGE DAILY TRAFFIC

10,491	11,127
BEFORE	AFTER

RESPONSIBLE AGENCY

Portland Bureau of Transportation

Moores River Drive

LANSING, MICHIGAN

Metro pop: 470,348 | City pop: 114,773

Source: Josh DeBruyn

Source: Google Maps

A contraflow bicycle lane added during a resurfacing project keeps bicyclists off the highway and the sidewalks.

- New pavement markings were installed for delineation.
- Existing vehicle lanes were narrowed to include a buffered contraflow bicycle lane.
- "Except Bicycles" signs were added to the existing "Do Not Enter" and "Wrong Way" signs.

Source: MDOT Photography Unit

Key Outcomes

A Safety Benefit to All Modes
The prior configuration lacked pavement markings. In addition to delineating the new contraflow lane and buffer, markings were installed for the existing vehicle left-turn lane.

Minimal Impact to Vehicles
All existing vehicle movements were maintained.

Shorter Travel Times
Bicyclists are now able to travel eastbound on a short 150 foot stretch of Moores River Drive that is otherwise westbound lanes only. This small accommodation helps people on bikes more directly access the Lansing River Trail's 20 miles of off-street multi-use paths, which terminates at Moores River Drive a short distance from this contraflow lane.

STREET CLASSIFICATION
Major Collector

RIGHT OF WAY
66 feet

LENGTH
150 feet

SPEED

SPEED LIMIT 25	SPEED LIMIT 25
BEFORE	AFTER

AVERAGE DAILY TRAFFIC

N/A	2,600
BEFORE	AFTER

RESPONSIBLE AGENCY
Michigan Department of Transportation

Virginia Avenue

CHATTANOOGA, TENNESSEE

Metro pop: 528,143 | City pop: 167,674

Source: City of Chattanooga

Source: Google Maps

Underutilized street and alley serves as new neighborhood greenway to connect a Chattanooga neighborhood with village center.

- From W. 47th Street to St. Elmo Avenue, Virgina Avenue is an alley and bollards creates a two-way bicycle and pedestrian path with local, limited vehicle access.
- From W. 55th to W. 47th Street, Virginia Avenue is a low volume, narrow road. Half has been designated for two-way bicycle and pedestrian flow and the other half is now one-way for vehicles.

Source: City of Chattanooga

Key Outcomes

Reclaiming Older Street Network
The Virginia Avenue Neighborhood Greenway serves as a model for historic neighborhoods of the city such as Highland Park, North Chattanooga, Hill City, Alton Park, East Chattanooga, Brainerd, Red Bank, and others having low-traffic secondary alley networks that could be function as safe bike routes.

A Family-Friendly Bicycle Route
The St. Elmo neighborhood is less than three miles from downtown Chattanooga but pre-existing facilities did not offer much connectivity without a car. Some bike lanes exist on St. Elmo Avenue but the level of automobile traffic made the facility uncomfortable for the vast majority of people interested in using a bike more often.

STREET CLASSIFICATION

Local Road

RIGHT OF WAY

30-50 feet

LENGTH

N/A

SPEED

SPEED LIMIT 25	SPEED LIMIT 25
BEFORE	AFTER

AVERAGE DAILY TRAFFIC

N/A	N/A
BEFORE	AFTER

RESPONSIBLE AGENCY

Chattanooga Department of Transportation

Third Street

CAMBRIDGE, MASSACHUSETTS

Metro pop: 4,794,447 | City pop: 110,651

Source: City of Cambridge

Source: Google Maps

A raised contraflow lane and bike signal provides space for bicyclists on the new "Third Street Connector."

- A road previously used only as a one-way turn-around point now allows cyclists to travel in both directions, enabling safe and direct access to important destinations.
- The City installed a bicycle traffic signal to facilitate safe crossings for cyclists.
- A raised crosswalk provides a high-quality crossing for pedestrians.

Source: City of Cambridge

Key Outcomes

New Access for Bicyclists
An existing one-way turn lane was realigned and widened to include a with-traffic bike lane and a raised contraflow bike lane. A dedicated bike signal was installed at the modified intersection.

When a Roadblock Isn't a Roadblock
The granite block extending into the contraflow lane is part of the ventilation system for the fountain in Point Park. As such, the block couldn't be moved. Rather than abandon the contraflow lane, the City modified the lane to the minimum width of 4 feet (plus a 1 foot buffer) and provided signage. Additionally, much of the surrounding area is shared between bicyclists and pedestrians, so the operation speed through the area is relatively low.

STREET CLASSIFICATION

Major Collector

RIGHT OF WAY

32 feet

LENGTH

0.02 miles

SPEED

SPEED LIMIT 25 BEFORE	SPEED LIMIT 25 AFTER

AVERAGE DAILY TRAFFIC

N/A BEFORE	N/A AFTER

RESPONSIBLE AGENCY

City of Cambridge

Cortney Geary

Cortney Geary is a Principal Planner for the Chattanooga-Hamilton County/ North Georgia Transportation Planning Organization (TPO).

As a planner at a regional agency, Cortney has a different perspective than a planner working directly on street redesigns. She has used that position to help local transportation staff secure federal funding for bicycle infrastructure projects in the Chattanooga region.

How does a regional agency fit into bicycle infrastructure planning and construction?
The Chattanooga-Hamilton County/North Georgia Transportation Planning Organization is the metropolitan planning organization (MPO) for the region and we contribute through long-range transportation planning and prioritizing funding for transportation projects. Our MPO produced a Community to Region Framework, which helps us prioritize projects for funding. This breaks us out of our old silos based on transportation mode and allows small-scale bicycle and pedestrian projects to be competitive with major road projects.

Recently, through our 2045 regional transportation plan, we've been a lot more focused on data collection related to biking and walking. That's one of the best ways we've been able to support the local agencies responsible for implementing the projects. By providing more robust data they can better understand where they are going to have the greatest impact by adding facilities. We can also help them use these data to help communicate the benefits of these facilities to the public and elected officials.

What barriers have you faced to encouraging more bicycle facilities in the Chattanooga region?
There is still some opposition to bicycle projects in the region. The City of Chattanooga implemented a protected bicycle lane on Broad Street, but there was a lot of backlash after it was built. City leaders got calls from residents who didn't understand the project or said they hadn't heard about it before although there were several articles about the project in the newspaper before it was constructed. Some business owners opposed the project too. Most of that backlash has died down now, but the city received funding for another protected bicycle lane on Frazier Avenue, and it was not built due primarily to public opposition.

Our public agency staff members and some elected officials do see the value in these projects, in part thanks to a Think Bike workshop I helped organize. These workshops are run by cycling experts from the Dutch Cycling Embassy, and engage state and local engineers, planners, and business stakeholders on how to plan and implement bike projects. The Virginia Avenue corridor was one of the areas the workshop participants focused on. Part of the workshop was getting on a bike and going through the corridors. One engineer felt it was a real eye-opener; previously he thought Chattanooga was really great for cycling, and now he understands that improvements are needed to make it comfortable for people to get around by bike.

Source: Cortney Geary

What do you love about cycling?
I bike to get around as much as possible because it is quick, nimble, flexible, and fun. I love that my daily commute is primarily on low-traffic residential streets, buffered and curb/parking protected bike lanes, and the beautiful Walnut Street pedestrian bridge across the Tennessee River. I go out of my way to take this more comfortable, scenic route to work. My favorite thing about biking is how it makes me feel. Starting and ending my workday with a little bit of exercise and fresh air on the bike gets my brain going in the morning and helps me to decompress and leave work behind at the end of the day.

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Third Street

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Rethinking Streets for Bikes is a tool for implementing change. As more people bike—and use other forms of micromobility—in communities everywhere, it is more important than ever that communities have the confidence to meet these new transportation realities successfully.

The case studies within present a diverse look at high-quality bicycle transportation infrastructure implementation from a range of community types. Each case study includes information on design, community context, system connectivity, and other insightful information to raise the bar on what is possible and lower the risk in doing it somewhere else.

Many people who are interested in making it comfortable for everyone to bike often look to Denmark and the Netherlands for inspiration—and rightfully so. However, there is a lot of experimentation happening across the United States. Almost all the examples in the book are from the U.S. to show peer communities what can be done and done successfully at a high level.

This book is designed for all who engage in the exciting work of improving local transportation systems, including elected officials, professional planners and engineers, urban designers, community organizations and associations, and the public in general. This is a resource—please go and use it!

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