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Rethinking Streets for Bikes: An EvidenceBased Guidebook

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NATIONAL INSTITUTE for TRANSPORTATION and COMMUNITIES

FINAL REPORT

Rethinking Streets For Bikes: An Evidence-Based Guidebook

NITC-RR-1081 ■ March 2019

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TREC
TRANSPORTATION RESEARCH and EDUCATION CENTER

RETHINKING STREETS FOR BIKES
AN EVIDENCE-BASED GUIDEBOOK

Final Report

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16. Abstract

This project is a follow up to a successful previous NITC project and subsequent nationally distributed book, called "Rethinking Streets: An Evidence-Based Guide to 25 Street Transformations." The success of the first book demonstrated a need for easy access to evidence-based transportation information that can be used by practitioners, community members, policymakers, educators, and researchers. This project produced a follow-up guidebook, but with a focus on streets redesigned to accommodate bicycle transportation in ways following current best practices. Whereas the first book purposefully focused on "average" street retrofit projects to communicate the normalcy of such projects around the country, this project focused on the more ambitious approaches a variety of cities have taken to retrofit their streets to better accommodate normal people using bicycles as a normal mode of transportation. Complete Streets policies are being adopted across the United States, but local officials have few documented guidebooks to help them to retrofit streets for people on bikes based on completed projects using best practices. This project fills that gap.

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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 the design templates throughout this guidebook (and countless designs that did not make the cut)! These students include Neo D'Lehoko, David Escobedo, Griffen Gilbert, David Grabicki, Cassidy Jones, Taylor Stevens, and Jamie Wileke from the University of Oregon as well as Elizabeth Cox and Jordan Preston from the Oregon Institute of Technology.

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EXECUTIVE SUMMARY

The predominant approach toward street function on major roads in the United States is to emphasize mobility and throughput of vehicles. The "Complete Streets" movement challenges some of this paradigm, emphasizing that streets should accommodate multiple modes of travel and should often be considered destinations themselves. Often, efforts to transform streets into Complete Streets (or from mobility-based to accessibility-based designs) face resistance from both professional communities of traffic engineers and from the public that their design will reduce throughput and vehicle flow. Complete Streets advocates, in some cases, counter that while their designs often create pedestrian and cycling space from areas that were previously occupied by automobiles, that throughput is often not impacted and that flow can actually improve.

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1.0 INTRODUCTION

1.1 BACKGROUND

Redesigning cities and streets to make them safer, more comfortable, and ultimately more used by people on bikes is undergoing tremendous growth in cities across the country and in transportation research. Studies are being conducted on the safety of bikeshare (Martin et al., 2016); safety of street design (Welle et al., 2016); documenting changes in modal split (Buehler and Pucher, 2012); tracking changes in demographic preferences (American Planning Association, 2014); cyclists economic behavior (Clifton, 2012); evaluations of specific bicycle infrastructure design (Monsere et al., 2014); who cyclists are (Dill et al., 2013); and much more.

More broadly, there are a number of policies and studies related to Complete Streets, an approach that emphasizes that streets should accommodate multiple modes of travel and should often be considered destinations themselves (McCann, 2005; Burden and Litman, 2011; Seskin, 2011).

Many studies tend to concentrate on the hypothetical, either in design or assessment (Bochner, Daisa et al., 2011; Carlson, Greenberg et al., 2011; Elias, 2011; Tiwari and Curtis, 2012), or provide individual case studies that are limited in use for communities that want to explore a range of potential retrofit options (Carlson, Greenberg et al., 2011; Dock, Greenberg et al., 2012; Sanders and Cooper, 2012). Rethinking Streets: An Evidence Based Guide to 25 Street Transformations (Schlossberg et al., 2014) began to successfully fill this gap for a variety of types of street corridors, but did not focus specifically on best practices of street design for people on bikes.

The guiding question of this work is: how can a collection of completed street redesign projects that improved bicycle transportation infrastructure be formatted into accessible case studies that help new communities across the country more easily and more confidently move forward with their own bicycle transportation transformations?

2.0 INTENTION, METHODOLOGY & PROCESS

2.1 INTRODUCTION

The objectives of this project were fairly straightforward:

1. To identify existing examples across the United States and Canada from a variety of regions and built environment conditions of bicycle transportation redesigns that qualify as Complete Streets;
2. To document their existing conditions, including right-of-way, cross sections, transportation and design elements, automobile and bicycle throughput, relationship to the surrounding street network, and photos;
3. To translate this information into a guidebook for professionals (in particular, traffic engineers, transportation planners and urban designers), policymakers, community groups, and citizens to make evidence- and performance-based decisions on redesigns of streets and intersections;
4. To distribute this handbook widely to a range of stakeholder groups; and
5. To build on the highly successful approach and design template of the previous NITC Rethinking Streets project.

In addition, the overarching approach to communicating this range of information was to do so in a visually rich, easily accessible and understandable manner that allowed all stakeholders to engage with material of importance to them, while also giving each stakeholder access to information that other stakeholders tend to focus on in their decision-making processes. Thus, the project's intention was to create a resource that can both engage a wide variety of community stakeholders in street retrofit decision making *and* provide each stakeholder an opportunity to understand how others make decisions.

2.2 DEVELOPING GUIDEBOOK CONTENT

The research team developed the guidebook content in several ways, including engaging national partners, conducting stakeholder interviews, soliciting stakeholder and professional feedback, requesting potential street nominations from professionals, and scanning popular press and online sources for potential streets to include in the book. The primary methods for collecting potential streets to include in the guidebook were through an online data entry portal that was widely advertised nationally (see Figure 1 for sample screenshots) and through our own investigation of online reports, articles, and local government sites.

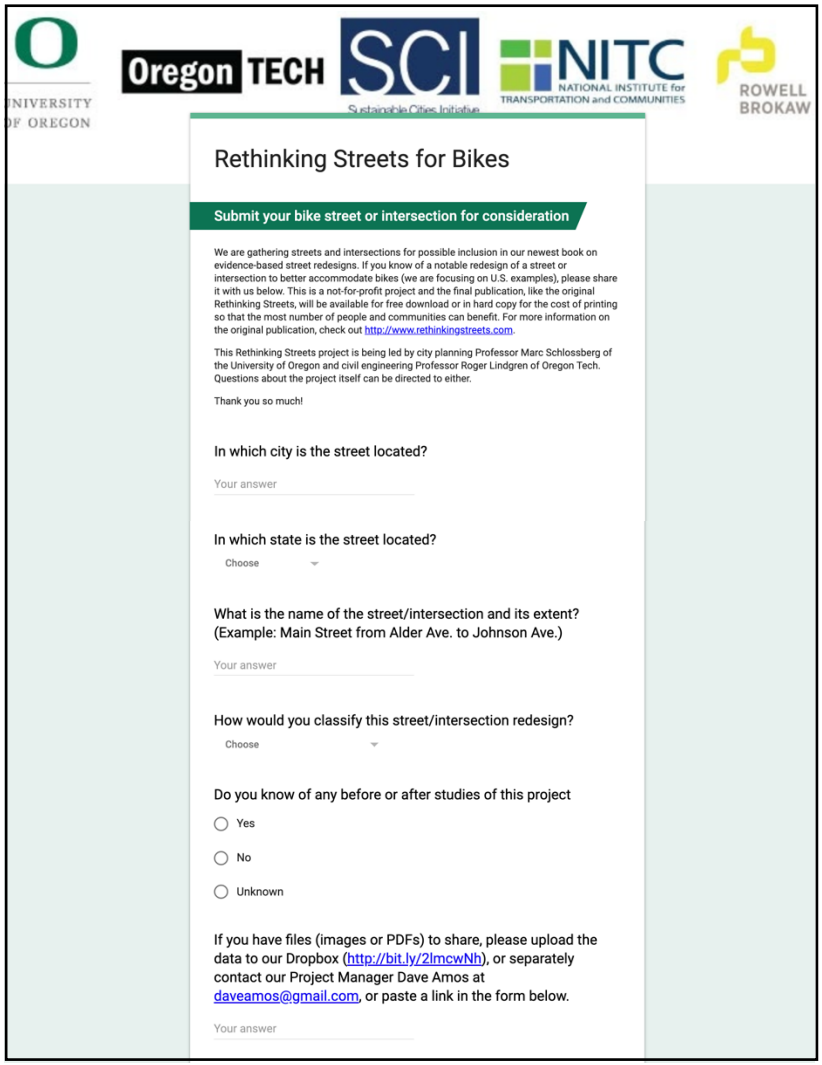

Figure 1: Online Case Study Solicitation Form

After collecting a diverse range of possible case studies, we narrowed the list to 25, purposefully choosing examples that represented a range of facility types and a geographical diversity that represents different urban forms and political contexts (see Figure 2).

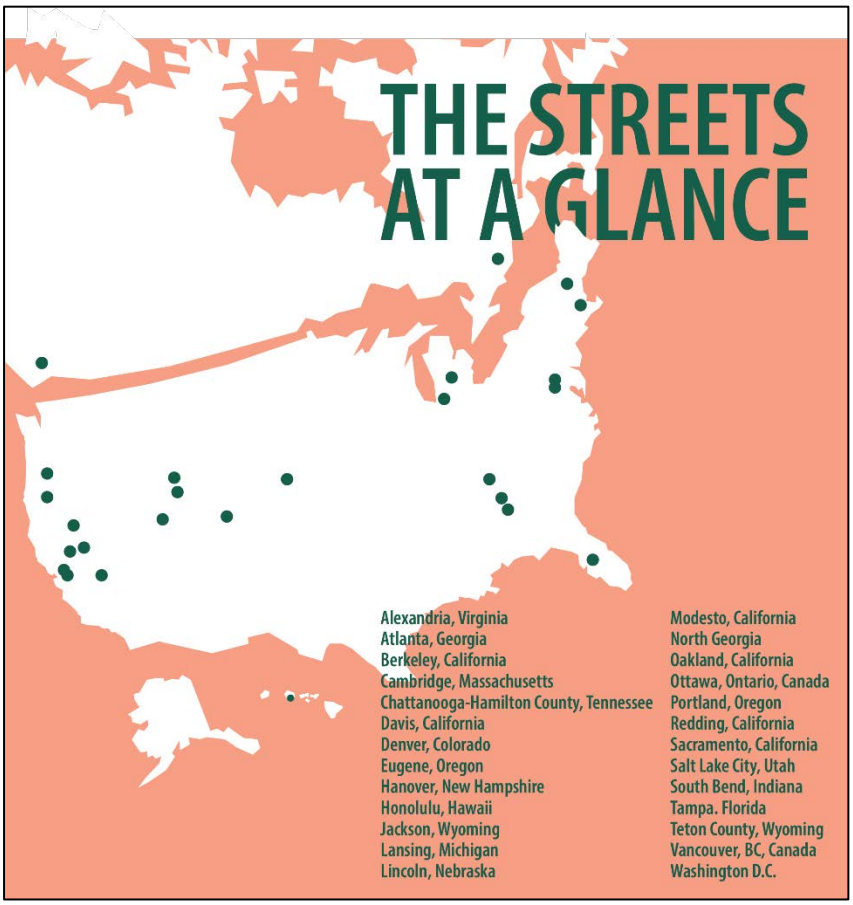

Figure 2: Location of Streets in Guidebook

2.3 DISSEMINATION OF INFORMATION

The guidebook was distributed in digital and print form. Two print copies were distributed to every state DOT office, including to the bike/ped coordinator and to the Director's office. Print copies were also distributed to every state bike/ped coordinator working for the FHWA, key contacts for each case study city, leadership of top transportation organizations (i.e., NACTO, League of American Cyclists, Association of Pedestrian and Bicycle Professionals, ITE, etc.), and to a set of key transportation researchers across the United States.

The availability of a digital download option was conducted via multiple outlets. Each person who downloaded the original Rethinking Streets book was notified by email (about 5,000), and other email and social media promotion from NITC and SCI helped spread news of the book initially. Multiple public presentations were given during the time of the grant to preview the future release of the book with an opportunity to "pre-register" to

download one when available or to announce the book's completion. Those presentations included: the Greater Oregon Institute of Transportation Engineers (ITE) Meeting (Bend, 2018), the Transportation Research Board (TRB) Annual Meeting (Washington, D.C., 2019), and the Florida District ITE Leadership Summit (Tampa, 2019). The Co-PIs also led a NITC-sponsored webinar about the completed project in February 2019. Close to 2,000 downloads were recorded by the end of March 2019, and much like the first Rethinking Streets, it is anticipated that book downloads will continue almost daily for years to come.

3.0 THE GUIDEBOOK

3.1 HOW TO USE THE GUIDEBOOK

The guidebook can be used in multiple ways. First, communities that are thinking about retrofitting some of their streets to enhance bicycle activity alongside a retrofitted street design can seek out specific examples in the book that most closely resemble their project. Bicycle facilities in the guidebook are grouped by generalized type, making it easy for users to immediately focus on street types of most relevance to their own needs. These types include: Two-way Cycle Tracks, One-way Protected Bike Lanes, Raised Facilities, Advisory Bike Lanes, Off-street Paths, Protected Intersections, and Small Investments. Such examples provide direct insight into what is possible and can also provide a contact point for follow up if desired.

Second, many users will wish to see the collection of case studies in their entirety to get a full range of possibilities. Thus, users who seek out the entire collection of examples will be able to envision a whole host of opportunities within their community, given that many of the examples could be found in most communities of any size across the country.

3.2 THE GUIDEBOOK SECTIONS

3.2.1 Front Matter

The guidebook begins with a series of introductory subsections designed to orient users to the use of the guidebook, explain some basic transportation planning and engineering concepts, and help community stakeholders, including transportation professionals, understand multiple concepts of transportation decision making. In the end, the guidebook's purpose is to help communities use evidence from completed projects elsewhere to better inform their own bicycle-centric street retrofit decision making, and to do so with broad community input that can understand projects using the same base knowledge and terminology. The front matter is designed to provide this common orientation to all users throughout a community, including transportation planners and engineers, policymakers, and community stakeholders at large.

The guidebook's front matter includes these subsections: *Changing the Framing of our Streets*, *Myths about Cycling*, and *The Changing Mobility Landscape*. As with the presentations of the street case studies, these front-matter subsections are designed to be visually appealing and easily accessible by a wide variety of users. Figure 3 is an example of a page that describes the street cross section, including how easy and/or expensive it is to manipulate or change different aspects of the street.

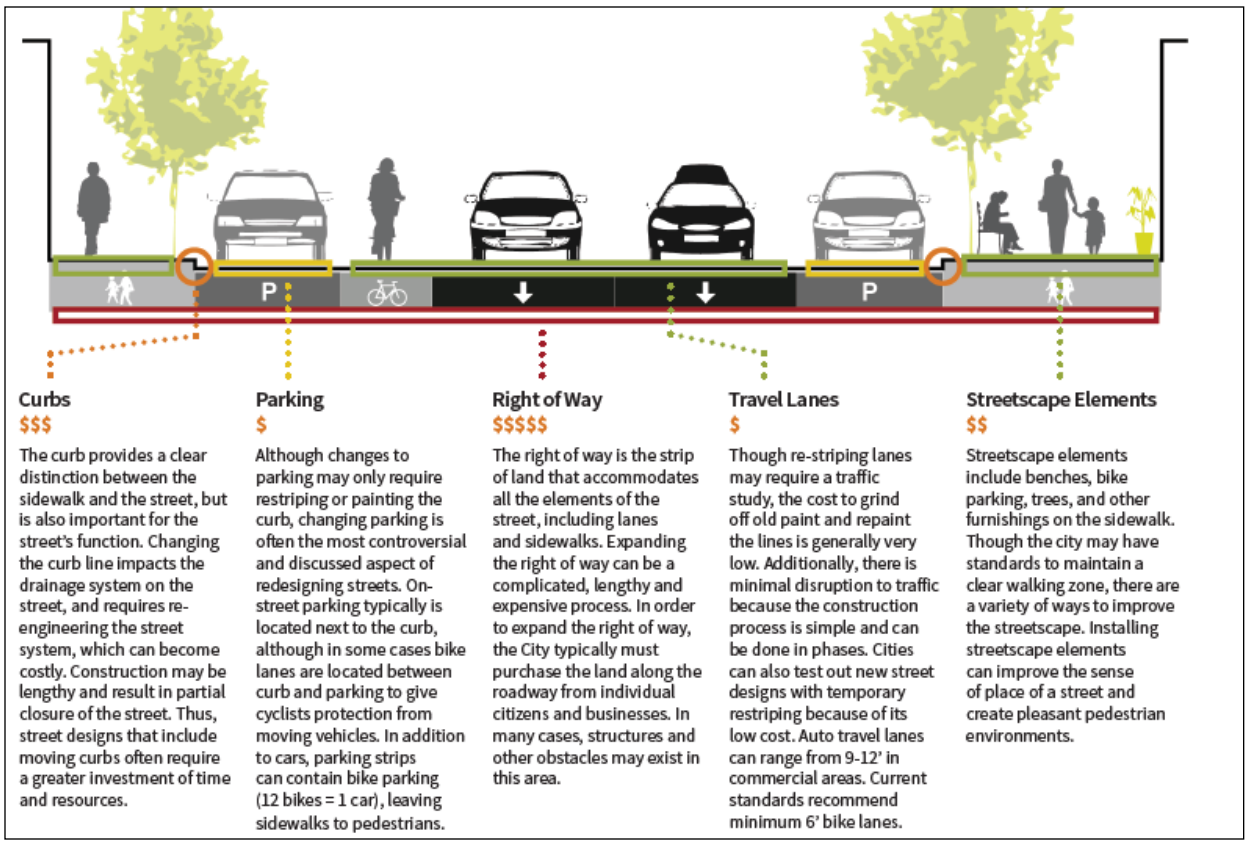

Figure 3: Street Cross Section Explanation

Also, within the front matter is a sample four-page spread of a case study street that highlights each information element on the page to point out its purpose. Each case study street is presented in the same visual format, with some information similarly included in all cases with other information customized to the unique set of circumstances being shared. The "How to Use This Guide" section orients users to the different elements they will be seeing in the remainder of the guide (see Figure 4).

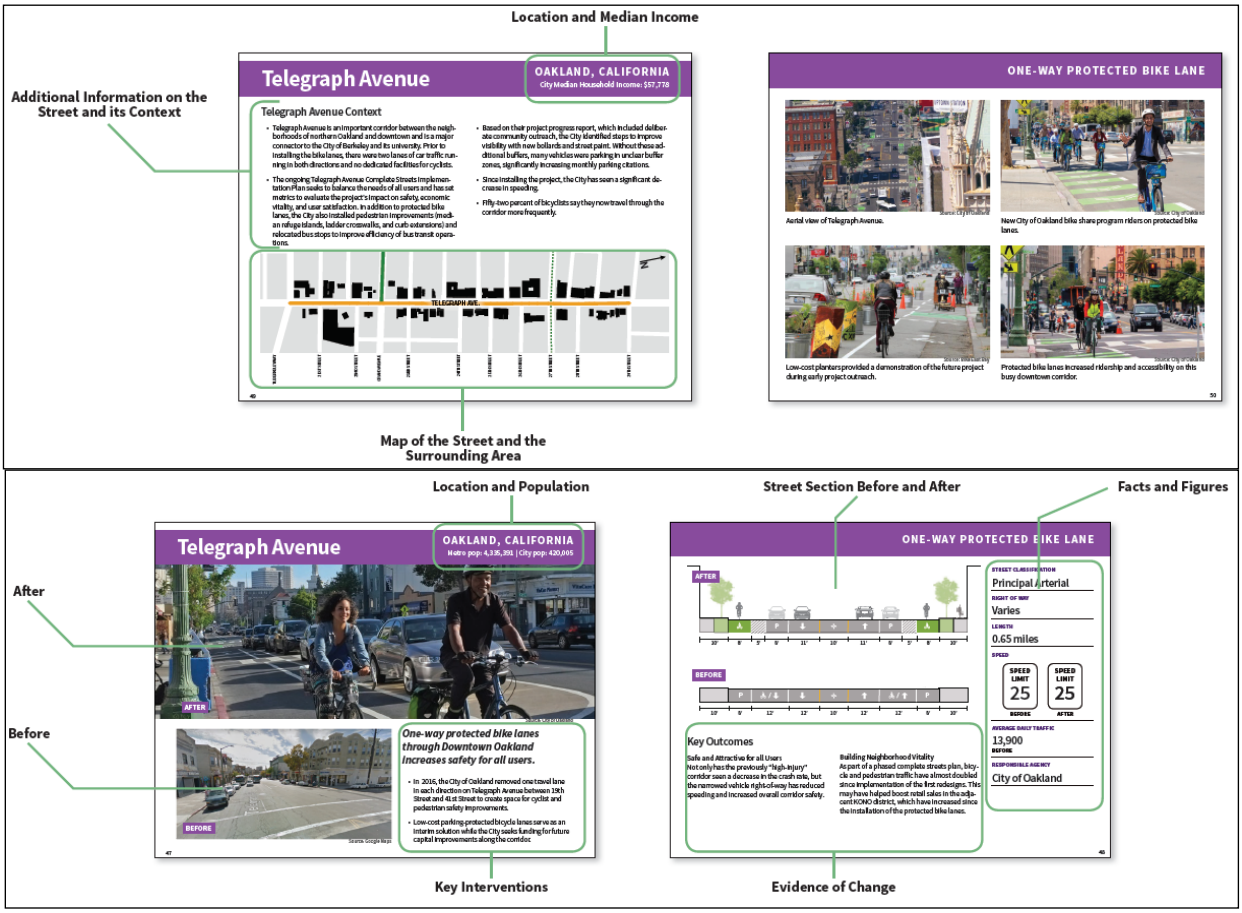

Figure 4: Sample Pages "How to Use This Guide"

3.2.2 Guidebook Streets

The core of the design guide is a collection of 25 completed street retrofit projects from across the U.S. and Canada, presented in a consistent, visually accessible manner available to community stakeholders in communities of all sizes. Case examples are grouped into the following general bicycle facility typologies:

- 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.
- One-Way Protected Bike Lanes: A protected bike lane is 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.
- Raised Facilities: 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.

- 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.
- 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.
- Protected Intersections: Protected intersections extend bicycle infrastructure along corridors into the intersection by providing well-identified, priority bicycle movements in all directions, while minimizing or eliminating possible interactions with motorized vehicles.
- Small Investments: Sometimes the key to completing a system or turning a piece of the bicycle transportation system from stressful to stress-free is a small intervention of size or budget, and the examples shown in guidebook are examples of such creativity and problem-solving.

Each open-faced page of the guidebook includes the following elements:

- Location and demographics
- Before-and-fter photographs and cross sections of the facility
- Key interventions and prime findings
- Map of the area, including other bicycle facilities
- Photographs and additional information on the street and its context

3.2.3 Changemaker Spotlights

The guidebook also features five profiles of changemakers or transportation professionals making a difference in their community by working with stakeholders to plan for and design effective, high-quality biking infrastructure. Figure 5 shows a portion of one of the guidebook's changemaker spotlight pages.

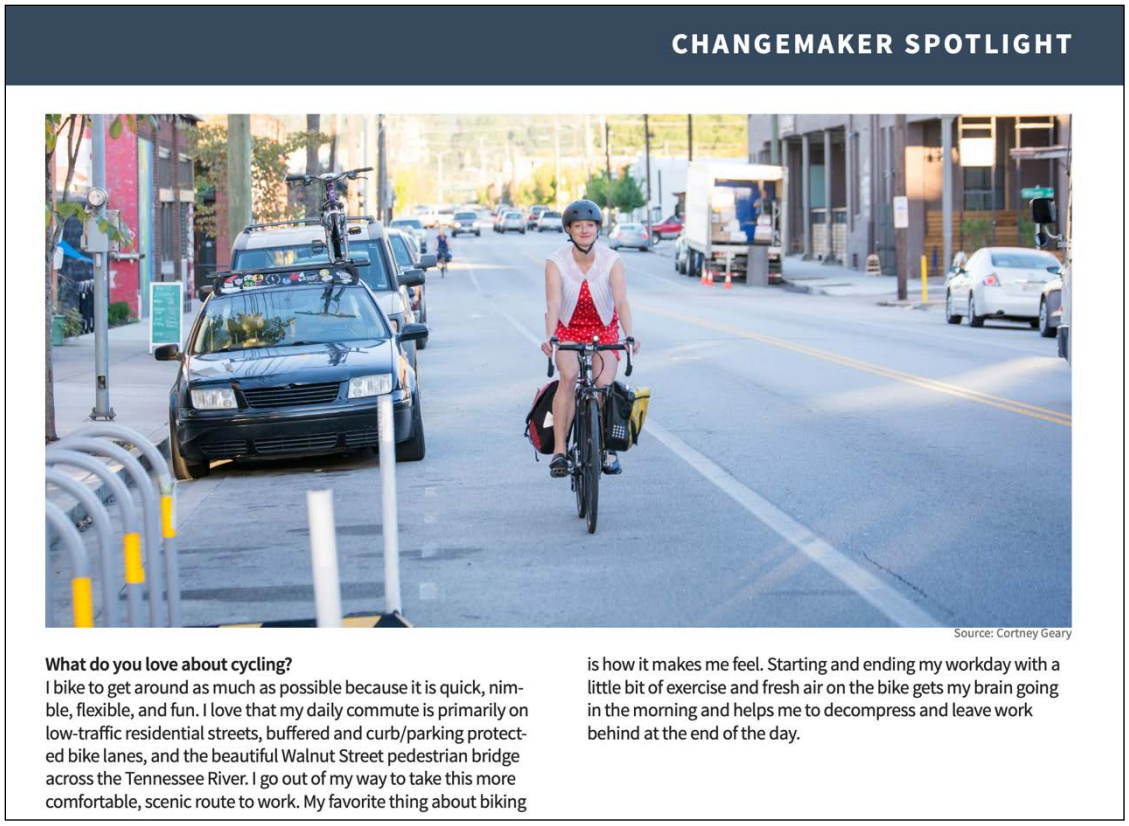

Figure 5: Sample Changemaker Spotlight

3.2.4 Guidebook Back Matter

Following the presentation of street examples, citations and resources for further investigation are clearly presented. While this guidebook is designed to orient a wide variety of community stakeholders to the range of possibilities for street redesigns, it is also intended as a resource where community stakeholders can find people or projects to follow up with as necessary. The information in the back-matter portion of the guide is designed to assist in this way. An example of information source references is shown in Figure 6.

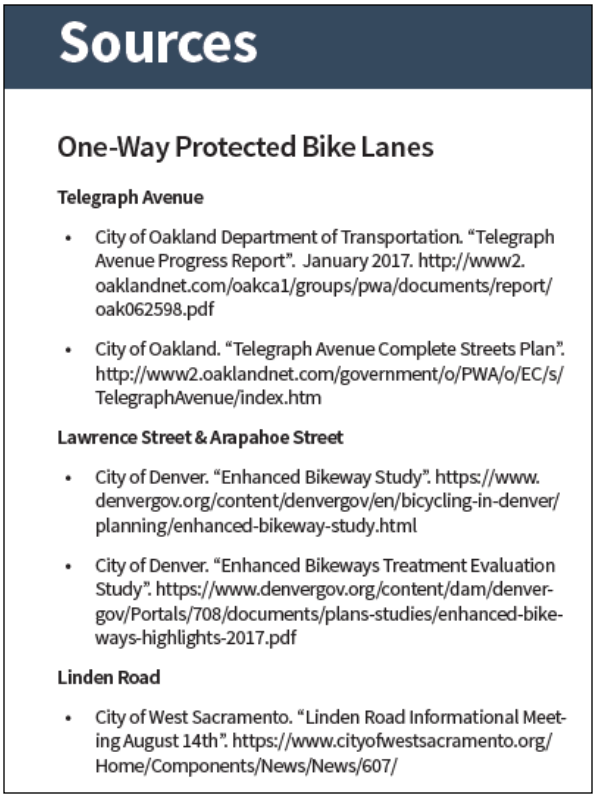

Figure 6: Sample Information Sources

4.0 CONCLUSION

Many communities across the country are re-examining their streets, how they function, who they serve, and how they can be improved to serve more functions than throughput for motorized vehicles. While such throughput is, of course, an important function of a transportation network, for decades street design has favored that function over multimodal access or the placemaking qualities of streets. The Complete Streets movement of the last decade has helped move these issues more into the mainstream, with many local and state legislatures adopting some variation of Complete Streets polices. Increasingly, communities are asking for improved bicycle facilities as part of their desire for more Complete Streets.

What has not existed is a bicycle-focused, evidence-based street design guidebook to help local professionals, policymakers, and other community stakeholders see how other communities have proceeded with similar projects and what the transportation and economic impacts have been. Thus, rather than having a collection of hypothetical design alternatives, this guidebook created as part of this project presents already completed street reconstructions that show before-and-after conditions, contexts around the project, and different transportation performance metrics. The goal is to reduce some of the fear of the unknown within local transportation decision making and to provide a common language to all the stakeholders that inevitably come together when redesigning important streets in their community.

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