FAST-TRACKED

A TACTICAL TRANSIT STUDY

THANK YOU:

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To all of **the project teams and interviewees** who gave their time to share their projects and review their project content.

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Sincerely,

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EXECUTIVE SUMMARY

As transit agencies, local governments, and citizens look for ways to improve existing, and start new, transit service, many of them are turning to the Quick-Build (Tactical Urbanism) methodology. This approach uses inexpensive, temporary materials and short-term tactics as a way of implementing projects in the short-term, while longer term planning takes place. The following report documents the current state of the practice with regard to what are called Tactical Transit projects, specifically for surface transit (bus and streetcar). These are both physical and operational strategies that improve the delivery of surface transit projects using this methodology. This report is not meant to be a catalogue of all current examples, but it is rather a snapshot of the current state of the practice, and puts forward a pedagogical framework within which projects can be explained, and further avenues of research catalyzed.

A project can be considered a Tactical Transit project if it:

- Is implemented on a much faster timeline than typical capital projects; within 1-2 years;
- Uses impermanent or low-cost materials;
- Is executed with a much smaller budget than a typical capital project; under $100,000;
- Seeks to iterate upon the design of infrastructure;
- Is short in duration, but part of a larger or longer-term effort;
- Is used to accelerate implementation of transportation infrastructure; or
- All of the above.

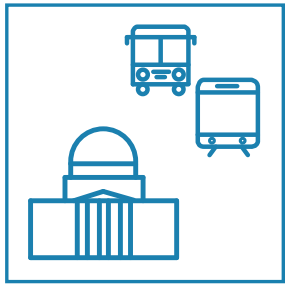
The report features 20 bus and streetcar Tactical Transit projects both physical and operational in nature, three advocacy groups, and two funding programs, all investigated through 36 interviews plus additional conversations with over 60 individuals from local government, transit agencies, advocacy groups, consulting firms, and other agencies. Geographically, the work included spans 11 states across five different regions of the country, with variation in project location community size and local government structure.

PARTNERSHIP MODELS

The three most common partnership models, or project team compositions, of the 20 Tactical Transit projects are described below. Surprisingly, most projects were led by city departments, not transit agencies!

City as project lead, with transit agency support. This model was particularly applicable when the project was infrastructure that would be installed in the street. In this case, most projects used city staff or on-call contractors to install the projects, and did the conceptual design in-house to save resources and streamline the process.

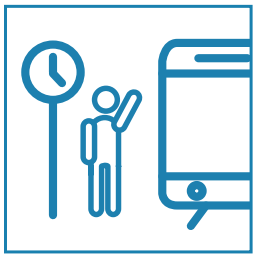
City and transit agency share equal weight of project. This model was most applicable when the project was operational or amenity-based.



Third entity leads project, with city and/or transit agency support. Some projects strongly reinforce that advocacy groups are well-suited to create momentum to help city staff get buy-in from their directors.

The Tactical Transit projects in this report are placed into three broad categories that describe their intended outcomes (some projects were placed in more than one category):

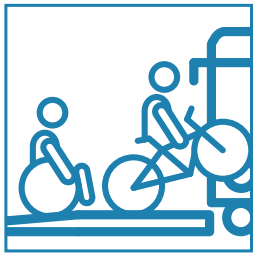
- 13 **Speed + Reliability** projects (10 of which are/include dedicated bus lanes);
- 13 **Access + Safety** projects (4 of which are/include boarding platforms); and,
- 7 **Rider Experience** highlights (this list includes both Tactical Transit projects, and a few of the featured advocacy groups and funding programs).



Speed + Reliability:
Speed and Reliability projects addressed transit travel times, improved headways, improved boarding times, and reduced dwell times.

The main project types in this category are dedicated bus/transit lanes, dedicated pre-boarding areas, and operational changes, including consolidation, route realignment, signal adjustments, vehicle access restriction, queue jump lanes and other intersection treatments.

- Projects saw transit travel time savings from 20%-50%, with the most common savings being 20%-30%.
- Tactical Transit projects were shown to improve both transit and car travel times.
- Most transit lanes studied were under one mile in length, yet saw significant improvements in travel times.



Access + Safety:
Access + Safety projects focused on improving multi-modal and ADA access to transit stops and/or boarding areas.

The projects in this category feature elements like modular boarding platforms, bike lanes, pedestrian infrastructure, road diets, parklets and other public space enhancements, and wayfinding.

- Projects in this category documented 40%-65% reductions in collisions, and reductions in pedestrian fatalities.
- Projects showed increases in ridership of up to 17%.
- Projects documented increases in bicycle travel from 40-400%!

Rider Experience:
Rider Experience projects involved improvements to customer experience, both pre- and post-board.

These projects included improved seating or furnishings, public art, design competitions, wayfinding, and the creation of new public spaces around transit.

- Three projects resulted in proposals for dedicated permits or design guidelines to guide future similar projects.
- Most of the work highlighted in this category was led by advocacy groups, foundations, or nonprofits. Where transit agencies supported their efforts, the impacts were significantly amplified.

EXECUTIVE SUMMARY

One of the key purposes of this research is to share challenges and solutions so that others can develop their own projects. Below and on the following page are common challenges and "pro tips" for agencies and other partners looking to implement Tactical Transit projects, tied to specific steps in the planning and implementation process.

	CHALLENGE	PRO TIP
1	**ASSEMBLING THE TEAM** Projects might struggle to get started due to departmental silos and a basic lack of communication between agencies and the public.	**WORK TOGETHER** This might seem obvious, but time and again project teams communicated that the cross-departmental communication necessary for success was not the always the norm before the Quick-Build projects were implemented. Project teams that had the most success had **designated project managers from each respective department, or entity, and established a regular schedule of communication**. Whether these were already existing teams poised to work together on transit projects, or formed just for the projects, setting aside time and resources up front for the creation of a single body devoted to the project made the project team more effective.
2	**DESIGNING THE PROJECT** The vast majority of transit projects do not have the benefit of dedicating a full travel lane to improve transit headways or travel times.	**BE CREATIVE Operational strategies can be just as impactful** in improving transit metrics as physical projects can. When it comes to physical infrastructure, some of the projects took parking lanes, shoulders, and integrated existing bike lanes into their projects to find the right-of-way they needed. These projects revealed creative ways to re-configure the street.
3	**PUBLIC OUTREACH** As with any public planning initiative, fielding public feedback can be difficult. Stakeholders can be passionate about parking, traffic, their business revenue, etc. Deciding on the level of public engagement, who to target, and how to message the project can be challenging.	**PUT THE PUBLIC TO WORK** Ultimately, the level of public engagement and response to feedback depends on how successful the lead project team entity has been in distilling public input and integrating public involvement into the Quick-Build process. Things like taking **inventory of parking and existing curbside uses, and the actual implementation of the project, can be powerful forms of public engagement in themselves**, and are crucial parts of the project planning process. Along the way, it is key to capitalize on the temporary messaging and reinforce that the project is about learning for everyone.
4	**ESTABLISHING METRICS** Projects might not show raw improvements to their primary metrics (raw increases in ridership, improvement in travel times, etc.). How can teams measure success?	**COLLECT MORE DATA** Think about the problem you're trying to solve, and **expand the number of metrics you're using** to maximize the ways of communicating success. For example, consider the indirect factors that contribute to inconsistent headways such as boarding times, pedestrian crossing times, number of maneuvers around parking cars, etc. These metrics can help teams identify other strategies for accomplishing their ultimate goals.

CHALLENGE	PRO TIP
5 **PROCURING MATERIALS** Municipal procurement regulations often work against the spirit of Quick-Build projects, making it difficult for staff to procure materials quickly and inexpensively.	**FIND SHORTCUTS** Partner with nonprofit entities that can manage a grant-funded materials budget to help circumnavigate spending restrictions. Additionally, keeping materials budgets tight can keep costs under procurement thresholds, allowing city staff to quickly and cheaply procure materials without a bid process. **Look at existing capital improvement projects to find opportunities to test**. For example, some projects took advantage of previously planned repaving projects to implement dedicated bus lanes.
6 **IMPLEMENTATION** Actually getting these projects implemented can provide their own set of challenges. From design to installation and enforcement, stitching together all of the necessary pieces can be daunting and costly.	**USE EXISTING RESOURCES** Where some of the more temporary projects couldn't provide detailed budgets, it was often because they either reallocated staff hours, or scoured their departments for what they had on-hand, to assist with implementation. **Using staff time for a few days is still a drop in the bucket** when compared to making investments that haven't been vetted in the real world.
7 **PUBLIC SUPPORT** With Quick-Build projects, there can be a knee-jerk reaction to stop a test if there is a public backlash. Just because it might be framed as a short-term project, doesn't mean it has to be removed at the first sign of frustration.	**BE PATIENT** Success doesn't always happen overnight. Like any roadway project, traffic takes time to adjust. For pilot (at least a month in duration) projects, **don't prematurely succumb to push-back just because of the adjustment period.** In fact, six months is the recommended duration to fully assess the project's impact following an adjustment period. Adjustment period confusion can also be ameliorated with very clear educational signage and targeted outreach that informs the public of how to respond.
8 **RESPONDING TO CHALLENGES** Quick-Build projects rely on a willingness to fail and iterate. Projects may face any number of technical challenges, from unforeseen roadway conflicts (curbside uses) to material failure.	**ITERATE** The most successful projects used their data and public feedback to create a second round of improvements to fully realize project benefits. If the data shows that the project is not working, **don't give up, make adjustments!** Because of the temporary nature of some of the projects, challenges can be addressed while the project is operational. Design tweaks are in the iterative nature of the Quick-Build process, which can ease the communication between potentially conflicting roadway users when communicated effectively. For example, conflicts with driveways, existing curbside zones, access points, intersection treatments, signal timing, and lane widths can all be addressed during project implementation.

INTRODUCTION

> **"Let's not hire a consultant to tell us what we already know; let's just do this."**
>
> Senior Planner, Metro Transit

TACTICAL TRANSIT

Cities all over North America are using the Quick-Build methodology, based on Tactical Urbanism, to expand transit options, improve existing service, and increase ridership. Tactical Transit projects, operational and physical Quick-Build projects that uniquely focus on transit, have evolved as a way for municipal governments to improve the way they respond to rider needs and increased demand for service.

Municipal agencies and other entities are not only recognizing the benefits of the iterative methodology, but they are also prioritizing it as a legitimate form of project delivery as line items in their budgets, as teams comprised of internal leadership, and as separate and streamlined permitting processes. More and more we observe the phasing out of the "pop-up", and the introduction of less stringent regulations that allow for flexibility in testing projects to arrive at more informed and cost-efficient, long-term projects.

A project can be considered a Tactical Transit project if it:

- Is implemented on a much faster timeline than typical capital projects; within 1-2 years;
- Uses impermanent or low-cost materials;
- Is done with a much smaller budget than typical capital project; under $100,000;
- Seeks to iterate upon the design of infrastructure;
- Is short in duration, but part of a larger or longer-term effort;
- Is used to accelerate implementation of transportation infrastructure; or
- All of the above.

Perhaps the most salient quality of the Quick-Build methodology is that it is intended as learning experience. Regardless of what makes it "quick", a project that adheres to at least one of the above criteria is sure to break down silos, encourage innovation, deliver public benefits, and bridge the gap between governmental and citizens.

At a time of increased competition for funding public transit, Tactical Transit projects are not only accelerating the delivery of transit projects, but also helping create a paradigm shift toward safer, more efficient design and use of our streets.

GO AVE 26

AARON PALEY, COURTESY OF LA MÁS

WHY THIS DOCUMENT?

A component of what has made Tactical Urbanism, or the Quick-Build methodology, flourish is the idea that anyone can do it. Even consultants who coach groups, citizens, and entities in the methodology do so with the intention of building capacity, so that the process lives on and is applied to other projects by that same entity in the future. With publications like the **Tactical Urbanist's Guide to Materials & Design (Street Plans, 2016)**, and **Quick Builds for Better Streets: A New Project Delivery Model for U.S. Cities (People for Bikes, 2016)**, more people than ever are using the Quick-Build methodology as a way of testing and accelerating street and public space projects. However, no similar publication for Tactical Transit projects currently exists.

Tactical Transit projects involve different challenges from those found in a street or open space project. Transit infrastructure is often the most costly transportation infrastructure type, while departments that own streets and infrastructure are often different from transit operators. Furthermore, there are often more unique physical constraints to work within (like fixed streetcar tracks). These challenges pose unique questions with regard to Tactical Transit projects.

When it comes to coordinating a new service, who does what? How is funding identified? How are materials procured? How is the public involved? This document seeks to answer these questions and more.

This report is just the beginning; a first look into the pioneers who, within the last 5-6 years (most frequently within the last three years) have adopted the Quick-Build methodology to tackle issues of surface transit (bus and streetcar), and a glimpse into where this application currently stands, and where it could go. If we've learned anything from some of the more newsworthy examples of the methodology, it's that change can happen fast. From using plastic lawn chairs in 2009, to an interim design plaza in 2010, to a permanent car-less pedestrian plaza in 2015, examples like Times Square remind us that we can only begin to imagine how the Quick-Build methodology could impact surface transit in the near future.

HOW TO USE IT

This report presents the results of interviews and other investigation that provide insight into how local and regional governments, transit agencies, and other organizations have implemented surface transit Quick-Build projects. The 20 projects explored are organized into three categories in the **Findings** section of this report, based on each project's intended goal/outcome.

1. Speed + Reliability: Projects that addressed issues of bus travel times, improved headways, and improved boarding times/reduced dwell times, etc.

2. Access + Safety: Projects that enhanced multi-modal and/or ADA accessibility to surface transit, had separate distinct elements that addressed this, or produced desirable outcomes like increased ridership, decreased crash incidents, increased bike volumes, etc.

3. Rider Experience: Projects that addressed rider comfort, created a sense of place around accessing transit, or mobilized communities in support of transit.

A few projects may appear in more than one category if they had multiple elements or tested various types of infrastructure. Within each category, those projects' findings are summarized according to a few aspects of each project

MARTA ARMY

that were deemed most insightful for the intended purpose of this document (Project Impetus, Internal Process + Partnerships, Procurement + Implementation, and Triumphs + Lessons Learned). The Findings section also presents a series of "comparables" across the different types of projects, and is followed by the Project Summaries (based on the interview protocol). Keep an eye out for projects that the research team found particularly noteworthy, referred to as "Superlatives" and indicated with each Superlative category's icon in Figure 1:

- Complexity: Which was the most complex project, and yielded the most positive outcomes?
- Advocacy Initiation: Which project is the strongest example of one that started as an advocacy initiative, and was implemented?
- Long-term Outcome: Which project created something long-lasting, other than permanent infrastructure?
- Iteration: Which project is the best example of the iterative Quick-Build process?
- Positive Outcome: Which project had the most positive speed and reliability outcome?

Following the Findings section, the **Spotlight: Advocacy + Funding** section presents a few examples of transit advocacy groups and funding programs that have executed their own small-scale Quick-Build projects, or contributed to one of the Quick-Build projects in Figure 1. These entities were discovered first for their own projects, or contributions to the others featured in this report, and the research team felt their stories could be shared separately as examples of ways cities and transit agencies could harness the power of their communities, or seek resources for the funding of region- and network-wide transit improvements projects. It is important to note that this is not an exhaustive list of all transit advocacy and funding entities, but rather those that were discovered either through their own physical Quick-Build projects, or for their relation to those included in this report.

See the **Terms Sheet** at the end of the report for clarification on how the research team defines the commonly-used words and transit tools. For example, where used, the term "demonstration project" specifies a project duration of several days, whereas "pilot project" specifies a project duration of several weeks, to months, to even years!

METHODOLOGY

> **"The reality is that we bypassed a lot of the process. The pilot is the process."**
>
> Transportation Planner, City of Everett

ONLINE INVESTIGATION

The research team received suggestions from the panel for projects to include in the final report, and supplemented these initial suggestions with online investigation to identify projects that seemed to have created enough impact to have an online presence, and that spanned a number of different characteristics (to the best of the research team's ability), like:

- Infrastructure type (dedicated lane, boarding platform, signalization adjustments, shared bus-bike lanes, wayfinding, etc.)
- Project team (city department of transportation, transit operator, nonprofit, grassroots initiative, etc.)
- Duration (demonstration, pilot, etc.)
- Geographic location (at least one project per region of the country, etc.)

The research team used the following search terms to discover projects that had yet to be identified online: "bus tactical urbanism", "transit pilot project", "pop-up bus lane", and "quick build bus project". The initial interview list consisted of 31 projects, which was narrowed to 20 projects to be included in the final report due to inability to connect with the project teams, redundancy in the types of projects featured, or a lack of sufficient available information.

The list of projects included in the final report were those that the research team deemed as having the most value in terms of lessons learned and insight, and that comprised the strongest set of projects that characterize the application of Quick-Build methods to surface transit at this time.

INTERVIEWS

A total of 36 interviews contributed to the final report. The research team found contacts for the projects either through the panel or online investigation, and invited these individuals to participate in a one-hour interview. Through the responses to these invitations, the team was connected with either additional team members who could provide valuable insight into the project planning and/or execution, or the "project manager" that most closely worked on the project. Interviews were also added by the research team as they were conducted, if the interviewees suggested that additional project team members could provide additional information, or if the research team felt an additional perspective would substantially inform the project's summaries.

Interview follow-ups consisted of requesting items discussed in the conversations, like final reports, images, striping plans, and any other documents that helped deepen the research team's understanding of the projects. The project teams were also given the opportunity to provide feedback on the project summaries included, all but one of which took advantage of this opportunity.

INTERVIEW PROTOCOL

The interview protocol was refined following its initial submission to the research panel. Some of the interview questions were derived directly from discussion with the panel members, and reflected aspects of the projects they and their colleagues wanted to make a focus of the investigation. The interview protocol informed the sub-headers in the Project Summaries, supplemented where possible with other sources of investigation (plans, evaluation reports, grant reports, press articles, etc.).

The following questions were asked of each interviewees, or project team:

1. What, or who, instigated the project? What was the specific challenge the project sought to address?

2. Why did you choose the Quick-Build methodology?

3. What was the length of time between project conception and implementation?

4. Please describe the nature of the collaboration between the major entities involved.

5. Please describe the design process.

6. How were the materials decided upon? What factors went into this decision?

7. Has the process created more public buy-in, was it a trust building process?

8. Was any other data, aside from public feedback, collected? Is there any evidence that the project improved access, safety, ridership, or rider comfort?

9. Can you say at this point whether or not the project has been successful in improving speed and reliability? If not, how do you think the pilot methodology is accomplishing your goals thus far? What are the advantages to this process?

10. How do you see this initiative evolving? Future iterations? Permanent projects?

11. What were the biggest challenges to implementation, or things you'd do differently?

12. How was it funded?

The protocol was tweaked per project, but the questions were either asked exactly as is, or the topics alluded to in the questions were discussed where applicable.

BROADWAY BUS LANE

CITY OF EVERETT

PROJECT LIST + MAP

Project Name	Project Type I Main Elements	Project Scale	Location	Project Team
5L Fulton Limited Pilot	**Multi-Part Pilot Project I** limited-stop service, stop consolidation and relocation, road diet, bus zone optimization, parking re-configuration, signage	5 miles	San Francisco, CA	San Francisco Municipal Transportation Agency (SFMTA)
Bancroft West Pilot Project	**Dedicated Bus Lane I** two-way protected bike lane, signage	.25 miles	Berkeley, CA	City of Berkeley, Alameda-Contra Costa (AC) Transit, Bike East Bay
Broadway Bus Lane	**Shared Bus-Bike Lane I** boarding platforms, Transit Signal Priority (TSP)	1 mile	Everett, MA	City of Everett, Massachusetts Bay Transportation Authority (MBTA)
CTA Prepaid Bus Boarding	**Prepaid Boarding Pilots**	Four locations at bus stations/stops through-out the city	Chicago, IL	Chicago Transit Authority (CTA)
Denver Moves Broadway/Lincoln Transit Improvements	**Multi-Part Pilot Project I** peak to 24-hour existing bus lane transition, bus lane extension, addition of red paint, stop consolidation, service changes, signage	3.5-miles	Denver, CO	City of Denver, Regional Transportation District (RTD)
Go Ave 26	**Multi-Part Pilot Project I** wayfinding, signage, public art, public space enhancements	.25 miles	Los Angeles, CA	LA Más
Hands on Exchange	**Protected Bike Lane I** bus stop enhancements	.75 miles	Akron, OH	Street Plans, University of Akron, City of Akron
Hennepin Avenue Bus Lanes	**Dedicated Bus Lanes I** signage	.55 miles	Minneapolis, MN	Metro Transit, City of Minneapolis

Indicates a Superlative. Skip to pg. 45 to learn which projects the research team found particularly noteworthy.

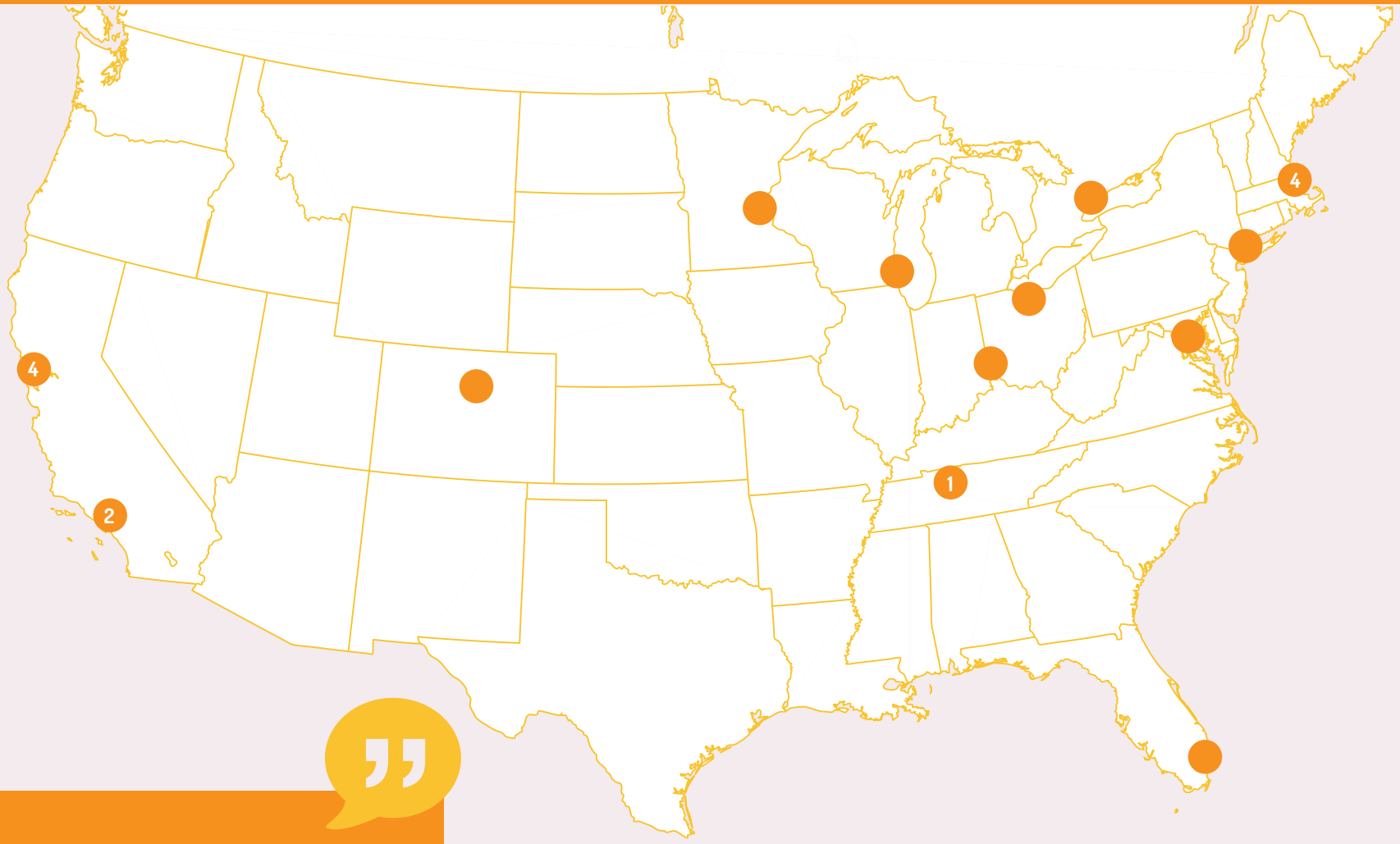
Note: Where the project teams had preferred project names, or where there was an official, existing name for the project, the research team did not deviate from this name. Otherwise, projects were named according to city (if multiple locations of interventions)/corridor and infrastructure type. The first listed entity in the far right column is the lead entity.

Figure 1, Project List

Project Name	Project Type I Main Elements	Project Scale	Location	Project Team
King Street Transit Pilot	**Multi-Part Pilot Project I** Motor vehicle access restriction, stop relocation and enhancements, signal adjustments, signage, public realm installations	1.6-mile segment	Toronto, CAN	City of Toronto, Toronto Transit Commission
Los Angeles Bus Boarding Platforms	**Bus Boarding Platforms**	Multiple platforms throughout the city	Los Angeles, CA	City of Los Angeles Department of Transportation (DOT)
Main Street Bus Lane	**Dedicated Bus Lane I** signage	.42 miles	Cincinnati, OH	City of Cincinnati, Cincinnati Metro, Better Bus Coalition
Massachusetts Avenue Bus Lane	**Shared Bus-Bike Lane I** queue jump lanes, stop relocation, signage, TSP	.25 miles	Arlington, MA	Town of Arlington, City of Cambridge, MA Dept. of Conservation and Recreation (DCR), MBTA
Mt. Auburn Street Bus Lanes	**Shared Bus-Bike Lanes I** TSP, queue jump lanes, painted curb extensions, signage, conventional bike lane	.90 miles	Cambridge & Watertown, MA	City of Cambridge, Town of Watertown, MA Dept. of Conservation and Recreation (DCR), MBTA
New York City Bus Boarding Platforms	**Bus Boarding Platforms**	Multiple platforms throughout the city	New York, NY	City of New York City
Nolensville Crossing Treatment	**Midblock Crossing I** refuge islands, signage	Single crossing across a 5-lane state road	Nashville, TN	TDOT, Metro Public Works, Walk Bike Nashville
Oakland Bus Boarding Platforms	**Bus Boarding Platforms**	Four platforms within three blocks stretch	Oakland, CA	City of Oakland
Rhode Island Avenue Bus Lane	**Dedicated Bus Lane I** signage	1.1 miles	Washington, D.C.	District of Columbia, Washington Metropolitan Area Transit Authority (WMATA)
Solano Avenue Bus Parklet	**Bus Parklet**	N/A	Albany, CA	City of Albany, AC Transit, business owners
Streets for People	**Dedicated Bus Lane I** buffered bike lane, signal adjustments, signage	.63 miles	Miami, FL	Miami Downtown Development Authority (DDA), Miami-Dade County, City of Miami
Washington Street Bus Lane	**Shared Bus-Bike Lane I** signage	1.22 miles	Boston, MA	City of Boston, MBTA

Note: Refer to the Terms Sheet on pg. 129 for how the research team is defining and referring to the Tactical Transit projects and transit tools in the report.

Figure 1, Project List.



"No studying. The pilot is the study."

Founder, Better Bus Coalition

Note: Dots with numbers indicate multiple projects in either the same city or metro region.

Figure 2, Project Map.

FINDINGS

The findings of this research are presented in the following pages, organized in the project categories to the right, and summarized according to the following characteristics of the projects:

1. Project Impetus: This describes why the projects were initiated, or what the project team considered the primary motivation for the project. For some, the project aligned with a current or past planning process, but for others, the projects were implemented more for the sake of experimenting.

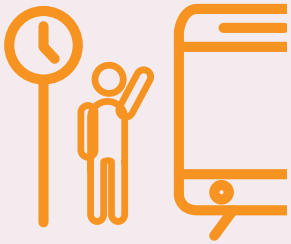
2. Internal Process + Partnerships: This describes the various structures of the project teams, with an emphasis on factors that made some projects' processes smoother than others. From internal "dream teams" to directives from political officials, this can provide especially meaningful insight to those readers not sure where to start within their organizations.

3. Procurement + Implementation: What were the most common implementation strategies? What were advantages and disadvantages to the ways some projects did it?

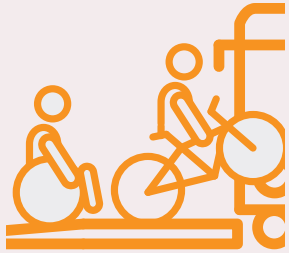
4. Triumphs + Lessons Learned: What did a lot of the projects learn from the Quick-Build process? What were some recurring challenges, and how were these overcome (or not)?

Each section begins with a brief synopsis of each project and its most salient outcomes. For a more detailed summary of each project based on the interviews, see the Project Summaries starting on pg. 45.

SPEED + RELIABILITY: Projects that primarily addressed issues of bus/streetcar travel speeds and reliability, or produced desirable outcomes like more regular headways, faster overall route travel times, less dwell times, etc.



ACCESS + SAFETY: Projects that primarily enhanced multi-modal and/or ADA accessibility to surface transit, had separate distinct elements that addressed this, or produced desirable outcomes like increased ridership, decreased crash incidents, increased bike volumes, etc.



RIDER EXPERIENCE: Projects that primarily addressed rider comfort, created a sense of place around accessing transit, or mobilized communities in support of transit.

SPEED + RELIABILITY: PROJECTS

5L FULTON LIMITED PILOT
BANCROFT WEST PILOT PROJECT
BROADWAY BUS LANE
CTA PREPAID BUS BOARDING
DENVER MOVES BROADWAY
HENNEPIN AVENUE BUS LANES
KING STREET TRANSIT PILOT
MAIN STREET BUS LANE
MASSACHUSETTS AVENUE BUS LANE
MT AUBURN STREET BUS LANES
RHODE ISLAND AVENUE BUS LANE
STREETS FOR PEOPLE
WASHINGTON STREET BUS LANE

13 projects
13 cities

The projects in this category feature physical and operation elements like dedicated bus lanes, service modifications, bus stop consolidations/optimization, signal adjustments, pre-paid boarding, vehicle access restriction, and queue jump lanes and other intersection treatments.

5L FULTON LIMITED PILOT: San Francisco, CA

Starting in 2013, the San Francisco Municipal Transit Agency implemented a multi-part project along the Fulton Street corridor, as suggested by a previous planning process called the Transit Effectiveness Project. A variety of physical and operational changes were made along the 5-mile+ Fulton corridor to improve transit speed and reliability, and safety for all roadway users, including:

- Introduction of limited stop service (5L Fulton Limited)
- Bus stop consolidation (18 total stops removed)
- Bus zone optimization (stop relocation and lengthening)
- A 4-to-3 lane road diet on an approx. .5-mile segment
- Parking reconfiguration at several intersections
- Signage (where necessary to alert riders of the changes)

Outcome(s): 9% improvement in transit travel times

BANCROFT WEST PILOT PROJECT: Berkeley, CA

In 2018, as a part of a series of pilot projects in Berkeley, CA's Southside neighborhood, the City of Berkeley implemented a .25-mile long, 24-hour dedicated bus lane on Bancroft Way in the westbound curbside lane. In addition to the 11'6"-wide bus lane, the project included a two-way, protected bike lane in the other curbside lane, leaving two travel lanes available for westbound traffic. The conceptual designs for the permanent iteration of the transit lane are to commence in 2019.

Outcome(s): Final data is still being compiled, but compliance with the dedicated lane has been strong.

BROADWAY BUS LANE: Everett, MA

Following the release of the Everett Transit Action Plan in November 2016, the city wanted to test out the most obvious strategy for improving bus transit service that had come out of the planning process: peak-hour bus lanes. A month later, the city implemented a 1-mile, 12'-wide test bus lane using cones in the southbound, curbside parking lane on Broadway from 4am-9am each day. Because it was so successful, the city continued the test until the lane was made permanent about nine months later.

Outcome(s): Transit travel time savings of 20-30%, approximately 6 minutes

CTA PREPAID BUS BOARDING: Chicago, IL

The Chicago Transit Agency implemented four prepaid boarding pilots to test their ability to expedite boarding between June 2016 and June 2017, one of which is ongoing. The pilots employed mobile fare validators, movable barriers and signage, and the reallocation of staff hours to execute.

Outcome(s): 54% average reduction in boarding times across the four pilots

DENVER MOVES BROADWAY: Denver, CO

After a number of initiatives reinforced the need and opportunity to address low-cost transit improvements on the Broadway/Lincoln one-way pair, the City of Denver implemented a multi-part pilot project to try different strategies along portions of the corridor. In 2017, the city did the following:

- Transitioned portions of the existing 3pm-6pm bus lanes to 24 hours, totaling almost three miles along Broadway and just under a mile on Lincoln
- Added red paint to a short segment of the existing bus lane on Broadway
- Extended the existing bus lane on Broadway north two blocks
- Executed minor bus stop consolidation and associated service changes
- Installed signage (where necessary to alert riders of the changes)

Outcome(s): 2.2 minutes average transit travel time savings, reduction in non-transit vehicle bus lane violations, 2.8% increase in ridership

HENNEPIN AVENUE BUS LANES: Minneapolis, MN

After being inspired by Everett's bus lane test, the transit provider for the Minneapolis/St. Paul area, Metro Transit, decided to execute a three-day demonstration project with traffic channelizers on Hennepin Avenue to see if congestion could be alleviated and transit travel times improved. Two 10'-wide segments of approximately .5 (northbound) and .3 (southbound) miles were installed in the curbside parking lanes each morning and afternoon, respectively.

Outcome(s): Bus travel speeds slowed overall (likely due to the bus lane width), but transit travel times were a bit more consistent.

KING STREET TRANSIT PILOT: Toronto, CAN

After years of observing that the streetcar service on King Street was slow and unreliable, the City of Toronto initiated the King Street Pilot Study to develop new concepts for testing strategies to improve the streetcar's speed and reliability. In November 2017, the project team implemented a 1.6-mile, multi-part pilot project on King St. that included the following elements:

Bancroft West Pilot Project

FEHR & PEERS

Denver Moves Broadway

NACTO

"Why take people to see BRT in Mexico City? Why not get people to feel what BRT is like here?"

Program Officer, Barr Foundation

Rhode Island Ave. Bus Lane

DDOT

- Creation of a dedicated transit corridor through the restriction of motor vehicle access along the corridor, prohibition of through movements and left turns, and only allowing right turns onto King Street for curbside access
- Designation of curbside lanes in both directions solely for transit stops, taxi stands, accessible loading, pickup/dropoff/delivery, and public space installations
- Streetcar stop relocation (18 stops) beyond traffic lights to facilitate right turns and allow for more direct boarding
- Signal timing adjustments
- Art and street furniture installations where curb space wasn't being used for motor vehicle or transit access

In April 2019, the City of Toronto City Council voted to make the project permanent.

Outcome(s): Approx. 5-minute transit travel time savings, significant improvement in streetcar reliability

MAIN STREET BUS LANE: Cincinnati, OH

After advocacy group Better Bus Coalition gained significant political support for a dedicated bus lane pilot on Main Street in Downtown Cincinnati to address significant congestion and transit delays during rush hour, the city and transit agency teamed up to execute a morning and afternoon peak-hour dedicated bus lane in November 2018. The approximately .42-mile, 11'6"-wide bus lane in the curbside parking lane was demarcated with a single, thick thermoplastic stripe and temporary signage.

Outcome(s): 20% reduction in transit travel times, overwhelming positive feedback

MASSACHUSETTS AVENUE BUS LANE: Arlington, MA

To alleviate significant delays on Massachusetts Avenue, a challenge known to the Town of Arlington for years, the town and its project team partners implemented a one-month, shared bus-bike lane pilot demarcated with cones and temporary signage from 5:45-9:15am each morning. The .25-mile long, 15'-wide lane was implemented in the eastbound, curbside parking lane of Massachusetts Avenue. In addition to the lane, the project included the following elements:

- Transit Signal Priority (TSP), one bus stop relocation, and a queue jump lane at Lake Street, a major intersection before the start of the bus lane
- Traffic signal adjustment (to split-phase), a queue jump lane, and a lane assignment change at Alewife Brook Parkway, where the bus lane terminated

Outcome(s): 50% reduction in transit travel times (5-6 minutes), 40% reduction in variability of travel times

MT. AUBURN STREET BUS LANES: Cambridge/Watertown, MA

Capitalizing on the momentum from multiple local entities to address delay and unreliability on Mt. Auburn Street in Cambridge, the city formed a team to test out some solutions it had been studying. Starting in October 2018, Cambridge and Watertown implemented an eastbound, red-painted, shared bus-bike lane on Mt. Auburn Street (.65 miles), and an eastbound segment on Belmont Street where it intersects Mt. Auburn Street (.25 miles). The segments varied in width, from 11' to 13', and mostly occupied the existing travel lanes. In addition to the bus lanes, the pilot project implemented the following:

- Westbound, .5-mile conventional bike lane on Mt. Auburn St./Belmont St.
- Queue jump lanes on Mt. Auburn St. at Walnut St. and School St., two intersections within a mile west of the start of the bus lane
- Signage (where necessary to alert riders of the changes)
- TSP and signal timing adjustments at multiple intersections along Mt. Auburn St.
- Painted curb extensions where the bike lane was implemented to reduce roadway width and pedestrian crossing distances

Outcome(s): Data is still being collected, but 98% of riders said they wanted to make the bus lanes permanent

RHODE ISLAND AVENUE BUS LANE: Washington, DC

To increase transit capacity during a subway line shutdown, the District Department of Transportation seized the opportunity to test a priority bus lane on Rhode Island Avenue. In July 2018, the project team installed an approximately 1-mile, 12-hour

dedicated bus lane (bikes allowed), demarcated with temporary signage and pavement markings, in the curbside lane in both directions. The approximately 11'-wide lanes were evaluated for six weeks.

Outcome(s): Bus travel speeds actually decreased, and there were significant bus lane violations from non-transit vehicles

STREETS FOR PEOPLE: Miami, FL

In September 2017, Miami's Downtown Development Authority initiated a pilot project on SE/SW 1st St. in Downtown to test a Complete Streets configuration. Along an approximately .63-mile long segment, the project team implemented a 6am-8pm, red-painted dedicated bus lane (11' wide) and a green-backed, buffered bike lane. The project also included the installation of Leading Pedestrian Intervals at two intersections within the project segment, other signal timing adjustments along the route, as well as new signage for the bus lane.

Outcome(s): Transit travel speeds did not change significantly, but motor vehicle travel times improved.

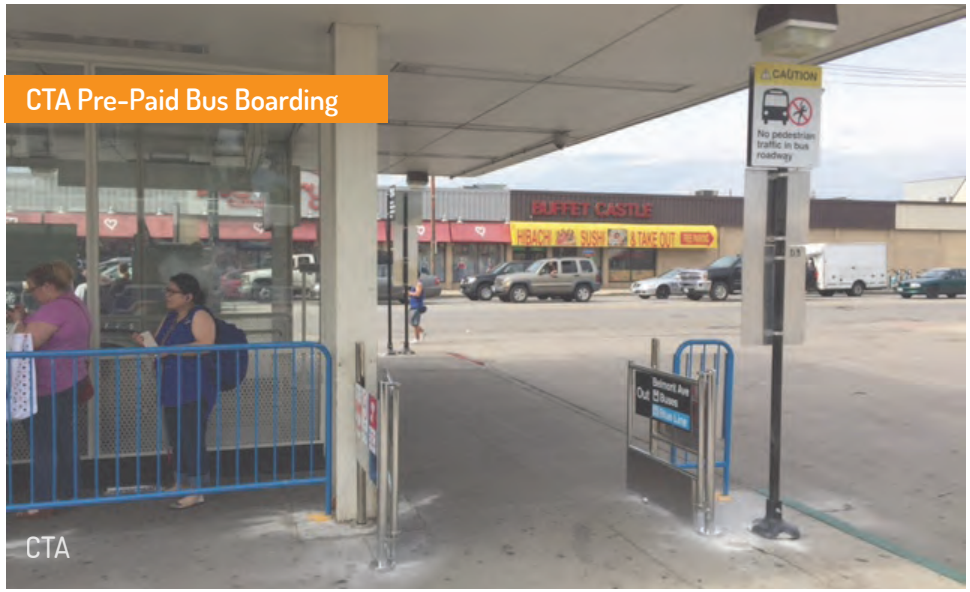
WASHINGTON STREET BUS LANE: Boston, MA

As a part of the GoBoston 2030 mobility planning effort, the city had identified that Washington Street would greatly benefit from improved transit service. To see how a dedicated bus lane could alleviate riders' complaints of delays and unreliability, the city implemented a 2-day, 1.2-mile, morning peak-hour (5am-9am) shared bus-bike lane demarcated with cones. A few months later, the city repeated the same test, but for four weeks, to gather more robust data. Due to the pilot's success, the bus lane was implemented permanently only a month later.

Outcome(s): 20-25% improvement in transit travel times

Washington Street Bus Lane

CITY OF BOSTON



CTA Pre-Paid Bus Boarding

CTA

SPEED + RELIABILITY: SUMMARY

5L FULTON LIMITED PILOT
BANCROFT WEST PILOT PROJECT
BROADWAY BUS LANE
CTA PREPAID BUS BOARDING
DENVER MOVES BROADWAY
HENNEPIN AVENUE BUS LANES
KING STREET TRANSIT PILOT
MAIN STREET BUS LANE
MASSACHUSETTS AVENUE BUS LANE
MT AUBURN STREET BUS LANES
RHODE ISLAND AVENUE BUS LANE
STREETS FOR PEOPLE
WASHINGTON STREET BUS LANE

13 projects
13 cities

Findings pertaining to the following four project characteristics are summarized for the projects in the Speed + Reliability category: Findings pertaining to the following four project characteristics are summarized for the projects in the Speed + Reliability category: Project Impetus, Internal Process + Partnerships, Procurement + Implementation, and Triumphs + Lessons Learned.

PROJECT IMPETUS

(a) The following projects were implemented primarily either as a part of, or a way to advance, **a current or previous planning process or initiative**:

- 5L Fulton Limited Pilot (San Francisco, CA)
- Bancroft West Pilot Project (Berkeley, CA)
- Broadway Bus Lane (Everett, MA)
- Denver Moves Broadway (Denver, CO)
- King Street Transit Pilot (Toronto, CAN)
- Streets for People (Miami, FL)
- Washington Street Bus Lane (Boston, MA)

For these projects, the planning processes had built up the case for transit improvements either through identifying specific corridors within a jurisdiction that were in need of speed and reliability improvements, or through establishing a set of transit projects that could be applied to multiple corridors to improve network functionality (a type of "transit toolkit"). The Quick-Build process offered most of them an opportunity to put "paper to asphalt", and advance long-term, planned improvements.

(b) The following projects were implemented after observing delays and/or unreliability, **for the sake of testing a more immediate solution** or applying the Quick-Build process:

- CTA Pre-Paid Bus Boarding (Chicago, IL)
- Hennepin Avenue Bus Lanes (Minneapolis, MN)
- Massachusetts Avenue Bus Lane (Arlington, MA)
- Mt. Auburn Street Bus Lanes (Cambridge/Watertown, MA)

For the Massachusetts Avenue Bus Lane, the Town of Arlington considered opportunities to test transit infrastructure "very rare", and were particularly excited by the process. In Cambridge, the city had experimented with bikeway pilots, but hadn't used the Quick-Build process for a transit project yet.

Specifically, quite a few of the project team mentioned the concept of the "low-

hanging fruit" of transit improvements, and using the Quick-Build process to "get more bang for their buck" where large-scale projects weren't feasible or cost-effective at the time. This was a clear motivation expressed by the 5L Fulton Limited Pilot, Denver Moves Broadway, and the Hennepin Avenue Bus Lanes, although was discussed with other project teams, as well.

(c) The following projects were initiated as a **response to political or some other type of pressure**:

- Main Street Bus Lane (Cincinnati, OH)
- Rhode Island Ave Bus Lane (Washington, DC)

In Washington, DC, the bus lane was implemented in response to subway construction, although the team also used it to garner support for similar interventions and the implementation of permanent bus lanes across the District.

In Cincinnati, months of advocacy and data collection by transit group Better Bus Coalition facilitated a partnership with a local political official, who together presented the project to the city in a way that was hard to dispute.

Perhaps the most consistent characteristic present in a majority of these projects that made their decision to test transit improvements quickly was the advanced "readiness" within their departments and/or political ecosystem. Whether or not they were familiar with the Quick-Build process, there was a willingness, if not great enthusiasm, to complement their studies with real-world evaluation.

INTERNAL PROCESS + PARTNERSHIPS

(a) The following projects' processes of execution were made (relatively) easy due to a particular **existing structure that enabled less reliance on multiple entities**, and/or strong political support and directives:

- 5L Fulton Limited Pilot (San Francisco, CA)
- Broadway Bus Lane (Everett, MA)
- CTA Pre-Paid Bus Boarding (Chicago, IL)
- King Street Transit Pilot (Toronto, CAN)

In San Francisco, the SFMTA is both the transit operator and the transportation department, which made the decision-making process a lot less complex. Similarly, the CTA could implement its project without much city collaboration, as three out of the four pilots were located on CTA-owned right-of-way. In Everett and Toronto, the Mayor and other political officials directed the project teams to execute the projects within a certain time frame, either purely out of urgency to address the challenges at hand, or because the political climate would soon change.

CITY OF TORONTO

(b) The following project teams had **dedicated positions, or "transit liaisons", to facilitate better communication between transit agencies and city transportation departments** that proved useful in the execution of the Quick-Build projects:

- Greater Boston projects (Boston, Arlington, Cambridge/Watertown, Everett)
- King Street Transit Pilot (Toronto, CAN)

For the Boston area projects, collaboration with the MBTA was particularly smooth, as they had recently created a staff position specifically for municipal collaboration for transit projects. The project manager for the King St. Transit Pilot is the manager of the Surface Transit Projects Group at the city, and serves as the point person between the city and the Toronto Transit Commission, where a primary focus of his position is developing joint strategic transit initiatives.

Where there were struggles internally in the execution of these projects, and "different levels of comfort" with using the test methodology, data that showed an irrefutable correlation between traffic congestion and bus service made the projects difficult to turn down.

PROCUREMENT + IMPLEMENTATION

(a) The following projects were **executed entirely internally by the lead entity**, from design to installation:

- 5L Fulton Limited Pilot (San Francisco, CA)
- Broadway Bus Lane (Everett, MA)

- CTA Pre-Paid Bus Boarding (Chicago, IL)
- Denver Moves Broadway (Denver, CO)
- Rhode Island Avenue Bus Lane (Washington, DC)
- Washington Street Bus Lane (Boston, MA)

For these projects, the lead entity was able to rely on internal departments and staff for every aspect of the projects, like: complete conceptual designs and/or striping plans, provide materials that were on-hand (signage, cones, barriers, etc.), install signage and pavement markings, reallocate staff to operate and enforce the projects, host public engagement and communications efforts, and evaluate the projects. The most common part of the project phases (design, implementation, evaluation) for which contractors were used in the remaining projects was implementation.

Also more common among the projects that did not execute the projects internally was the addition of funding from grants, or significant contributions from other partners, that allowed the project budgets to be a bit less lean.

In regards to materials procurement, there was a similar division among the projects based on internal reliability. Being able to use materials that resided within city departments, and that were easily accessible, enabled certain project teams to maximize the expediency of their project delivery and efficiency of execution. For example, traffic cones are not always materials owned by a city government. Not every city has its own sign or pavement markings shop. These were particularly advantageous to the projects mentioned in the list.

Although a few teams were using some products in bus lanes for the first time, none cited the materials procurement processes as particularly difficult. For the most part, the process for these materials followed suit with standard procedures. For example, the Bancroft West Pilot Project used an epoxy-modified acrylic asphalt paint for the dedicated bus lane. Part of the project evaluation will include how well this paint will last, until Methyl Methacrylate (MMA) is used for the permanent lane in approximately 3-4 years. Additionally, Denver Moves Broadway tried three different pavement coating materials for its red paint: MMA, epoxy traffic paint, and thermoplastic. The only part of this process that was different from typical procurement procedures was the application to the FHWA to test the different types of planned pavement markings.

TRIUMPHS + LESSONS LEARNED

(a) Regardless of the projects' outcomes on speed and reliability, the following projects specifically expressed **improvement in collaboration** as a meaningful outcome of the Quick-Build process:

- Denver Moves Broadway (Denver, CO)
- Hennepin Avenue Bus Lanes (Minneapolis, MN)
- King Street Transit Pilot (Toronto, CAN)
- Mt. Auburn Street Bus Lanes (Cambridge/Watertown, MA)
- Rhode Island Avenue Bus Lane (Washington, DC)

For Denver Moves Broadway, the project offered the city and the Regional Transportation District (RTD) a unique opportunity to more clearly define who does what when it comes to transit— something that hadn't yet been explored. In Toronto, the King St. Transit Pilot was the first time the three project team entities (City of Toronto Planning and Transportation Services Divisions, Toronto Transit Commission) had collaborated on the delivery of a transit project. For Cambridge and Watertown, the project ended up being a crucial exercise in encouraging cross-jurisdictional collaboration, something that the interviewee said isn't common in the Northeast. In Minneapolis and Washington, DC, the project teams had never delivered a project on such a fast timeline. Both teams are confident that the Quick-Build process will prove useful in improving overall efficiency and collaboration between the city and transit agencies.

(b) Regardless of the projects' outcomes on speed and reliability, the following projects specifically expressed **lessons learned in messaging and communications** as a meaningful outcome of the Quick-Build process:

- King Street Transit Pilot (Toronto, CAN)
- Main Street Bus Lane (Cincinnati, OH)
- Mt. Auburn St. Bus Lanes (Cambridge/Watertown, MA)
- Streets for People (Miami, FL)

The King St. Transit Pilot and the Main St. Bus Lane learned that presenting data was especially important in the public and political messaging of the projects. In Toronto, the project team diligently collected data and surveyed the existing curbside uses on King Street, to be able to communicate how the changes would actually benefit business owners concerned about parking, deliveries, etc. In Cincinnati, the project team also learned the value of not being afraid to present conclusions based on data. The public quickly realized the project was a "no-brainer" when it was made clear to them that traffic congestion was the main culprit behind the slow transit service. In Cambridge/Watertown and Miami, messaging the project as temporary, or as something that would be evaluated by all, was crucial to gaining public support. The project teams learned how to refine this messaging throughout the process, which became one of the more important takeaways for them.


LAS PALMAS
200
ONLY

THE NUMBERS

9

Projects with documented improvements in transit travel times and/or reliability.

QUICKEST IMPLEMENTATION:

BROADWAY BUS LANE
1.5 MONTHS

50%

Reduction in transit travel times along Massachusetts Avenue.

.67

Average pilot bus lane length in miles.

54%

Reduction in boarding times across all four pilots in Chicago.

20%

Improvement in transit travel times on Washington Street in Boston.

Watertown: 35,025

Project community size:

x 100

Toronto: 2.8 million

Project team lead entity:

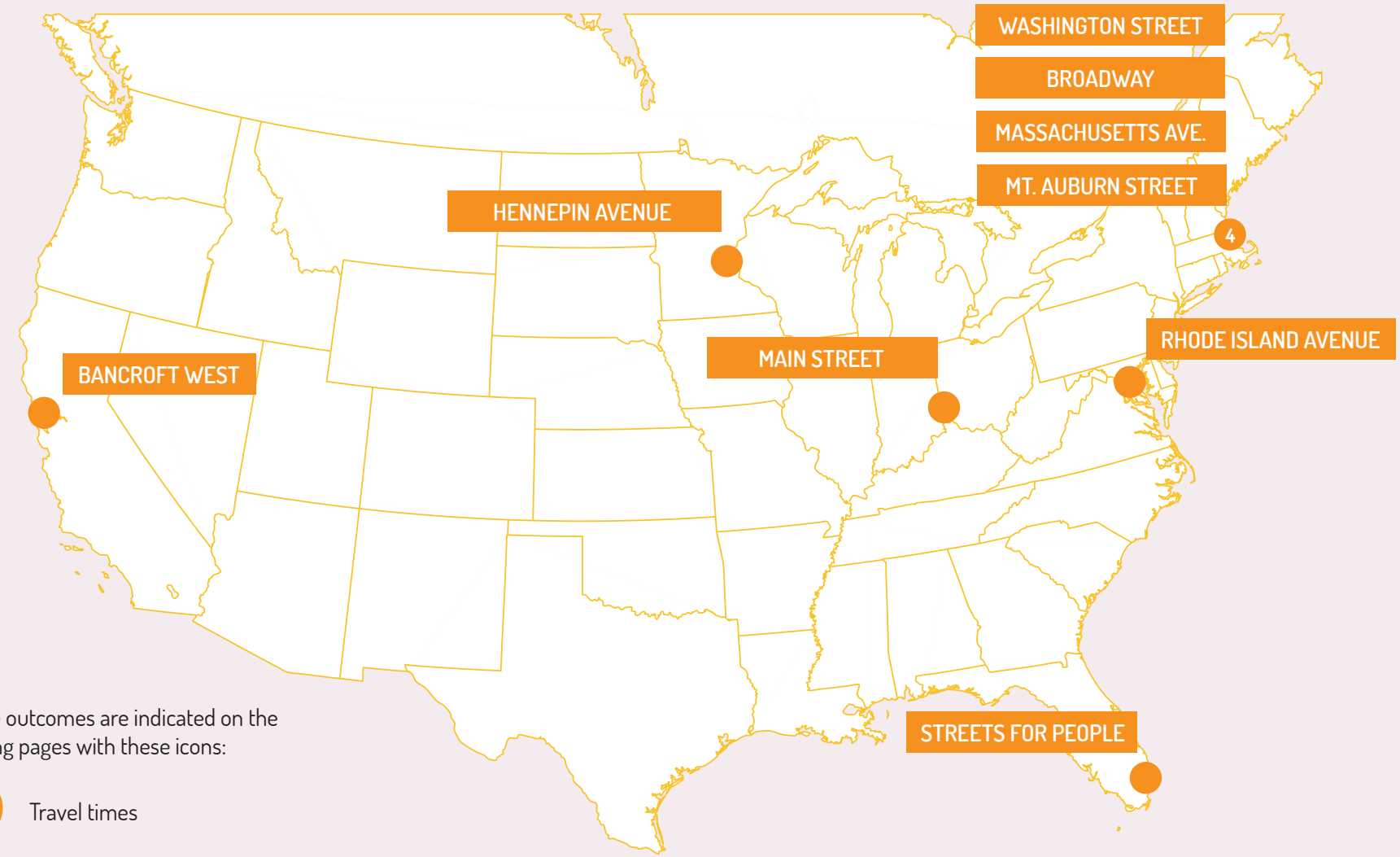
TRANSIT AGENCY **3**

CITY DEPARTMENT(S) **9**

OTHER **1**

Figure 3, Speed + Reliability Project Highlights.

ZOOM-IN: BUS LANES

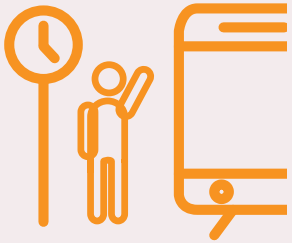


Positive outcomes are indicated on the following pages with these icons:

Travel times

Reliability

Figure 4, Bus Lanes Map.



	BUS LANE TYPE	MAIN ELEMENTS	FUNDING SOURCE(S)	OUTCOME(S)	WHAT'S NEXT?
BANCROFT WEST PILOT PROJECT Berkeley, CA .25 miles	24-hour	• 2-way protected bike lane	City street rehabilitation program funding	• Final data report is still being compiled • So far, there has been mostly positive feedback	Conceptual design for the permanent lane will begin in 2019
BROADWAY BUS LANE Everett, MA 1 mile 10,000 daily boardings/alightings	AM peak-hour, shared bus-bike	• Modular bus boarding platforms • TSP	City funding and staff time, the Barr Foundation, state Complete Streets program	• Travel times reduced by 20-30%, approximately a 6-minute savings • Over 80% of riders responded positively to the bus platforms	Bus lane was made permanent
DENVER MOVES BROADWAY Denver, CO 3.5 miles (project extents) 1,800 boardings, 2,000 alightings daily	Existing peak-hour lanes to 24-hours, partial existing lane extension	• Red pavement markings • Bus stop consolidation	All city funds	• 2.2 minute round-trip travel time savings for all transit routes on corridor (mid-point evaluation) • 2.8% increase in ridership (mid-point evaluation)	Project is permanent, pending future iterations
HENNEPIN AVENUE BUS LANES Minneapolis, MN .55 miles, .37 miles 3,300 daily riders	AM + PM peak-hour (both directions)	N/A	All city funding and staff time	• Overall no significant change in daily bus travel times • 92% of bus operators thought there were advantages to the bus lanes	Bus lane was deinstalled
MAIN STREET BUS LANE Cincinnati, OH .42 miles 635 buses on project segment daily	AM + PM peak-hour	N/A	All city funds	• Initial data collection estimates a 20% transit time savings • Immediate positive feedback from riders	More pavement markings went down two months later

Figure 5, Bus Lanes Table.

	TYPE	MAIN ELEMENTS	FUNDING SOURCE(S)	OUTCOME(S)	FOLLOW-UP
MASSACHUSETTS AVE BUS LANE Arlington, MA .25 miles 10,000+ daily riders	AM peak-hour, shared bus-bike	• Bus stop relocation • TSP • Queue jump lanes	Entirely funded by the Barr Foundation	• 50% (approx. 5-6 minutes) travel times savings • 40% reduction in variability of travel times	Bus lane to be made permanent
MT. AUBURN STREET BUS LANE Watertown and Cambridge, MA .65 miles, .25 miles 12,000+ daily riders	24-hour , shared bus-bike	• Conventional bike lane • Queue jump lanes • TSP	Barr Foundation plus additional project team contributions	• 98% of riders surveyed want it to be permanent • 70% of riders surveyed think it sped their commute by at least four minutes	Project is permanent, pending future iterations
RHODE ISLAND AVENUE BUS LANE Washington, D.C. 1.1 miles N/A	12-hour w/ pavement markings and signage	N/A	All District funding and staff time	• 70% of vehicles in the bus lane in most sections of the corridor were private vehicles • Both bus travel speeds and vehicular speeds decreased	Project is no longer operational, markings will fade over time
STREETS FOR PEOPLE Miami, FL .63 miles 6,000+ riders on project segment daily	8am-6pm	• Protected bike lane • Leading Pedestrian Intervals	Contributions from all project team entities, plus grant funds	• No significant change in bus travel times • 65% reduction in crashes • 40% increase in peak-hour bicycle volumes	Project is permanent, pending future iterations
WASHINGTON ST BUS LANE Boston, MA 1.22 miles 19,000+ daily riders	AM peak-hour, shared bus-bike (2-day, then 4-week)	N/A	All city funding and staff time	• 20-25% travel time savings during 4-week pilot • Implemented permanently within a month after the pilot	Bus lane was made permanent

Figure 5, Bus Lanes Table.

ACCESS + SAFETY: PROJECTS

5L FULTON LIMITED PILOT
BANCROFT WEST PILOT PROJECT
BROADWAY BUS LANE
GO AVE 26
HANDS ON EXCHANGE
KING STREET TRANSIT PILOT
LOS ANGELES BUS BOARDING PLATFORMS
MT AUBURN STREET BUS LANES
NOLENSVILLE CROSSING TREATMENT
NYC BUS BOARDING PLATFORMS
OAKLAND BUS BOARDING PLATFORMS
SOLANO AVENUE BUS PARKLET
STREETS FOR PEOPLE

13 projects
12 cities

The projects in this category feature elements like modular boarding platforms, bike lanes, pedestrian infrastructure, road diets, parklets and other public space enhancements, and wayfinding.

5L FULTON LIMITED PILOT: San Francisco, CA

Starting in 2013, the San Francisco Municipal Transit Agency implemented a multi-part pilot project along the Fulton Street corridor, recommendations that were derived from a previously conducted planning process called the Transit Effectiveness Project. A variety of physical and operational changes were made along the 5-mile+ Fulton corridor to improve transit speed and reliability, and safety for all roadway users, including:

- Introduction of limited stop service (5L Fulton Limited)
- Bus stop consolidation (18 total stops removed)
- Bus zone optimization (stop relocation and lengthening)
- A 4-to-3 lane road diet on an approx. .5-mile segment
- Parking reconfiguration at several intersections
- Signage (where necessary to alert riders of the changes)

Outcome(s): 40% reduction in collisions, 17% increase in ridership

BANCROFT WEST PILOT PROJECT: Berkeley, CA

In 2018, as a part of a series of pilot projects in Berkeley, CA's Southside neighborhood, the City of Berkeley implemented a .25-mile long, 24-hour dedicated bus lane on Bancroft Way in the westbound curbside lane. In addition to the 11'6"-wide bus lane, the project included a two-way, protected bike lane in the other curbside lane, leaving two travel lanes available for westbound traffic. The conceptual designs for the permanent iteration of the transit lane are to commence in 2019.

Outcome(s): Final data is still being compiled, but compliance with the dedicated lane has been strong.

BROADWAY BUS LANE: Everett, MA

Following the release of the Everett Transit Action Plan in November 2016, the city wanted to test out the most obvious strategy for improving bus transit service that had come out of the planning process: peak-hour bus lanes. A month later, the city implemented a 1-mile, 12'-wide test bus lane using cones in the southbound, curbside parking lane on Broadway from 4am-9am each day. Because it was so successful, the city continued the test until the lane was made permanent about nine months later. Just prior to the bus lane being made permanent, the city decided to test additional improvements to the corridor. In June 2017, two modular bus boarding platforms were installed along test route, as well as Transit Signal

Priority. The boarding platforms were installed on top of the sidewalk to ease getting on and off the bus, by eliminating the gap between the height of the sidewalk and the height of the bus.

Outcome(s): Over 80% of riders responded positively to the platforms, and it was observed that overall ridership in Everett after the platforms were installed increased 5%.

GO AVE 26: Los Angeles, CA

In the Fall of 2016, LA-based urban design nonprofit LA Más received a grant from foundation TransitCenter to address first-last mile transit connections on a .25-mile segment of Avenue 26, a corridor in Northeast Los Angeles with a Metro Gold Line station and several bus lines. What they came up with was a multi-part pilot project that included wayfinding signage, sidewalk wayfinding and art, murals, pole wraps, public space enhancements, and fence art all to make the journey to transit safer, clearer, and more enjoyable for those accessing it on the corridor.

Outcome(s): 23% of post-implementation survey respondents said they used the Metro and other transit along the corridor more since the project's installation, and 19% reported walking to transit more frequently.

HANDS ON EXCHANGE: Akron, OH

In August 2018, design firm Street Plans installed a .75-mile long two-way, protected bike lane on Exchange Street in Akron, OH in the curbside travel lane following a grant award from The Knight Foundation (with partners the University of Akron Foundation and the City of Akron). This project included specific treatments and improvements to the four bus stops within the project segment to ease boarding. ADA ramps and pedestrian crossings across the bike lane were installed, so that buses could also stop in the travel lanes. The project was removed after two months.

Outcome(s): Significant public pushback about the bike lane, but public satisfaction with the bus stop treatments

KING STREET TRANSIT PILOT: Toronto, CAN

After years of observing that the streetcar service on King Street was slow and unreliable, the City of Toronto initiated the King Street Pilot Study to develop new concepts for testing strategies to improve the streetcar's speed and reliability. In November 2017, the project team implemented a 1.6-mile, multi-part pilot project on King St. that included the following elements:

- Restriction of motor vehicle access along the corridor, prohibiting through movements and left turns, and only allowing right turns onto King Street for

Utica Avenue, Brooklyn

ZICLA

Solano Avenue Bus Parklet

STEPHEN NEWHOUSE

"We basically just did this. We didn't treat it like a giant capital project."

Senior Transportation Engineer, City of Los Angeles

JON ENDOW, COURTESY OF LA MÁS

curbside access
- Designation of curbside lanes in both directions solely for transit stops, taxi stands, accessible loading, pickup/dropoff/delivery, and public space installations
- Streetcar stop relocation (18 stops) beyond traffic lights to facilitate right turns and allow for more direct boarding
- Signal timing adjustments
- Art and street furniture installations where curb space wasn't being used for motor vehicle or transit access

In April 2019, the City of Toronto City Council voted to make the project permanent.

Outcome(s): Cycling volumes increased 440% during the afternoon commute, all-day, weekday streetcar ridership increased approximately 16%, and 45 public space amenities were installed.

LOS ANGELES BUS BOARDING PLATFORMS: Los Angeles, CA

Out of curiosity, and in sync with its Vision Zero initiative at the time, the city decided to test out a modular bus boarding platform from a Spanish manufacturer that it had heard about. In October 2017, the first platform was installed at a stop with a buffered bike lane to see if boarding could be made safer for both riders and bicyclists. A second platform was installed almost a year later. Since the second platform, two more have been installed as a part of city-wide initiatives/pilot projects.

Outcome(s): No formal data was collected, but the city continues to use the platforms to address a variety of potential mobility conflicts/challenges.

MT. AUBURN STREET BUS LANES: Cambridge/Watertown, MA

Capitalizing on the momentum from multiple local entities to address delay and unreliability on Mt. Auburn Street in Cambridge, the city formed a team to test out some solutions it had been studying. Starting in October 2018, Cambridge and Watertown implemented an eastbound, red-painted, shared bus-bike lane on Mt. Auburn Street (.65 miles), and an eastbound segment on Belmont Street where it intersects Mt. Auburn Street (.25 miles). The segments varied in width, from 11' to 13', and mostly occupied the existing travel lanes. In addition to the bus lanes, the project implemented the following:

- Westbound, .5-mile conventional bike lane on Mt. Auburn St./Belmont St.
- Queue jump lanes on Mt. Auburn St. at Walnut St. and School St., two intersections within a mile west of the start of the bus lane
- Signage (where necessary to alert riders of the changes)
- TSP and signal timing adjustments at multiple intersections along Mt. Auburn St.
- Painted curb extensions where the bike lane was implemented to reduce roadway width and pedestrian crossing distances

Outcome(s): The bus lane and bike lane received positive feedback from bicyclists, and as of a few months after its installation, no complaints were received regarding any bus-bike conflicts.

NOLENSVILLE CROSSING TREATMENT: Nashville, TN

After seven pedestrian deaths in seven years at a bus stop on the Nolensville Pike, nonprofit Walk Bike Nashville, the Tennessee Department of Transportation, and Metro Nashville teamed up to implement a near-term interim crossing solution. Within three months of the most recent fatality, in November 2017, the crossing was restriped, a median refuge and flashing pedestrian beacons were installed.

Outcome(s): It has been observed that drivers are proceeding more cautiously by the bus stop, and there have been zero pedestrian fatalities since its installation.

NYC BUS BOARDING PLATFORMS: New York, NY

The New York City Department of Transportation hadn't explored the use of interim bus bulbs, and realized they'd be the first to test out the new modular boarding platforms coming from a Spanish manufacturer. In July 2016 the city department installed the first platform on Utica Avenue, a corridor that would be receiving a new Select Bus Service route. The platform received positive feedback from riders and community members, and it was deinstalled and relocated to Harlem at another location. Since the use of the first platform, the city installed three more platforms in 2018, and committed to spending $3 million on the platforms over the next three years for more installations.

Outcome(s): Survey feedback was overwhelmingly positive, and the platforms have proven useful at both easing and expediting boarding at certain locations.

OAKLAND BUS BOARDING PLATFORMS: Oakland, CA

As a part of the Telegraph Avenue Complete Streets project, a series of pilot projects and transformations to Telegraph Avenue guided by the Telegraph Avenue Complete Streets Plan, the city installed four modular bus boarding platforms in 2018. The platforms were intended to serve as an interim solution while permanent floating boarding islands for the street were being designed, and were customized to allow for the safe pedestrian crossing of the curbside bike lane to board the bus.

Outcome(s): Data is still being compiled for the bus platforms, but a progress report of the entire Complete Streets Project showed a 9% increase in sales, and 52% of bicyclists surveyed said they increased their frequency of riding on the corridor because of the bike lane.

SOLANO AVENUE BUS PARKLET: Albany, CA

What started with an application to a Safe Routes to Transit grant, and a request from business owners to replace an existing bus stop with a parklet, turned into a successful precedent for bus parklet design guidelines regionwide. In February 2018, the city and Alameda-Contra Costa Transit (AC Transit) installed a parklet at a bus stop on Solano Avenue. Now, AC Transit's Bus Parklet Design Manual will guide the design and installation of more bus parklets throughout the transit network.

Outcome(s): The parklet was immediately well received by both transit riders and operators, and sparked the production of a manual to scale up the installation of bus parklets at other locations.

STREETS FOR PEOPLE PILOT PROJECT: Miami, FL

In September 2017, Miami's Downtown Development Authority initiated a pilot project on SE/SW 1st St. in Downtown to test a Complete Streets configuration. Along an approximately .63-mile long segment, the project team implemented a 6am-8pm, red-painted dedicated bus lane (11' wide) and a green-backed, buffered bike lane. The project also included the installation of Leading Pedestrian Intervals at two intersections along within the project segment, other signal timing adjustments along the route, as well as new signage for the bus lane.

Outcome(s): Peak-hour bicycle volumes increased 40% when compared to data collection from two years prior, and collisions have reduced 65%.


Hands on Exchange

TIM FITZWATER


Broadway Bus Lane

AD HOC INDUSTRIES

ACCESS + SAFETY: SUMMARY

5L FULTON LIMITED PILOT
BANCROFT WEST PILOT PROJECT
BROADWAY BUS LANE
GO AVE 26
HANDS ON EXCHANGE
KING STREET TRANSIT PILOT
LOS ANGELES BUS BOARDING PLATFORMS
MT AUBURN STREET BUS LANES
NOLENSVILLE CROSSING TREATMENT
NYC BUS BOARDING PLATFORMS
OAKLAND BUS BOARDING PLATFORMS
SOLANO AVENUE BUS PARKLET
STREETS FOR PEOPLE

13 projects
12 cities

Findings pertaining to the following four project characteristics are summarized for the projects in the Access + Safety category: Project Impetus, Internal Process + Partnerships, Procurement + Implementation, and Triumphs + Lessons Learned.

PROJECT IMPETUS

(a) The following projects' access and safety **elements were included as a part of a mult-part pilot project**:

- 5L Fulton Limited Pilot (San Francisco, CA)
- Bancroft West Pilot Project (Berkeley, CA)
- Broadway Bus Lane (Everett, MA)
- King Street Transit Pilot (Toronto, CAN)
- Mt. Auburn St. Bus Lanes (Cambridge/Watertown, MA)
- Oakland Bus Boarding Platforms (Oakland, CA)
- Streets for People (Miami, FL)

A few of the above more complex projects, like the 5L Fulton Limited and King Street Transit Pilots, cited that the combination of the various elements/treatments resulted in a generally safer roadway condition for all users, even if the elements that were to specifically address access and safety were a smaller part of the overall project. For example, eliminating through traffic on King Street created a street where people walking and biking felt more comfortable, and enjoyed spending more time. On the Fulton Street corridor, the road diet allowed for wider lanes for the buses to reduce sideswipe collisions, which also enabled the installation of a pedestrian refuge to ease crossing the corridor. A few of the bus stops that were removed were along the higher speed and volume parts of the corridor, and were unsignalized.

(b) The following projects were **conceived to primarily address issues of access and safety**:

- Go Ave 26 (Los Angeles, CA)
- Hands on Exchange (Akron, OH)
- Los Angeles Bus Boarding Platforms (Los Angeles, CA)
- Nolensville Crossing Treatment (Nashville, TN)
- Solano Avenue Bus Parklet (Albany, CA)

(c) Of the above projects, the following projects were **initiated as a result of grant awards**:

- Go Ave 26 (Los Angeles, CA)

- Hands on Exchange (Akron, OH)
- Solano Avenue Bus Parklet (Albany, CA)

(d) The following bus platform projects tested the infrastructure primarily out of curiosity than anything, **for the purposes of being innovative and expanding their toolkit of transit access solutions**:

- Los Angeles Bus Boarding Platfoms (Los Angeles, CA)
- NYC Bus Boarding Platforms (New York, NY)

INTERNAL PROCESS + PARTNERSHIPS

(a) The projects with the **least complex internal processes** of the Access + Safety projects were:

- Los Angeles Bus Boarding Platforms (Los Angeles, CA)
- NYC Bus Boarding Platforms (New York, NY)

In New York City, an existing partnership between the MTA and Department of Transportation through the Select Bus Service Program has created a process for joint execution of transit projects across the city. Also, the NYC Department of Transportation manages the roadways, and they used internal crews for the assembly/disassembly of the platforms, knowledge they wanted to arm their staff with for future, efficient installations. In Los Angeles, the bus stop at which the first boarding platform was installed was serviced by DASH, a transit service provided by the Los Angeles Department of Transportation (LA DOT). This allowed LA DOT to procure, install, and iterate on the design of the boarding platform quickly and efficiently.

(b) The following projects were either **led, or had significant contributions from, nonprofit or non-governmental entities**:

- Bancroft West Pilot Project (Berkeley, CA)
- Go Ave 26 (Los Angeles, CA)
- Hands on Exchange (Akron, OH)
- Nolensville Crossing Treatment (Nashville, TN)
- Solano Avenue Bus Parklet (Albany, CA)
- Streets for People (Miami, FL)

Where the nonprofit or agency wasn't the lead on the project, other entities played a pivotal role in the projects' conception, implementation, and evaluation. For example, Bike East Bay assisted with public outreach and evaluation of the Bancroft West Pilot Project. Walk Bike Nashville's advocacy regarding the unsafe pedestrian


Mt. Auburn St. Bus Lanes
TEGIN TEICH


5L Fulton Limited Pilot
SFMTA

conditions on the Nolensville Pike was key in encouraging quick action. In Albany, the original request for the project came partly from business owners on the street, who also designed the bus parklet for the city and AC Transit.

(c) Project teams that expressed **particular challenges with their execution** include the following:

- Bancroft West Pilot Project (Berkeley, CA)
- Go Ave 26 (Los Angeles, CA)
- Hands on Exchange (Akron, OH)

PROCUREMENT + IMPLEMENTATION

There was more variation in the procurement and implementation of the Access + Safety projects compared to the Speed + Reliability projects. For example, the process for the implementation of the boarding platforms was much more iterative. In all of the cities that implemented them (Everett, Los Angeles, New York City, and Oakland), the project teams cited a lot of back and forth with the manufacturer, some of which contributed to more lengthy materials procurement processes than anticipated. This meant, however, that the platforms were very customizable, and the manufacturers were amenable to experimenting with different elements of their product to suit the cities' needs (markings, crossing treatments, height, ramps, etc.). By nature, the platforms were also being acquired for more location-specific treatment, or were being integrated into existing streetscape or pilot projects as interim solutions.

In Nashville, the materials for the crossing treatment were mostly what the two local government entities, Tennessee Department of Transportation (TDOT) and Metro Nashville, had on-hand, or could procure relatively quickly. The refuge islands were procured, but the pedestrian beacons, posts, signage, and striping were all provided or produced in-house by either TDOT or Metro.

For Go Ave 26 and Hands on Exchange, the materials were purchased with grant money. Even though the projects received assistance from the city government for permitting and implementation, being able to bypass the cities' procurement processes to obtain the project materials was a distinct advantage.

TRIUMPHS + LESSONS LEARNED

Unique to the Access + Safety projects was the ability to reuse the project materials to test infrastructure at other locations. For example, the New York City Department of Transportation deinstalled the first platform on Utica Avenue in Brooklyn, and reinstalled it in Harlem. The boarding platforms provide a sort of "roving" interim design solution once their deinstallation becomes more efficient.

Also found more frequently in the Access + Safety projects was the contribution to a longer-term outcome that would guide similar projects in the future. For example, Go Ave 26 contributed to a proposal from LA Más to the city's Department of Transportation and Public Works for an Adopt-a-Sidewalk Program, one that would streamline permitting for future projects. Similarly, AC Transit produced a Bus Parklet Design Manual following the first parklet's installation, to regulate their design and implementation in the future.

HANDS ON EXCHANGE

TIM FITZWATER

THE NUMBERS

40%

Increase in bicycle volumes on SW/SE 1st Street in Miami.

QUICKEST IMPLEMENTATION:

NYC BOARDING PLATFORMS 1.5 MONTHS

0

Pedestrian deaths since the installation on Nashville's Nolensville Pike.

11

Recycled plastic modular boarding platforms installed across four cities.

440

Percentage increase in bicyclist volumes along King Street during the AM commute.

65%

Reduction in collisions on SW/SE 1st Street in Miami.

Project community size:

Albany: 19,688

x 200

Atlanta: 5.6 million

Project team lead entity:

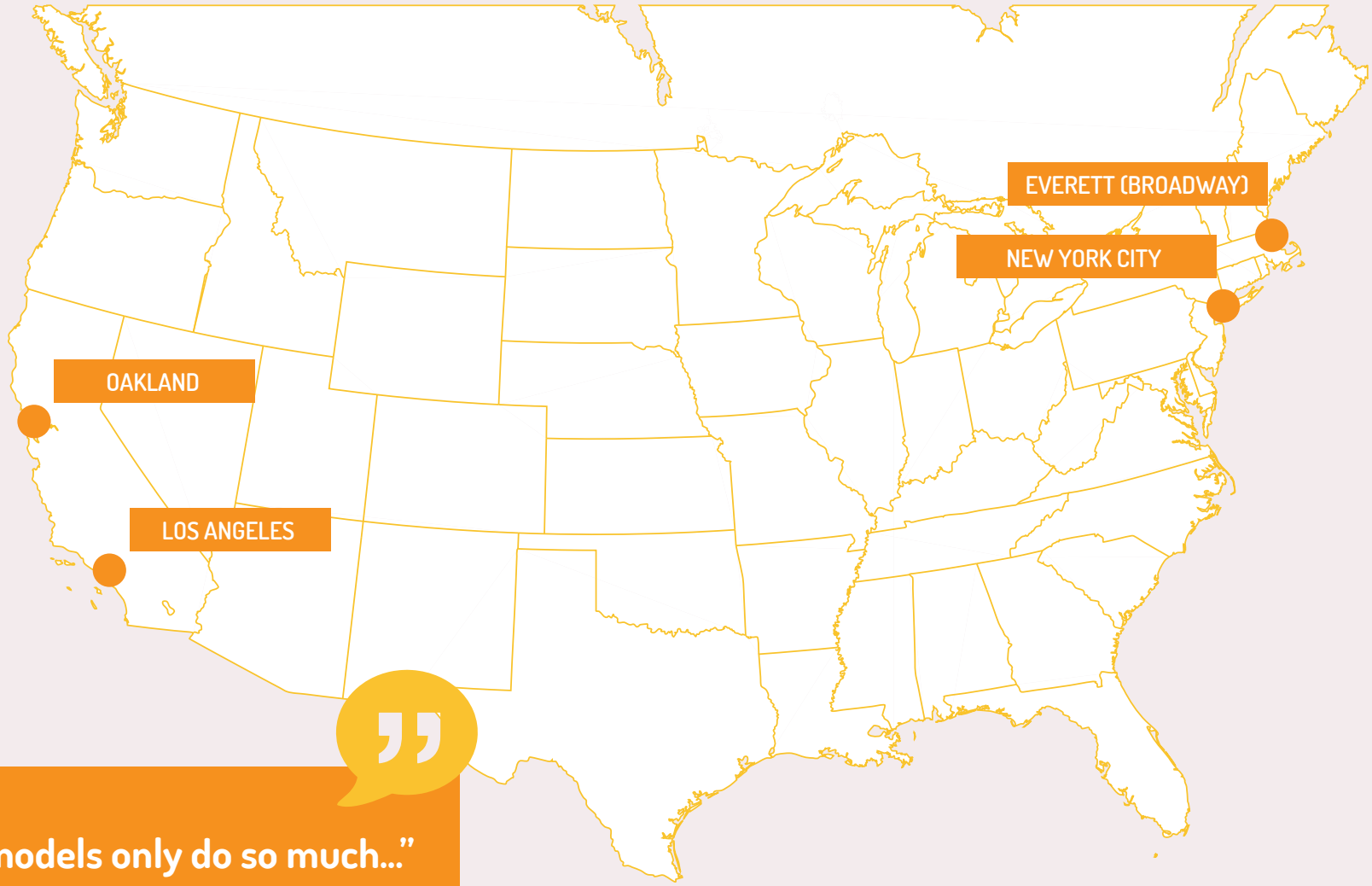
TRANSIT AGENCY **1**

CITY DEPARTMENT(S) **8**

OTHER **4**

Figure 6, Access + Safety Project Highlights.

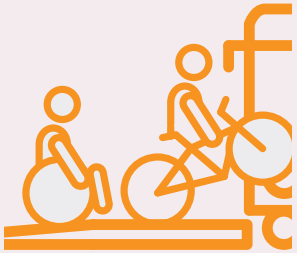
ZOOM-IN: BUS PLATFORMS



"Traffic models only do so much..."

Transit Manager, City of Cincinnati

Figure 7, Boarding Platforms Map.



	IMPETUS	DESIGN ELEMENTS	COST/FUNDING SOURCE(S)	OUTCOME(S)	WHAT'S NEXT?
EVERETT (BROADWAY BUS LANE) Everett, MA 2 boarding platforms	Building on the-bus lane project, and Everett Transit Action Plan	• Double white edge striping • Red tactile warning pads	Barr Foundation BostonBRT program	• Over 80% of survey respondents found it easier to board the bus with the platforms • 81% said they wanted to expand the number of platforms	More evaluation of the optimal design of the platforms
LOS ANGELES Los Angeles, CA 2 boarding platforms	First out of curiosity, now they're being incorporated into corridor projects	• Double yellow/ white edge striping • K-71 bollards • Bike ramps + markings	The first was given to the city by the manufacturer, the second is part of a streetscape project	• The first platform wasn't evaluated, but the second and third will be more formally, and will include the collection of public feedback	A third will be installed in Spring 2019
OAKLAND Oakland, CA 4 boarding platforms	A part of the Telegraph Avenue Complete Streets Pilot Project	• Double white edge striping • Crosswalk markings • Bike ramps + markings	Internal city funds (not capital funds)	• The city is still figuring out the best way to formally evaluate the platforms, and plans to use them elsewhere around the city if necessary	Eyes and ears are open for other conditions that may warrant the use of the platforms
NEW YORK CITY New York, NY 3 boarding platforms	First out of curiosity, now to more frequently address a variety of conditions (bike lane interactions, transit shutdowns, etc.)	• Double yellow edge striping	Available internal funds, and then funds allocated to the Select Bus Service program	• There's no formal evaluation of the platforms, but the city is confident they're well received and functioning as intended	A $3 million contract for up to 40 more platforms is underway

Figure 8, Boarding Platforms Table.

LOS ANGELES BUS BOARDING PLATFORMS

JOE LINTON, STREETSBLOG

RIDER EXPERIENCE

Meet me at the bus stop!

*Indicates either an advocacy group or funding program featured in the Spotlight section. Skip to pg. 113 to learn more.

	Placemaking Tool						
	Beautification (Planters + Trash Cans)	Parklets	Public Art	Seating	Shade	Signage	Street Art
*Better Bus Coalition				●			
*BostonBRT	●					●	
Go Ave 26			●			●	●
King Street Transit Pilot	●	●	●	●	●		●
*MARTA Army	●						
Solano Avenue Bus Parklet		●					
*TURBO Nashville	●			●	●		●

Figure 9, Rider Experience Table.

Beyond dedicated lanes, Transit Signal Prioritization, queue jump lanes, and platform-level boarding, there are tactical strategies cities and other entities have used to bring bus transit to the front of people's minds and political agendas. When cities seek to maintain bus ridership, creating a sense of place and community around using the bus, and making the experience more enjoyable, can help to accomplish parallel goals and make a statement about investment in the transit system.

Projects from the Project List (Figure 1), as well as advocacy groups and funding programs included in the Spotlight section, are included in Figure 9 to provide a broad spectrum of transit placemaking examples. Where some projects had placemaking components as a part of a larger project or initiative, as was the case in Toronto and within the Barr Foundation's BostonBRT program, a few projects or groups made placemaking the core project element. The Solano Avenue Bus Parklet and Go Ave 26 had elements of access, with elevated boarding and wayfinding, but were also designed to be beautiful, comfortable, and create a cohesive aesthetic throughout each intervention. In Toronto, the public space component of the King Street Transit Pilot enabled more community input and participation through the design competition put on by the city. Similarly, the Barr Foundation provided support to its funding awardees by using local artists to dress up bus shelters, and fun signage with each city's BostonBRT branding to enliven the experience of waiting for the bus.

For the Better Bus Coalition, MARTA Army, and TURBO, placemaking and the sprucing up of bus stops didn't have to come at a substantial cost. Using donations and small grants, these groups made large statements using just wood and screws, and have built on these projects to accomplish larger goals for their transit networks.

THE NUMBERS

80

Trash cans placed at bus stops in East Point, GA.

LOWEST COST PROJECT:
MARTA ARMY ADOPT-A-STOP

1

Avg. number of years from project conception to implementation.

48

New public spaces created in the right-of-way on King Street.

3

Number of initiatives that resulted in a new permit process or design guide.

6

Different types of installations were a part of Go Ave 26.

Project community size:

Albany: 19,688

x 143

Los Angeles: 4 million

Project team lead entity:

TRANSIT AGENCY **0**

CITY DEPARTMENT(S) **2**

OTHER **1**

Figure 10, Ridership Experience Project Highlights.

PROJECT SUMMARIES

The project summaries in the following pages are organized alphabetically, and match the projects found in the Project List (Figure 1).

The content reflects the topics discussed in the interview protocol, supplemented by additional investigation performed by the research team (reading evaluation reports and other documents sent by the project teams like presentations and striping plans, reading press releases, perusing project social media and webpages, plus other online investigation).

The summaries are meant to tell a story of each project, while highlighting the more critical pieces of information. They do not reflect every detail of the projects, but are rather based on the conversations the research and project teams had, providing insight into some elements of the projects that are not readily available online or in publicly available reports produced by the project teams.

Each project's category from the Findings section is indicated in the summary with its respective icon found in the Project List (Figure 1), and keep a look out for the five Superlatives, which are indicated by the icon introduced in the Project List.

Here's why the research team chose the Superlatives they did:

COMPLEXITY

KING STREET TRANSIT PILOT: This project set out to tackle a lot of elements regarding both the operation and experience of transit, and the project produced positive outcomes in respect to almost of their metrics of success.

ADVOCACY INITIATION

MAIN STREET BUS LANE: This project was initiated by the advocacy group Better Bus Coalition, and became a reality about two months after it was approved by City Council. More permanent striping went down within just a few months after its

LONG-TERM OUTCOME

SOLANO AVENUE BUS PARKLET: This project started out as a response to the wishes of a community for a better bus stop, and sparked AC Transit to produce a set of design guidelines for the infrastructure's implementation all over the city.

ITERATION

BROADWAY BUS LANE: This project initially began as a week-long test, but lasted up to nine months until the city built the permanent lane. Within that time, Everett continued piloting other elements of BRT service.

POSITIVE OUTCOME

MASSACHUSETTS AVENUE BUS LANE: This month-long project using cones in Arlington, MA produced positive results of the highest magnitude amongst all the projects: transit travel time savings of 50%, and 40% improvement in reliability.

5L FULTON LIMITED PILOT

PROJECT TEAM: San Francisco Municipal Transportation Agency (SFMTA)

PROJECT LOCATION: Fulton Street between 6th Avenue and the Temporary Transbay Terminal, San Francisco, CA

PROJECT INSTALLATION: October 2013

PROJECT DURATION: Ongoing, iterative improvements underway

MATERIALS: Thermoplastic, traffic paint

DID IT WORK? SFMTA continues to make incremental improvements to the Fulton corridor through its Muni Forward Implementation Plan.

A multi-part pilot project including limited-stop service, stop consolidation and relocation, a road diet, bus zone optimization, parking re-configuration, and signage.

(1) PROJECT IMPETUS

The SFMTA conducted a planning process with extensive community input from 2006-2008 called the Transit Effectiveness Project (TEP), which was the first comprehensive evaluation of the entire transit system in several decades. Following market research, a service assessment, and an operations review, the TEP recommended comprehensive route updates, reliability initiatives and travel time improvements. The TEP included a service policy framework to guide investments, including travel time reduction measures along the system's highest-ridership corridors, known as the "Rapid Network."

The Fulton corridor is part of the Rapid Network, carrying approximately 23,000 riders a day, and the SFMTA proposed a pilot project in 2013 **to test numerous TEP recommendations**, including bus stop consolidation and introduction of a new limited-stop service. In addition to improving the transit customer experience, the pilot project included street design changes to improve safety for all road users.

(2) WHY THE QUICK-BUILD METHODOLOGY

The 5 Fulton route was one that SFMTA saw being improved through relatively quick, low-cost interventions, and with limited trade-offs. The pilot approach was chosen because staff believed **significant customer benefits could be realized without waiting for more capital-intensive elements to undergo design and construction**. The pilot approach also allowed for low-cost treatments (such as bus stop consolidation) to be applied along an entire route and the resulting benefits and impacts to be analyzed prior to investment in permanent infrastructure such as bus bulbs and traffic signals. Furthermore, the pilot enabled the SFMTA to test solutions on this route that were being considered for application throughout the Rapid Network.

(3) PROJECT TIMELINE: 6 months

The project team had the TEP work as a foundation, and they were guided by the recommendations that came of it. The agency also had the full support of the director to start implementing interim solutions.

(4) PROJECT TEAM + ROLES

- SFMTA
  - Transit Engineering
  - Transit Service Planning
  - Transit Service Scheduling

- Transit Street Operations
- Training + Communications
- Paint, Sign, + Meter shops

The SFMTA both operates the transit system and manages the surface transportation in the city, so the pilot project primarily required collaboration between teams within the agency, including Transit Engineering, Transit Service Planning, Transit Service Scheduling (created the new schedule for the 5L service and modified the schedule for the 5 local service), Transit Street Operations, Training and Communications (trained operators on new 5L service, and stop changes for 5 local service). Transit engineers and transit service planners jointly developed the designs for bus stop, roadway striping, and parking modifications (eight consecutive blocks of road dieting, and addition of perpendicular parking on two blocks), which were ultimately implemented by the SFMTA's Paint, Sign and Meter crews. Transit Service Planning worked with the Communications team to ensure the public was notified prior to implementation via email, website, press releases, notices at bus stops, and with on-street ambassadors.

(5) PROJECT ELEMENTS + DESIGN PROCESS

- Introduction of limited stop service
- Bus stop consolidation
- Bus zone optimization
- Road diet (segment)
- Parking reconfiguration (segment)
- Signage

The pilot project introduced a new 5L Fulton Limited route during weekdays from 7am to 7pm, making local stops at the outer ends of the corridor but only limited stops at major transfer points along the most crowded segment (almost three miles). The 5 Fulton traverses almost the entire city, with 48 stops and over 50 minutes of travel time in each direction. During the hours of 5L Fulton Limited service, the 5 Fulton local route was truncated to provide additional service to all local stops in the most crowded segment of the corridor. The combination of these changes added about 20% in service hours.

In addition to the new service pattern, the pilot consolidated bus stops along the entire corridor. A total of 18 of nearly 100 bus stops along the route were removed, readjusting the average stop spacing from about 700 feet to 900 feet. Bus stops were chosen for removal based on ridership, neighboring land uses, and presence of intersection controls (for example, stops at controlled intersections were generally prioritized over those at uncontrolled intersections to improve pedestrian safety).

The project also included numerous street design changes to improve transit performance and safety. For example, bus zones were lengthened throughout the corridor to allow buses to pull fully parallel to the curb and ease boarding/alighting and accessibility, which also improved

the ability of limited-stop buses to pass local buses at local-only stops. A few bus stops were relocated from the near side to the far side of intersections to reduce traffic signal delays.

A road diet was also implemented along a portion of Fulton Street between Stanyan Street and Central Avenue (four lanes were reduced to three) to improve pedestrian safety and address a pattern of transit sideswipe collisions that had resulted from operation in 9' wide travel lanes. At a few intersections, parking was restricted to create right-turn pockets to minimize delays for buses waiting behind turning vehicles. Parking was also restricted on a narrow block with frequent commercial loading to provide buses more space to maneuver.

The project manager referred to all of these physical changes as the "nuts and bolts of transit engineering", relatively low-cost changes that would make a significant impact when applied consistently throughout a corridor.

(6) MATERIALS + IMPLEMENTATION

- Thermoplastic pavement markings/striping
- Traffic paint for curbing

Pavement markings and signage indicated bus stop changes, and changes to travel lanes and on-street parking. The road diet involved grinding out existing striping and replacing with new striping, implemented by the SFMTA's paint shop. This project element required the most lead time and was implemented over a period of several weeks prior to the launch of the pilot. In addition to restriping, numerous parking configuration changes were involved.

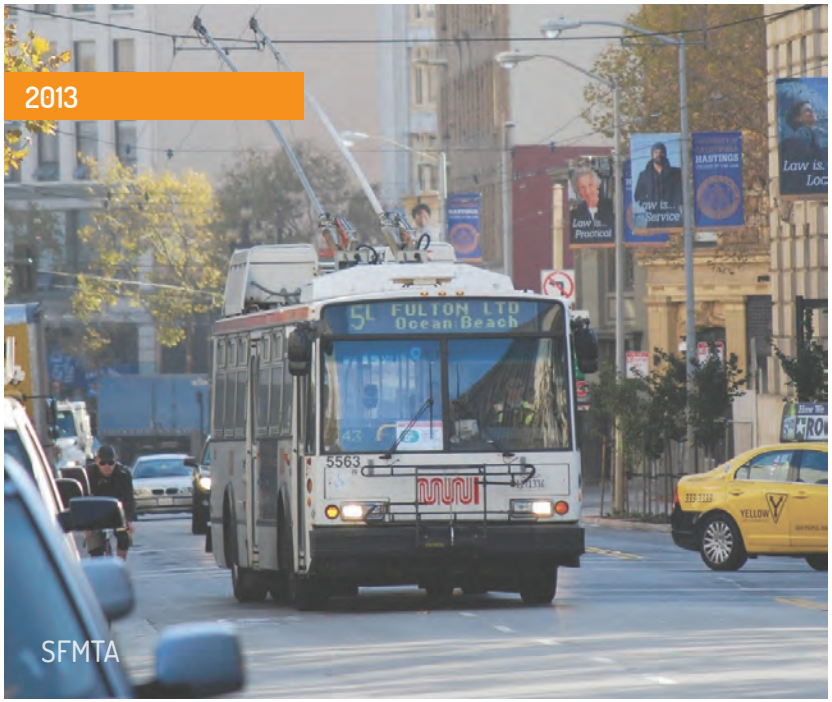
Bus stop removals and relocations were done a few days prior to the launch of the pilot, with customer alerts posted at all impacted stops for a few weeks prior. The removals involved grinding out pavement markings, covering red curb paint with grey, and removing bus stop signs. The relocations required posting tow-away no parking signs several days in advance to clear parked vehicles, then installing new pavement markings, red curb, and new bus stop signs. A few stops that were removed had transit shelters, which the SFMTA was not able to remove immediately due to the need to coordinate with the contractor who owns/maintains the shelters.

The last step was the lengthening of bus zones. Some of these were completed after the pilot launched, as they were less critical.

These relatively low-cost interventions were permanent solutions, but could be easily modified or reversed. This approach allowed the SFMTA to evaluate the changes prior to funding more capital-intensive treatments including bus bulbs and new traffic signals.

(7) PUBLIC ENGAGEMENT

The TEP effort had also recently ended, which included hundreds of community meetings, some just focused on the 5 Fulton corridor. The project team felt like the pilot was something the community would have seen coming, and so the public outreach process prior to the pilot's



implementation was more informative than it was collaborative. The SFMTA conducted two meetings, and did plenty of flyering and posting signs well in advance of the pilot's execution. For several days before and after the pilot launch, the team posted customer service ambassadors throughout the corridor to inform customers of the upcoming stop and service changes. The digital "Next Bus" arrival displays at all shelters were also programmed to inform customers of the pending stop changes.

During its implementation, there were staff ambassadors in the field answering questions and handing out flyers. Any concerns the team received were about people's stops being removed.

(8) PUBLIC FEEDBACK + OUTCOMES

Customer feedback was generally positive, which may have created more public buy-in for additional improvements proposed by the SFMTA following the pilot. The SFMTA tracked public feedback received via Twitter, email, and phone. They also kept a log of feedback they received during the public meetings prior to implementation.

Ridership along the corridor increased by 17% on weekdays when both the 5L Fulton Limited and 5 Fulton local were in service and decreased by 5% on weekends when just the 5 Fulton local operated, indicating that the introduction of the limited stop service (coupled with other pilot project improvements) had a substantial impact on ridership. **Transit collisions were reduced by almost 40%** on the segment where a road diet was implemented, although the total number of transit collisions along the entire corridor increased slightly, likely due to the substantial increase in transit service. For the entire route in both directions, **transit travel times were reduced by an average of 9%** when comparing the previous 5 Fulton local service with the new 5L Fulton Limited service. The travel time savings were most pronounced in the segment of the corridor where the 5L Fulton Limited makes limited stops (12% savings), but were also noticeable on the outer portion of the route where the service continued to make local stops with slightly increased stop spacing (6% savings).

(9) QUICK-BUILD LESSONS + ADVANTAGES

The pilot process informed the SFMTA's approach to similar projects on other corridors, making them more confident that they could apply similar interventions elsewhere, and also allowed planners to evaluate the public response to bus stop changes prior to implementation of permanent infrastructure such as bus bulbs. The project team also thinks it helped refine their messaging for future bus improvement projects, where justification for certain changes may need to be communicated.

(10) CHALLENGES

Prior to implementation, the primary concerns from the community included the removal of on-street parking associated with relocated and extended bus zones, and the increased walking distance for customers associated with bus stop consolidation. Shortly after the initial implementation, the SFMTA reinstated two bus stops that had been removed in response to public feedback.

(11) FUNDING

The pilot was entirely funded using the **agency's operating budget**.

(12) WHAT'S NEXT?

Two years after the pilot was implemented, the city completed a multi-million dollar capital project that added bus bulbs at approximately 10 intersections and traffic signals at three intersections along the 5 Fulton corridor. These changes were partially informed by the bus stop optimization changes made as a part of the pilot project. The 5L Fulton Limited has become a permanent route, renamed the 5R Fulton Rapid, and the SFMTA has continued to make improvements to this and other Rapid Network corridors throughout the city.

The interviewee said that they use the Quick-Build methodology for bicycle and pedestrian projects, and that it's harder to isolate elements of transit improvements that can be tested. The benefits of applying this mindset to the Fulton corridor was that it set the stage for what can be done to tackle the rest of the priority projects. It was about getting comfortable with some other solutions, and learning the variety of conditions within which they'd apply.

BANCROFT WEST PILOT PROJECT

PROJECT TEAM: Alameda-Contra Costa Transit (AC Transit), City of Berkeley Planning Department, Bike East Bay, Telegraph BID

PROJECT LOCATION: Bancroft Way between Dana + Fulton Streets, Berkeley, CA (three blocks)

PROJECT INSTALLATION: January 2018

PROJECT DURATION: Planned 6 months, will remain until next iteration

MATERIALS: Epoxy-modified acrylic asphalt paint, thermoplastic

DID IT WORK? Conceptual design of the permanent lane will begin in 2019.

A 24-hour, red-painted dedicated bus lane including signage, and a 2-way protected bike lane.

(1) PROJECT IMPETUS

This portion of Bancroft Way is **one of three corridor segments included in the city's Southside Pilot Projects**, a series of low-cost transportation improvements to be implemented over the next three years. The Bancroft West project also includes a two-way protected bike lane on the other side of the street, and multiple pedestrian improvements like new crosswalks. AC Transit had recently consolidated bus service on Bancroft Way in the Southside neighborhood of Berkeley due to service delays. When the city proposed a repaving of Bancroft Way, AC Transit proposed using it as an opportunity to try a dedicated bus lane to further improve transit service on the corridor and simultaneously support the city's Complete Streets goals.

(2) WHY THE QUICK-BUILD METHODOLOGY

Piloting **the transit lane on Bancroft West will inform the application of similar treatments to the other two segments of the Southside Pilot Projects** (Bancroft East and Telegraph Avenue). This was also the first time the city was installing such infrastructure, the first of its kind in the East Bay, so they didn't want it to be permanent from the outset. Finally, the **city was looking for low-cost projects that could be implemented quickly to support its Berkeley Strategic Transportation Plan** (13 years in the making). The city does have funding to make the Southside Pilot Projects permanent, but wants to test the infrastructure prior to doing so. The Bancroft West project was messaged as "the Bancroft bike lane and pilot transit lane".

(3) PROJECT TIMELINE: 2 years +

The 24-hour transit lane conceptual design was approved in Sept. 2016 by the Transportation Commission, and the city intended to install it in October 2017. Some complexities in the design delayed implementation a bit, and the city also wanted to wait to time the implementation with the repaving.

(4) PROJECT TEAM + ROLES

- AC Transit
- City of Berkeley
  - Transportation Division (within Dept. of Public Works)
  - Traffic Engineering
  - Consultant + contractors
- Bike East Bay + Telegraph BID

The city's Transportation Division managed the design process, and reviewed and commented on the detailed striping plans produced by the consultant. The city was responsible for overseeing the implementation, and put out a call to bid for the repaving and striping/pavement markings.

(5) PROJECT ELEMENTS + DESIGN PROCESS

- 24-hour dedicated bus lane
- 2-way protected bike lane
- Signage

The design process was originally supposed to be four months, but took six because of complex curbside uses on the north side of the street (loading/unloading zones and motorcycle parking).

For example, during the design process, the team realized they'd have to move motorcycle parking that was currently occupying the curbside lane. To reconcile this, they moved it to a pocket of available asphalt that was in between the curb and where the red paint started just east of Dana St. For the loading/unloading zone, they consolidated a few loading zones on the south side of the street, hoping to make up for the removal of the zones that were in the bus lane. However, the team is still grappling with this, as some people now have to cross the street to deliver/pick up from and to the north side of the street.

(6) MATERIALS + IMPLEMENTATION

- Epoxy-modified acrylic asphalt paint
- Thermoplastic pavement markings + striping

The city didn't want the red paint to be too permanent, so it used an epoxy-modified acrylic asphalt paint. The city hopes this material will last it 3-4 years, until it makes the lane more permanent with MMA (Methyl Methacrylate).

The striping and pavement markings were executed by the contractor who did the curbside lane repaving, acquired through a bid process.

The signage plan was produced by the city, and was added to the repaving contract as a change order.

(7) PUBLIC ENGAGEMENT

Bike East Bay assisted AC Transit in data collection, and was involved in the public outreach from the beginning. The organization also reviewed the designs of the bike and bus lane with AC Transit along the way. The Telegraph BID also worked with Bike East Bay to shape the outreach plans for the Bancroft West project.

(8) PUBLIC FEEDBACK + OUTCOMES

Both AC Transit and the city say that there has been mostly positive feedback thus far, and they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attribute this to the "pilot" messaging component.

The city says **it has observed good compliance with the transit**, most likely because of the long blocks (motorists aren't preparing to make right turns as frequently). There has been difficulty with the color, operators and motorists are claiming the terracotta is not visible enough at night. Trucks and rideshare vehicles are still pulling over into the bus lane occasionally to load and unload, so the city has asked parking enforcement to ramp up the monitoring of the bus lane.

The city and Bike East Bay are confident that it's working so far. However, data on speed and reliability metrics is still to be compiled.

(9) QUICK-BUILD LESSONS + ADVANTAGES

The AC Transit interviewee said that she thinks it's been successful enough to "set the tone" for future transit improvements. Additionally, both the bus and bike lane on Bancroft Way have been a powerful combination that have led the way and informed the rest of the Southside Pilot Projects, and similar improvements across the city.

(10) CHALLENGES

The Bike East Bay interviewee expressed that because the project was implemented essentially as a repaving project, it was permitted only for striping and signage. If signal adjustments had also been a part of the pilot, improvements to the transit service may have been more impactful. The loading/unloading zone access is something the team is still looking at.

(11) FUNDING

AC Transit and the city partnered on a federal grant for $6 million for the permanent versions of the pilot projects. For Bancroft West, the **city tapped into its Measure M program**, a measure adopted in 2012 that authorized the city to invest $30 million in street repaving/rehabilitation and green infrastructure. This pot of money paid for the repaving of the curbside lane. The city used funds from a settlement with the University of California, Berkeley to supplement the funding for the project. In total, it cost $1.2 million, with most of that accounting for the repaving. The design and striping plans cost $53,000, and the implementation of both the bike and bus lane was approximately $262,000.

(12) WHAT'S NEXT?

The conceptual design for the permanent iteration of the transit lane is commencing in 2019. The city said it would like the permanent lane to be at least a half foot wider, and would also like to better address some of the curb usage conflicts in the engineering design. It would also like to extend the bus lane to College Street, which would lengthen it about one block.

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BROADWAY BUS LANE

PROJECT TEAM: City of Everett Dept. of Planning & Development, Massachusetts Bay Transportation Authority (MBTA)

PROJECT LOCATION: Broadway between Glendale Square + Sweetser Circle, Everett, MA

PROJECT INSTALLATION: December 2016

PROJECT DURATION: Planned one week, remained until made permanent (9 months)

MATERIALS: Cones

DID IT WORK? It worked so well, it's already permanent!

ITERATION

An AM peak-hour, shared bus-bike lane that started out just with cones, and has since been made permanent with the addition of bus boarding platforms and Transit Signal Priority.

(1) PROJECT IMPETUS

At the request of the Mayor of the City of Everett, the Massachusetts Department of Transportation (MassDOT) produced the Everett Transit Action Plan, published in November 2016. This report put forward how people are moving about Everett, and how travel patterns might change in the future. At the end of the process, **the most obvious strategy for improving bus service in Everett, and better connecting Everett to Boston, were peak-hour bus lanes**. At the time the report was published, MBTA was also pushing for more efficiency in the bus network, and for cities to try out BRT elements as a tool for improving service. In the Fall of 2016, shortly after the report was published, the Transportation Planner and project manager for the City of Everett (interviewee) was looking at how the city could implement a southbound, peak-hour bus lane on Broadway, and wanted to know if it could reduce travel times enough to add an extra trip and increase frequency. Because MBTA recycles the schedules every six months, the agency would have to receive the results of any test by the end of 2016 in order to factor it into the Spring 2017 schedule. This meant that the city needed to act fast, and it chose to implement a week-long test on Broadway between Glendale Square and Sweetser Circle.

(2) WHY THE QUICK-BUILD METHODOLOGY

Mostly because of the time constraint. The city was considering this in October 2016, and MBTA needed data by December. **There was little to no time for a more robust test**. It was also important to show delivery following the Transit Action Plan, that the city really did want to "get out there and do stuff".

(3) PROJECT TIMELINE: 1.5 months

(4) PROJECT TEAM + ROLES

- City of Everett
  - Department of Planning and Development
  - Department of Public Works
- MBTA

The Planning and Development Department still had to collaborate with other departments, but it was easier because they had a direct mandate from the Mayor to get it done. All of the departments were aware of the mandate and were on the same page about quick implementation. Public Works staff worked overtime to install the cones in the curbside parking lane each day from 4am-9am, and 1-2 parking enforcement officers patrolled the 1-mile test every day. The city didn't need to get the sign-off from MBTA, because the city governs the roads, but MBTA was cooperative and enthusiastic from the beginning, and helped

the city come up with an effective test. MBTA told the city that the buses needed a minimum of 11 feet, and to make sure that the corridor they selected for the test would allow for a lane that size.

(5) PROJECT ELEMENTS + DESIGN PROCESS

- AM peak-hour shared bus-bike lane
- Signage
- Modular bus boarding platforms (2017 iteration)
- TSP (2017 iteration)

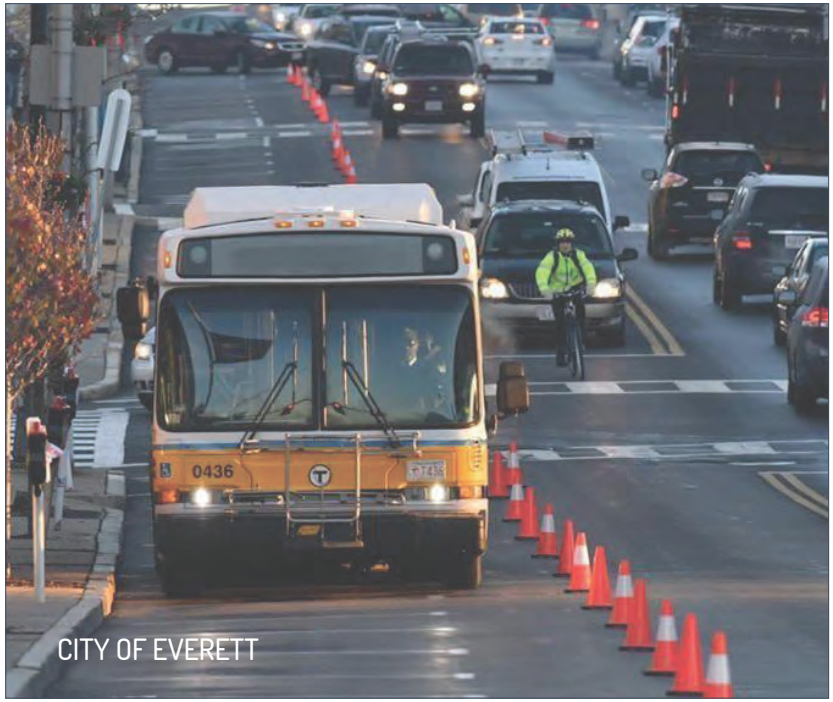
A formal design process for the test was not needed, as the project's primary component was the installation of cones. However, much was learned from the test that informed the permanent lane's design, specifically about the inclusion of a bike lane. At the time of the test, the corridor wasn't heavily used by bikes. The interviewee said that in years past, both the MBTA and the bicycling community hadn't been very supportive of combining buses and bikes in the same lane. However, bicyclists almost immediately started using the lane during the four-week pilot, so the city added signage that welcomes bikes to use it both in off-peak hours and during the pilot's operational hours. The project team also learned that 12' is really the optimal width for a bus lane (which is what had been tested), to give wiggle room to operators, and because the travel lanes on this part of the corridor were 10'.

Feedback from bicyclists was very positive, so the city incorporated this into the permanent design. The interviewee said that this type of design wasn't really "spelled out" in the Manual of Uniform Traffic Control Devices (MUTCD), the guidelines for roadway markings adhered to by most cities, but that it reflected reality. As with the entire project process, the interviewee had the support of the Mayor to employ a more innovative design at the time, one that reflected what was happening on the ground. The interviewee produced the design of the permanent lane entirely in-house, also using Boston's Complete Streets Guidelines. He said that he didn't want to put the project out to a consultant because he felt he had the backing to design the lane how he wanted.

(6) MATERIALS + IMPLEMENTATION

- Cones
- Recycled plastic boarding platform (2017 iteration)

Cones were the most immediately implementable, and the least logistically complex at the time. The city only set out to execute a week-long test, but ended up continuing the test through to when the paint went down in December 2017. The city hadn't budgeted for any striping at the time (cost was estimated at $130,000), so a full Public Works crew and a couple parking enforcement officers were used to install and deinstall the cones each morning (they had spray painted "X" where each cone went), and enforce proper usage of the lane. Public Works has a certain amount of resources allocated for overtime needs, which were tapped into



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for the bus lane staffing. For the enforcement, they tried to use parking enforcement staff that were already on duty, and could patrol the pilot segment for the few hours each morning. The Transportation Planner said that this was still worth it to them, and eventually they were able to dial back the enforcement personnel on site.

To help with enforcement, the interviewee said that the project team actually tried to make the pilot lane look as much like a construction zone as possible, to deter motorists from entering. The "No Parking" signs at the meters said "construction" on them, and the flashing sandwich boards contributed to the construction feel. He said that within a week of running the pilot, they realized they didn't need so many enforcement officers, and were able to dial it back to 1-2.

The project team continued to iterate on the initial bus lane. In June 2017, a few months before the permanent striping went down, the city installed two boarding platforms and Transit Signal Priority along the bus lane's corridor using the Barr Foundation's BostonBRT program funding. The platforms were installed with the city's internal crews.

(7) PUBLIC ENGAGEMENT

The Transportation Planner believes that the most important public outreach was the execution of the test itself. The city notified the businesses only 3-4 days before implementation, mostly because it anticipated that most of the responses would be negative if it offered more opportunities for public input and wanted business owners, transit riders, and other street users to be able to react to the test. A few businesses weren't in favor of the project, but most initial responses were positive. The Transportation Planner thinks that the fact that they were able to produce results so quickly helped instill the public's confidence in the city's ability to be responsive and nimble. He did cite the Mayor's mandate and buy-in from local officials as a critical success factor unique to the city. Not all communities would have been able to act as fast.

(8) PUBLIC FEEDBACK + OUTCOMES

The city almost immediately observed (qualitatively) that the pilot lane was making bus travel easier. The MBTA collected data on travel times, and the results were enough to justify the continuation of the test. During the first week of the test, **travel times reduced by 20-30%, approximately a 6-minute savings**. Trips were also more consistent.

The city collected feedback on the bus platforms in November 2018, and asked riders about their perceptions of the permanent lane. The results of public feedback collected for the platforms revealed 45% of survey respondents found it "much easier" to board the bus. Including those that said it was "somewhat easier" and that they were "satisfied" with the platforms, **over 80% of the respondents were in favor of the platforms**, with only 2% negative comments. 81% said that they wanted Everett to expand the number of platforms and place them at more bus stops. The majority of respondents claimed that boarding times haven't really changed since the platforms, and **49% of respondents remain "extremely satisfied" with the now permanent bus lane**.

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Data on boarding times for the platforms was not statistically significant. However, at a time when bus ridership has recently decreased in Boston about 1-2%, **ridership in Everett is up 5%**. The interviewee thinks there is no doubt that this is attributed to the improvements made to Broadway. Specifically, thanks to the Barr Foundation's marketing help, the platforms really created a buzz, and reinvigorated support for riding buses. The interviewee said that making the bus stops look nice really helps "market the service".

(9) QUICK-BUILD LESSONS + ADVANTAGES

The Transportation Planner thinks the test accomplished other goals in addition to making bus travel more efficient on the corridor: making the bus a more viable option, and making it more prominent in the street. He cited political support as a critical success factor of the project. The Mayor was prepared to "take the heat" if people didn't respond well to the test. The city "bypassed a lot of the process" because the "pilot is the process". The city's leadership empowered the Transportation Planner to manage the project, and directed other city staff to support as necessary. Furthermore, the city didn't have expectations for test projects like neighboring municipalities did (like Cambridge, for example), making both the administrative and the public more receptive to the process.

(10) CHALLENGES

In regards to the boarding platforms, the Transportation Planner cited a few elements of their function that they're still trying to address. For example, the boarding platforms are fixed at a certain height, whereas the heights of the buses slightly fluctuate. This sometimes leaves a gap between the modular platform and the bus door. The city put asphalt down in both locations to try to make this more seamless. He also said that it's been difficult to accommodate riders in wheelchairs because the bus ramp still needs to deploy to the street level. The city will keep the platforms on the street for as long as possible, and as of December 2018 has collected robust feedback mostly indicating public satisfaction with the temporary infrastructure.

(11) FUNDING

Both the **test lane and permanent lane were funded with city resources**. The **boarding platforms were procured and installed with the BostonBRT program awarded funds**, and the city paid for the remainder of the cost of the TSP (less than $5,000) with supplemental funding from the state's Complete Streets Program. The city had applied for funding the previous year for signal adjustments that would provide the base for the TSP, which cost a couple hundred thousand dollars in total. The total cost of the platforms was $100,000, $35,000 and $65,000 each. Given that there was a steep learning curve involved in the installation of the platforms, the interviewee estimates about $10,000 to $20,000 in labor costs. However, this wasn't quantified or factored into the budget at the time.

(12) WHAT'S NEXT?

The test was so successful that the city continued it with cones until August 2017, and installed the permanent lane in September-October 2017. The permanent lane was designed, financed, and installed entirely by the city. To build on the bus lane test, and further advance the city's Transit Action Plan, the city applied to the Barr Foundation's BostonBRT pilot project program in May 2017 for platform-level boarding at two locations, and TSP (Transit Signal Priority) at three intersections along the Broadway corridor (something the project team realized was feasible shortly after executing the lane test). The recycled plastic modular boarding islands were installed in late June 2017. As of December 2018, the platforms were still installed. The results of public feedback collected for the platforms revealed 45% of survey respondents found it "much easier" to board the bus. 81% said that they wanted Everett to expand the number of platforms and place them at more bus stops. The majority of respondents claimed that boarding times haven't really changed since the platforms, and 49% of respondents remain "extremely satisfied" with the now permanent bus lane.

CTA PRE-PAID BUS BOARDING

PROJECT TEAM: Chicago Transit Authority (CTA)

PROJECT LOCATION: Four locations in Chicago, IL

- Blue Line Belmont station (June '16-ongoing)
- Loop Link Madison Street/Dearborn Street station (Sep. - Dec. '16)
- Bus stop at Lake Shore Drive/Belmont Avenue (June - Oct. '17)
- 69th Red Line station (June - Oct. '17)

PROJECT INSTALLATION: First pilot installed June 2016

PROJECT DURATION: Ranged from 3-6 months, one is ongoing

MATERIALS: Variety of barricades, signage, mobile fare validators

DID IT WORK? One was so successful, it's ongoing!

Four pre-paid bus boarding pilots using mobile fare validators, movable barriers and signage, and reallocated staff hours.

(1) PROJECT IMPETUS

The first pilot, at the bus stop at the Belmont Blue Line station, began as a kind of "one-off" improvement to some observed bus boarding delays at that location. Early conversations within CTA's planning department focused on making improvements to speed up service at this bus stop, and **CTA decided to test something that would speed up boarding at this location.** If the configuration tested at this location worked, they'd introduce other test locations. Following the pilot, space and accommodations for prepaid boarding were incorporated into the design for the new station (which is currently under construction).

(2) WHY THE QUICK-BUILD METHODOLOGY

Piloting a strategy at the Blue Line station allowed the CTA to assess whether it made sense to explore strategies to address delays at other bus stations/stops for corridors with heavy ridership.

(3) PROJECT TIMELINE: 8 months

Between the decision to implement the first pilot and its implementation.

(4) PROJECT TEAM + ROLES

- Chicago Transit Authority
  - Planning Department
  - Operations Department
  - Facilities Department
  - Communications Department
  - Fare & Revenue Systems Department

CTA formed an internal team comprised of members of the Planning, Operations, Facilities, Communications, and Fare & Revenue Systems departments, with an assigned project manager from the Planning Department. This team conducted regular meetings, and made multiple site visits to assess the unique conditions of each pilot. CTA's Fare & Revenue Systems department made sure that there were accessible facilities at the stations for people to load their Ventra fare cards, as cash was not accepted to enter the pre-paid area.

(5) PROJECT ELEMENTS + DESIGN PROCESS

- Pre-paid boarding pilots (4)

Each location's conditions were different, necessitating a site-specific approach to how the pre-paid boarding would be executed. At the first piloted location (Belmont Blue Line), there was already an organic queueing process. CTA installed fencing to discourage fare evasion and

establish a "paid" area, and a Bus Service Management (BSM) supervisor scanned Ventra Cards with a mobile validator. A Ventra vending machine was installed adjacent to the bus stop for any cash-paying customers to load value on a fare card, since the rail station's Ventra machine was in an inaccessible location. CTA also provided free Ventra fare cards at the pilot locations, which could be loaded with cash (Ventra cards are usually $5 each). This pilot was executed during weekday peak hours only, from 3pm-7pm, westbound only.

At the Madison/Dearborn Loop Link station, mobile fare validators were situated on the existing boarding platform. Cash paying customers were able to load their cards in the Walgreen's adjacent to the stop. The pilot was staffed by one BSM supervisor and two Transitional Return to Work (TRTW) employees, and also executed only during weekday peak hours from 3pm to 6:30pm.

At the Lake Shore Drive/Belmont Avenue bus stop, existing characteristics created an area where customers who paid could wait (a grassy pocket lined with benches). Cash paying customers could fill their cards at a convenience store nearby, and this pilot was also staffed by one BSM supervisor and two TRTW employees from 6:30am to 9:30am on weekdays.

At the 69th Red Line Station, one BSM supervisor and one TRTW employee staffed the pilot weekdays from 3pm to 6pm. Customers could add cash to their cards in the rail station. The preboarding validation was executed on a sidewalk which was adjacent to a CTA bus-only lane. At this location, the bus lane is actually a bridge over the highway. Pedestrians cross on it, but it's not open to general purpose traffic, which helped to create a more easily managed space.

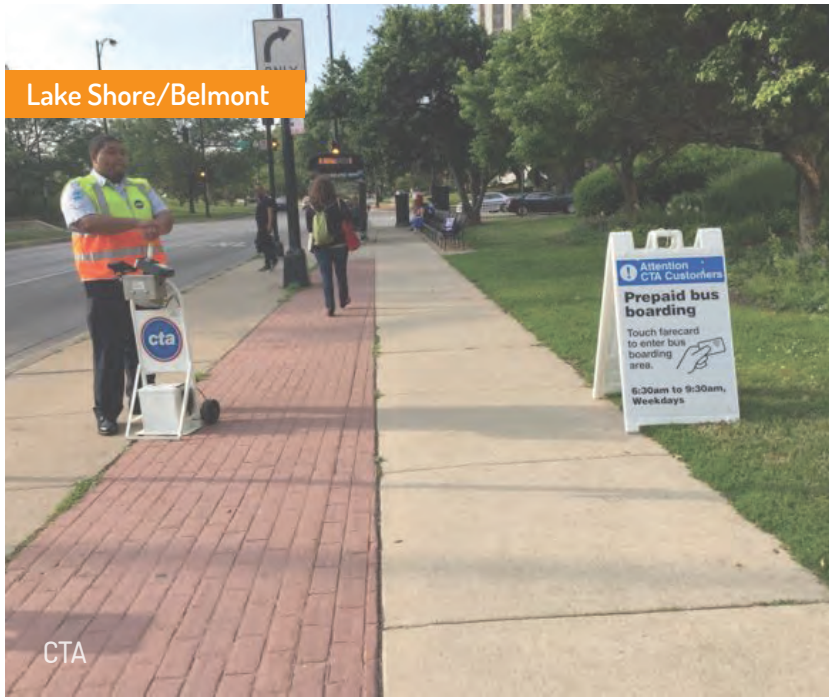
(6) MATERIALS + IMPLEMENTATION

- Mobile fare validators
- Sandwich boards
- Mobile barriers

The Facilities Department deployed equipment like semi-permanent barricades and swing gates. CTA's Revenue Equipment group provided the mobile validators, and the Communications/Signage group provided sandwich boards, depending on each location's set-up. Staff were also key to the execution of the pilots, but no new positions were created for them (staff hours were moved around, not created). The interviewees commented that since there was no facilities "manual" for the set-up of prepaid bus boarding, the execution from the facilities side was somewhat trial-and-error. In general, none of the locations required robust equipment installation, although the Belmont Blue Line required the installation of electrical and communication lines, in addition to the barricades and swing gates.

(7) PUBLIC ENGAGEMENT

The project team handed out flyers and posted signage prior to the pilots, but did not deploy a robust public engagement effort in advance.



(8) PUBLIC FEEDBACK + OUTCOMES

The project team surveyed riders at each location, and asked questions regarding riders' satisfaction with the process, and whether they thought it sped up boarding. The team used slightly different techniques to collect public feedback, in order to increase participation. Email surveys were conducted, flyers with links to surveys were handed out, and in-person surveying was conducted as necessary. The team learned that there was a learning curve at most locations. The pilot at the Lake Shore Drive/Belmont Avenue station was the best received, with people asking when/if it was going to come back.

At the Loop Link and Red Line station locations, **90% of respondents said they were satisfied with the prepaid process**. At the Blue Line location, 79% of respondents were satisfied, and 77% agreed that it sped up boarding (this was the location with the organic queuing, and the new process created some disruption).

To collect other data, the project team performed field observations. They used stopwatches to keep track of boarding times, and had a specific protocol to keep track of how long the buses remained in the terminals. The **data showed an average of 54% reduction in boarding times across the four pilots**, although actual time saved varied significantly. The largest time savings were observed at the Belmont Blue Line station for both customer and bus boarding times (54% and 56% reductions, respectively). The actual bus boarding time saved ranged from an average of 37.8 and 32 seconds on Belmont Blue Line and Lake Shore Drive/Belmont, respectively, to 23.3 seconds at 69th Red Line and 15.9 seconds at Loop Link.

Supervision feedback and field checks also revealed improved payment compliance, which was two-fold. First, after the pilots got started, customers acclimated to the new system, and because the majority knew that cash was not accepted to enter the prepaid area, fewer people tried to pay with cash. Second, there was a greater understanding that you had to tap your Ventra card before entering the pre-paid area, so fewer people were wandering in accidentally without paying.

(9) QUICK-BUILD LESSONS + ADVANTAGES

In general, the process was very productive for the team because they learned that boarding time savings were possible in general. The pilots made the largest dent where boarding was particularly heavy. The team already knew they would ultimately have to find a way to automate the fare checking, because staffing every bus stop isn't sustainable, and although time savings were observed. These pilots would have to be implemented at multiple consecutive locations along a corridor to be able to discern if they could contribute to meaningful overall travel time reductions.

(10) CHALLENGES

Incorporating cash payments was a challenge. The team introduced special free Ventra fare cards to accommodate one-time cash-paying customers, added a street-level Ventra Vending machine at the (non-ADA accessible) Blue Line location, and identified stores where customers could load value to their cards. Finding and maintaining gates for the prepaid area at the Blue Line location was also a challenge. It was difficult to find gates that were designed for Chicago weather and maintaining the gates they used took a decent amount of work. A longer term challenge will be identifying a scalable rollout strategy that does not result in significant fare evasion and reduced revenue.

(11) FUNDING

All of the **funding came out of the CTA's existing budget**, including existing staff time. The set-up cost estimate for the Blue Line station was $77,000, which includes the labor and material for setup (fencing, gates, trash receptacles, power for Ventra, signage), and the Ventra Vending machine, but the team did not calculate the actual costs associated with these materials. The other installations were less expensive because the existing environment was used to designate a prepaid area. Labor was the most expensive resource of the pilots, with the CTA predicting it would cost from $82,000 (69th Red Line and Belmont Blue Line) to $222,000 (Madison/Dearborn and Lake Shore/Belmont) in labor annually if the pilots were continued.

(12) WHAT'S NEXT?

The project team doesn't have plans to scale up the implementation of these pilots right now. Because of the significant time savings it produced, the Blue Line Belmont pilot will resume following the completion of the construction at the station. This pilot will only be operated by one TRTW employee, rather than by a BSM supervisor to reduce cost.

The other pilots were discontinued because of extensive staff needs and cost for less significant time savings. This was especially true of the Loop Link pilot, which had the highest staffing and lowest time savings. The lack of shelter/weather protection at Lake Shore Drive/Belmont Avenue and the 69th Red Line station also contributed to their discontinuation.

Long term, CTA is considering piloting a proof-of-payment system at heavy boarding locations along an entire corridor, when customers pay before boarding at payment "posts" (replacing staffed fare payment areas), and a fare enforcement team verifies payment on-board. They've estimated that pre-paid boarding could save up to 580 hours per weekday if it were implemented system-wide.

DENVER MOVES BROADWAY

PROJECT TEAM: City and County of Denver Public Works Department, Regional Transportation District (RTD)

PROJECT LOCATION: Broadway/Lincoln corridors, Denver, CO

PROJECT INSTALLATION: August 2017

PROJECT DURATION: A few elements were permanent from the outset

MATERIALS: MMA, Epoxy traffic paint, thermoplastic markings

DID IT WORK? The project resulted in speed and reliability transit improvements, increased ridership, and reduction in non-transit vehicle transit lane violations!

A multi-part pilot project including the transition of portions of existing bus lanes from peak-hour to 24-hour, the extension of an existing bus lane, the addition of red paint to an existing bus lane, stop consolidation, service changes, and modified signage.

(1) PROJECT IMPETUS

In May 2016, the City of Denver, along with Indianapolis and Oakland, was selected as a focus city for NACTO and TransitCenter's Transit Program Accelerator, an initiative focused on the implementation of NACTO's recent Transit Street Design Guide through the quick implementation of transit improvements to improve transit reliability and increase ridership. Denver **identified the Broadway and Lincoln corridors (one-way couplet) as ready for the quick implementation of transit improvements through the guidance of this NACTO program**. Denver received in-kind guidance from NACTO and peer city practitioners in the form of corridor analyses and a charrette with the city and the Regional Transportation District (the region's transit agency) staff. Following the corridor evaluation, charrette, and field visits, a number of quick-win/low-cost transit improvements were identified for near-term implementation along these corridors.

During the same time, the city was identifying transit capital investment corridors that would benefit from various levels of improvements as a part of the planning process for the development of Denver's first transit plan (Denver Moves: Transit, released January 2019). They recognized that the Broadway/Lincoln corridor, one that was highlighted during the planning process, would be a **good place to address the "low-hanging fruit" of transit improvements**, and test design solutions they learned from NACTO.

Prior to the installation of transit improvements, the transit services along the Broadway and Lincoln corridors experienced reliability impacts throughout the day due to increased vehicular volumes, mixing of traffic for driveway and adjacent street access within the existing peak-period transit lane, and non-transit vehicles violating the transit lane.

(2) WHY THE QUICK-BUILD METHODOLOGY

Following the completion of the city's first transit plan, and as the city begins to develop their transit program to deliver the planning and design of transit improvement projects, it has **identified quick-implementation/low-cost speed and reliability transit improvements as a great approach to provide interim improvements** for transit operations and passenger experience until major capital funding is identified for major capital transit improvements along key corridors in Denver. Broadway/Lincoln, for example, are envisioned to become high-capacity transit corridors (e.g., BRT). Until funding is identified for the major capital improvements, the various speed and reliability cost-efficient transit improvements, in coordination with other multimodal improvements along these corridors, provide some transit operational benefits in the interim.

A few aspects of the overall project were to be permanent from the outset, like transitioning

portions of the existing peak-hour transit lanes on Broadway (between 17th and Exposition Avenues) and Lincoln St. (between 6th and 14th Avenues) to 24-hour, and extending Broadway's lane an extra two blocks north of Colfax Avenue to 17th Avenue). The city applied to FHWA to test red pavement markings in the transit lane to be evaluated for at least a year.

(3) PROJECT TIMELINE: 8 months (approx.)

Identification of the Broadway and Lincoln corridor transit improvements began in early 2016 during the NACTO Transit Program Accelerator roadshow. Design of the improvements began in early 2017, and they were implemented in Fall 2017.

(4) PROJECT TEAM + ROLES

- Denver Department of Public Works
- Regional Transportation District

The Senior City Planner for Denver's Department of Public Works who managed this project (interviewee) communicated regularly with RTD personnel . City and RTD staff attended public meetings about the project, and RTD led the outreach about the stop consolidation and resulting schedule changes (five stops eliminated on Broadway, and four on Lincoln to consolidate all stops for the 0/0L route to every 1/4-mile). The red paint and new pavement markings, and the new signage, were designed and implemented in-house, entirely by the city. RTD contributed data collection and evaluation on the transit metrics. The interviewee said that this was one of the first projects where the city was leading implementation of transit improvements. It had the ability to execute the project because the city has jurisdiction over the streets themselves.

(5) PROJECT ELEMENTS + DESIGN PROCESS

- Conversion of portions of existing peak-hour transit lanes to 24-hours
- Red pavement application + new markings
- Signage
- Existing transit lane extension (Broadway)
- Bus stop consolidation
- Bus service changes

The city designed the pavement markings in-house, and incorporated a variety of different red dashed and solid pavement markings in the transit lane at intersections based upon the control (signalized/unsignalized) and presence of a right turn pocket. The city applied for and received permission from FHWA to design, install and evaluate (over one year) the effectiveness of the use of variations of red pavement treatments to reduce non-transit vehicle violations and vehicular conflicts in the transit lanes. These treatments were only applied to Broadway, as Lincoln had an upcoming resurfacing and the project team wanted to make sure the paint wouldn't have to be redone.

NACTO

NACTO

The city modified existing signage for the new 24-hour lane conversions by covering up the part of the signs that said "3pm-6pm", and modified existing overhead, flashing signals indicating the bus lane was operational where necessary.

(6) MATERIALS + IMPLEMENTATION

- Methyl methacrylate (MMA)
- Epoxy traffic paint
- Thermoplastic pavement markings/striping

The city used three different pavement coating materials for the red pavement markings application: MMA, epoxy traffic paint, and thermoplastic. They will monitor the durability of each material type. The red paint was the focus of evaluation not only for the FHWA requirements, but also to inform how the city will apply various transit improvements along this and other corridors in the city. The 24-hour lane conversion was permanent, but the city still made sure to observe its performance.

The installation of all the pavement markings took about a week. The RTD bus stop consolidation and activation of the 24-hour lane happened simultaneously.

No additional enforcement was established for the project, as the team wanted to evaluate the effectiveness of the red paint application and new signage to reduce non-transit vehicle violations and vehicular conflicts in the transit lanes.

(7) PUBLIC ENGAGEMENT

The city had previously done a lot of outreach on the corridor about the earlier installation of a bikeway along Broadway, and was able to build on similar messaging used prior for that project. The city disseminated flyers about the red paint before it went down, RTD held meetings for the bus stop consolidation, and a project website provided updates.

(8) PUBLIC FEEDBACK + OUTCOMES

A few comments received indicated the perception that the project had "taken away a lane". The public also expressed that they couldn't see some of the red pavement markings at night. There was also an adjustment period in the beginning with the consolidated bus stops, and in regards to compliance with the new 24-hour transit lane. The interviewee said the community sometimes had difficulty understanding how these improvements move more people than vehicles by repurposing a lane for transit-only use (except for right-turning movements).

Shortly after the implementation of the transit improvements, the Better Broadway Coalition sponsored a community engagement event to "roll out the red carpet" in Fall 2017. They also asked transit riders what would make bus stops better on Broadway and Lincoln. The top responses were: shelters, real-time arrival information, benches/seating, and better lighting.

The mid-point results of the transit improvements evaluation (June 2018) showed a **2.8% increase in ridership on the 0/0L routes**, two major routes serving the Broadway/Lincoln corridors. The mid-point summary also revealed an **average transit travel time savings of 2.2 minutes round-trip** for all transit routes on Broadway/ Lincoln. The evaluation of the red paint resulted in a reduction of non-transit vehicle violations and improved transit operations, providing an overall benefit. In concluding the experiment, the city is retaining the red pavement treatments along Broadway.

(9) QUICK-BUILD LESSONS + ADVANTAGES

By testing the red paint on a portion of the corridor, the project team was able to assess whether it should be applied to the rest of the corridor and others in Denver, and modify the design and pavement markings if need be. The interviewee also thinks the process has been good for clarifying the city's role in transit, and how they can coordinate with RTD in implementing transit improvements. The project also brought to light issues regarding bus stop amenities, specifically the presence/lack of bus shelters and their associated locations and maintenance.

(10) CHALLENGES

The interviewee thinks the project, with support from NACTO, was helpful in encouraging the department's engineers to buy into a bit more innovation in transit improvements (the red paint, specifically). It was challenging to communicate the "what is being evaluated and what is permanent" message to the public and media. The city is working with RTD in establishing an implementation process to help deliver these types of projects more effectively.

(11) FUNDING

The project was **funded entirely by the city**. The pavement markings cost about $106,000, and the sign fabrication and installation cost about $10,000.

(12) WHAT'S NEXT?

The city, in coordination with RTD, is continuing to look at corridors that are "ready" for low-cost improvements. There is identified funding for the Broadway/Lincoln long-term corridor multimodal design (intersection improvements, extension of the bikeway, and transit speed and reliability improvements), but less money available for small transit projects across the city. The city has recently developed a streamlined process with RTD for the implementation of similar projects on other corridors, especially now that the transit plan is complete and the city's transit capital investment corridors are identified.

GO AVE 26

PROJECT TEAM: LA Más

PROJECT LOCATION: Avenue 26 between Figueroa Street and the Lincoln/Cypress Metro Gold Line station, Los Angeles, CA

PROJECT INSTALLATION: August 2017

PROJECT DURATION: The sidewalk graphics and murals remain, whereas the park furnishings, signage, and pole wraps were removed after three months.

MATERIALS: Epoxy paint, vinyl decals, wood, steel, acrylic paint

DID IT WORK? The project resulted in a city council motion for an Adopt-a-Sidewalk pilot program!

A multi-part project including wayfinding signage, sidewalk art and wayfinding, public art, and public space enhancements.

(1) PROJECT IMPETUS

In the Fall of 2016, the nonprofit organization received a grant from New York City-based foundation TransitCenter for just under $150,000 to address first-last mile transit connections on a .25-mile segment of Avenue 26, a corridor in Northeast Los Angeles with a Metro Gold Line station and several bus lines. Because this stretch of Avenue 26 hosts quite a few transit connections, it sees a fair amount of pedestrian traffic. The **organization identified this stretch both to implement solutions to transit access for these pedestrians, and also because it was practically in their backyard**. They saw it as a great opportunity to do some hyper-local engagement and project work.

(2) WHY THE QUICK-BUILD METHODOLOGY

The project set out with three primary goals: to create a scalable pilot project that would expand the toolkit of first-last mile strategies, build partnerships between different local government and community entities, and test out "low-cost and easy-to-implement infrastructure" that would improve pedestrian safety and wayfinding in accessing transit along the quarter-mile stretch. They chose the Quick-Build process to accomplish these goals for a number of reasons. They **were working within a confined timeline and budget, for starters, and were also planning installations that the city wasn't familiar with**. The city wasn't going to contribute any funding, and preferred to not do anything permanent without testing out the interventions first. The permitting process, although arduous, was also only for temporary infrastructure. The organization is familiar with the "pilot-style" project, and has used the methodology on a number of occasions to push for something permanent.

(3) PROJECT TIMELINE: 8 months

The first three months were focused on building partnerships with the transportation agencies and local neighborhood groups, and executing robust community research, the findings of which were published in the project's Community Findings Report. The final five months included more public outreach, and the design and materials procurement processes for the interventions. The interventions were evaluated, and public feedback collected, until December 2017.

(4) PROJECT TEAM + ROLES

- **LA Más (w/ local artists, fabricators, and local government permitting bodies)**

LA Más interfaced with multiple local government agencies, at different levels, throughout the process: LA Metro (county), the city's Bureau of Engineering and Department of Recreation and Parks (city), and Caltrans (state). All of these parties were enthusiastic about the project. The Bureau helped the nonprofit test the sidewalk materials, and LA Metro promoted the project

on its blog. The organization has worked with Caltrans before, and was able to bypass some permitting steps with the support of the agency's leadership, although the complexity of the permitting process as a whole was cited as the biggest challenge of the project.

(5) PROJECT ELEMENTS + DESIGN PROCESS

- Wayfinding signage
- Pole wraps
- Sidewalk art + wayfinding
- Murals
- Fence art
- Public space furnishings

LA Más led all of the design and construction administration. They chose the black and white color palette because it mimicked colors found on the street, reflected light well, and wasn't something that would the community would respond strongly too (as opposed to bright colors). The simple shapes were flexible, and could be applied across different mediums easily. The organization based the choice of the interventions largely on feedback they received from their outreach. The murals were meant to brighten up the underpasses, and make walking on the corridor more pleasant. The public space furnishings reflected the most popular idea heard from the community: a place with shade to rest and hang out. The signage, sidewalk art and wayfinding, and pole wraps all helped alert motor vehicles of a pedestrian presence, and help pedestrians navigate their way to the transit along the corridor.

(6) MATERIALS + IMPLEMENTATION

- Epoxy paint
- Vinyl decals
- Wood + steel
- Acrylic paint

LA Más tested a variety of materials for the interventions, mandated by the city's permitting process, especially the sidewalk art. There wasn't a set duration for the interventions at the outset, but the team knew they wanted the interventions to be durable, yet removable. The implementation of the various project elements occurred over a few days, with volunteers helping the organization considerably where other partners had not been brought on for installation, mostly for the sidewalk art and wayfinding, pole wraps, and some fence art. The organization did most of the installation themselves, outsourcing the fabrication and installation of the park furnishings, wayfinding signage, and murals.

For the sidewalk wayfinding and art, they used a mix of both epoxy paint and vinyl stickers, materials the organization has used before. The park furnishings were outsourced to a fabrication lab, and were comprised of treated wood. The pole wraps were also vinyl decals,


Park furnishings

KEVIN POEI, COURTESY OF LA MÁS


Public engagement

JON ENDOW, COURTESY OF LA MÁS

and the wayfinding signage was a combination of wood and steel. The murals were painted with acrylic paint. The sidewalk graphics still remain, although have faded, and the murals still remain. The park furnishings have been removed.

(7) PUBLIC ENGAGEMENT

The organization executed a robust community outreach process to understand local needs and preferences, in addition to their initial analysis of the challenges with the corridor. They received over 100 responses from intercept surveys done over multiple days, 219 responses to the online survey, encouraged people to follow the project on social media and join their email list, and hosted a community walk to analyze existing conditions in-person.

(8) PUBLIC FEEDBACK + OUTCOMES

LA Más wasn't required by any of its partner agencies to do evaluation, but they still collected public feedback during and after the installation. The organization engaged the public with a block party, bike ride, and walk upon the project's completion.

The project was very well received by the community, documented both anecdotally and through the team's feedback collection. From the feedback collected during the block party, the majority of attendees responded that the most salient impact of the interventions was increased pedestrian safety. The organization continued to collect feedback through 60+ intercept, and online, surveys following the installation. The 24-question survey asked respondents about their experience following the installations, and revealed that **23% of respondents used the Metro and other transit along the corridor more since the project installation**. Almost half said that the area was more enjoyable to be in with the installations in place, and **19% reported walking more frequently**. Other than this data, the project team didn't collect data on other metrics like ridership, etc. at the bus stops or Metro station. Demonstrating the public's response to the project helped LA Más create a cohesive final report, and advocate for a second phase that would involve easing the permitting process for similar projects in the future.

(9) QUICK-BUILD LESSONS + ADVANTAGES

One of the biggest goals of the project was to build partnerships with different local government entities, and the organization's Community and Policy Lead (interviewee) said they think the project really helped them advance these relationships. They were able to show the agencies a new approach for first/last mile initiatives, something they think the city will continue to run with. Additionally, they used the project to encourage the local government agencies to make other improvements to the right-of-way.

(10) CHALLENGES

LA Más spent about $10,000 on the permitting process and fees. The interventions had to be reviewed by Caltrans, the Bureau of Engineering (which included the review of seven different


Underpass mural

JON ENDOW, COURTESY OF LA MÁS


Sidewalk installation

ABBY STONE, COURTESY OF LA MÁS

departments), and the Department of Recreation and Parks. The interviewee said that they saw a few opportunities to streamline the process, to eliminate redundancies and the project having to go through multiple internal loops for approval. The process to get approval was about six months, which the interviewee said would be unreasonable for a community group to go through in the future, for example. Also, LA Más had to test the materials in the right-of-way again, even though they had used them before for another project. Their proposal would create a list of pre-approved materials that wouldn't have to best tested on a project-by-project basis. LA Más is also suggesting that as long as applicants have a guaranteed maintenance partner in the future, projects shouldn't have to have a set duration at the time of application.

(11) FUNDING

The project was **funded entirely using a grant from TransitCenter for $147,850**. The breakdown of the physical intervention costs are as follows: park furnishings ($8,000, including hiring a woodworking team), signage ($3,200, including hiring a sign-painting team and wood/steel fabricator), murals ($6,000, including hiring the painting team), sidewalk/fences/poles ($20,000). The physical interventions (including the above for materials and labor, design, permitting, maintenance, and deinstallation) was over 50% of the entire project budget. Other resources were spent on building partnerships ($12,000), the community research and outreach ($39,000), evaluation ($8,300), and project administration and management ($8,000).

(12) WHAT'S NEXT?

In November 2018, Los Angeles City Council introduced a motion for an Adopt-a-Sidewalk program as a result of a follow-up proposal by LA Más. The program aims to simplify, and lower the cost of, the permitting process for sidewalk improvements. An analysis in the Chief Legislative Analyst's office is conducting a report to be heard by the Public Works Committee in Spring 2019.


Underpass mural

JON ENDOW, COURTESY OF LA MÁS


Underpass wayfinding

AARON PALEY, COURTESY OF LA MÁS

HANDS ON EXCHANGE

PROJECT TEAM: University of Akron Foundation, Street Plans, Knight Foundation City of Akron Engineering Bureau

PROJECT LOCATION: Exchange Street between Goodkirk Street and Arc Drive, Akron, OH

PROJECT INSTALLATION: August 2018

PROJECT DURATION: 2 months

MATERIALS: Contractor-grade traffic tape, acrylic field marking paint, traffic paint, 36" FlexStake vertical delineators

DID IT WORK? The pilot project was removed earlier than initially planned.

A two-way protected bike lane pilot project including bus stop enhancements.

(1) PROJECT IMPETUS

The project started as part of a Knight Foundation-funded series of workshops around the Tactical Urbanist's Guide to Materials and Design, an open-source guide published in 2016 by The Street Plans Collaborative (Street Plans). Akron was chosen as one of the grant cities, and a workshop with the city was hosted by Street Plans in February 2017 to introduce the Tactical Urbanism process to local staff and community members. As part of that workshop, **a subject corridor was chosen to show how the city might use this methodology in the future**. East Exchange Street was chosen because it is the subject of a longer term federal Complete Streets reconstruction, which was intended to include a road diet component after the city analyzed the capacity of the corridor and deemed a road diet feasible. The workshop identified several different alternatives along Exchange Street that the city might pursue. Following that workshop, the Knight Foundation funded a follow-up pilot project to implement a larger design exercise. The goal was to test the road diet and help train staff in the use of Tactical Urbanism..

(2) WHY THE QUICK-BUILD METHODOLOGY

The **corridor is the subject of a longer term capital improvement project**. Using the Quick-Build (Tactical Urbanism) methodology allowed the city to test in real time how a road diet would function, and how it might inform the capital project.

(3) PROJECT TIMELINE: 10 months

The first public meeting for the pilot project was held in November 2017. The back and forth between Street Plans and the city about the design was what took the longest.

(4) PROJECT TEAM + ROLES

- Street Plans (lead consultant)
- University of Akron Foundation (project partner)
- Knight Foundation (funder and partner)
- City of Akron Bureau of Engineering (design review, permitting, evaluation)

The project was funded by the Knight Foundation, and was designed and executed by Street Plans in partnership with the University of Akron Foundation. The University provided significant resources in the form of on-the-ground logistics for the project installation (materials storage and transport), while the city provided support throughout the planning and design of the project, which was led by Street Plans. The city reviewed the site plans with Street Plans, offering engineering design review and facilitating the permitting of the project (as well as aspects of the installation, like traffic control). The city also collected traffic and transit data along the corridor, and created a final evaluation report. The University of Akron led the public outreach effort, organizing the venues for the public meetings, reviewing and disseminating the marketing materials (created by Street Plans), and soliciting volunteers for the project installation. All parties participated in the two-day installation.

(5) PROJECT ELEMENTS + DESIGN PROCESS

- Two-way protected bike lane w/ bus stop treatments (including ADA ramps)
- Bus stop consolidation
- Crosswalks + painted curb extensions
- Temporary signage (coroplast)

The initial Tactical Urbanism workshop identified potential design alternatives. The first public meeting on the pilot project was held in November 2017, where the design alternatives were first workshopped with the community. The designs sought to implement a classic four to three road diet conversion with a protected bike lane. The major design challenge involved whether to implement a two-way protected bike lane on one side of the street, or protected bike lanes on both sides of the street.

After the first public meeting, and back and forth within the project team, it was determined that the two-way bike lane worked best on the north side of Exchange Street due to the complexity of driveways and businesses on the south side. Four bus stops were relocated and/or consolidated for more efficient traffic flow along the north side of Exchange Street. At the bus stops, Street Plans designed treatments in the bike lane that would enable safe boarding of the buses, and would allow the buses to make the stops in the travel lane. These treatments were reviewed and commented on by the Akron Metropolitan Regional Transit Authority. A final public meeting was held in May 2018, which focused more on brainstorming the implementation with community volunteers.

(6) MATERIALS + IMPLEMENTATION

- Epoxy traffic paint
- Water-based field marking paint
- Contractor-grade traffic tape
- 36" FlexStakes (adhered with epoxy adhesive)

As the project was implemented in the summer and was intended to last about six months, it was imperative that all of the materials would perform during the winter months. Paint, signs, and flex stakes had to resist both high and low temperatures, but also be relatively easily removable since it was a temporary project.

During the week prior to the installation, the city installed new ADA ramps at the (moved) bus stops along the project route (of which there were four), and installed signage indicating the bike lane, and indicating that bikes should yield to pedestrians at the crossings at the bus stops.

(7) PUBLIC ENGAGEMENT

Three public meetings in total were hosted by Street Plans prior to the project's implementation. The University of Akron Foundation promoted the project heavily throughout social media, and its email network.

TIM FITZWATER


TIM FITZWATER

(8) PUBLIC FEEDBACK + OUTCOMES

Signs were installed along the project route with a link to an online survey, which received over 1,400 responses. The **project received considerable public pushback**, and was removed before the originally intended test period (six months) was complete. Almost all of the negative feedback was focused on the increased congestion that the removal of the curbside lane caused, and was from motorists (89.55% of the respondents used a car as their primary mode of transportation on Exchange Street).

Traffic data and transit ridership was collected, but the metrics didn't provide conclusive evidence. From the evaluation report, bicyclists on the corridor actually decreased. There were no significant changes in vehicular or transit travel speeds, and both anecdotally and from the evaluation, traffic congestion along the corridor increased during the pilot.

The **online survey responses did reveal satisfaction with the bus stop treatments**, and the city received a few direct emails from citizens who would have like the project to last longer, to get a better idea of the longer term impacts of the road diet, and to possibly give bicyclists more time to become aware of, and comfortable with, the bike lane. The project team was aware that the survey may not have reached enough users of the bike lane, and transit riders, which could have produced more insightful feedback.

(9) QUICK-BUILD LESSONS + ADVANTAGES

One major element that was improved as a result of the project was the addition of ADA ramps at each of the bus stops. Furthermore, the detailing of the bus stop/bike lane interaction is being used in other projects around the city, which will ideally help with faster boarding. It was the intention of the bus stop consolidation and bus stop treatments to speed the transit service along the corridor, but because of the other impacts of the project, like the increased congestion, it was difficult for the project team to isolate any potential positive effects of the transit elements. In general, however, the project team was happy with the execution of the project, and the city believes that the forward-thinking design, and practicing the Quick-Build methodology, will serve it in future projects.

(10) CHALLENGES

The project team said that changes to the signal timing along the test portion of Exchange Street could have alleviated the resulting congestion, and also may have helped the team get a clearer picture of the impacts of the bus stop treatments. Also, having a local community partner champion the project after its execution may have improved communication and messaging of the project to the public, and targeted a wider variety of roadway users for post-implementation feedback. Better preparation for making adjustments to the project following its implementation might have helped alleviate negative feedback, and prevent the project from having to be prematurely removed.


TIM FITZWATER

(11) FUNDING

The project was **funded by Knight Foundation**, $156,000 (including the materials, which were approximately $23,500 of the total project budget).

(12) WHAT'S NEXT?

The project team hopes that the reconstruction of the corridor remains on course, and intends to further improve the transit amenities along the corridor as a result of the project. The city will be breaking ground on a Complete Streets project on Main Street in its Downtown in 2019, and will use the pilot project and the Main Street project to inform the future design of Exchange Street.

HENNEPIN AVENUE BUS LANES

PROJECT TEAM: Metro Transit, City of Minneapolis

PROJECT LOCATION: Two lanes on Hennepin Avenue Minneapolis, MN

- Northbound between 26th St. + Colfax Ave. S. (6:30am-9:30am)
- Southbound between 26th St. + Uptown Transit Center (3:30pm-7pm)

PROJECT INSTALLATION: May 2018

PROJECT DURATION: 3 days

MATERIALS: Traffic channelizers

DID IT WORK? Speed and reliability weren't significantly impacted, but the project team still learned a lot.

Two AM and PM peak-hour dedicated bus lanes (one in each direction) demarcated with traffic channelizers and including signage.

(1) PROJECT IMPETUS

The Senior Planner in the Service Development department (interviewee) within Metro Transit (transit provider for the Minneapolis/St. Paul area) was assigned to work on speed and reliability projects earlier in 2018. He became the project manager for the Hennepin Avenue project on the Metro Transit side. Hennepin Avenue was **a particularly highly trafficked corridor, both by motor vehicles and buses**. At the north end of the corridor is a freeway on-ramp which causes a lot of backup on Hennepin Avenue during rush hour. He **had seen the bus lane project in Everett the year before** and thought that it made sense for them to try a similar experiment on Hennepin Avenue.

(2) WHY THE QUICK-BUILD METHODOLOGY

The interviewee said that their **ultimate goal was to "get something out there and get the public's reaction."** They wanted to do something that would quickly demonstrate the benefit and impacts of bus-only lanes and hear immediately what riders thought. The corridor was a "natural fit" for their first test project. The interviewee also said that while they could have hired a consultant to conduct a traffic study, and get something in the ground 1-2 years, he thought Metro Transit was well-positioned to advance the demonstration project on its own. Through the test, they could more quickly assess the feasibility and impact of bus lanes on the corridor. They'd be able to observe any big flaws or issues that they'd address in a future, more long-term iteration.

(3) PROJECT TIMELINE: 3-4 months

The timeline was "somewhat longer than originally anticipated" (the original goal was to implement in March). Metro Transit was uniform in wanting to try it, but it took a bit longer to get the city on board with the planned changes. The city requested data that illustrated that it was the traffic congestion slowing the buses down, as opposed to just longer dwell times from higher peak period boardings. Time was also needed to ensure both city leadership and policymakers approved the plan.

(4) PROJECT TEAM + ROLES

- Metro Transit
- City of Minneapolis

Metro Transit took the lead on the project, with the major tasks being communication efforts, operator education, and production and distribution of the rider survey. They contracted with a signage company, Warning Lights, to install and remove the cones (2x/day). The city hooded the parking meters, although a majority of the test stretches were not metered, and enforced the no parking mandate. The city put out temporary "no parking by police order" signs that allowed cars to be towed immediately.

(5) PROJECT ELEMENTS + DESIGN PROCESS

- Signage
- AM + PM peak-hour dedicated bus lanes

Warning Lights worked with Metro Transit and the city to determine the on-street layout. Otherwise, a robust design process wasn't required. A challenge from the start was working with a 10' lane.

(6) MATERIALS + IMPLEMENTATION

- Traffic channelizers

The test was very much modeled after Boston and Everett's lanes. The interviewee said they knew it would be a considerable staff effort for the few days, but they believed it would be worth it to maximize as much data collection and observation as possible (they were able to get more detailed information on travel speeds block by block, and by time of day). From Metro Transit, two to three street supervisors adjusted the cones and monitored the buses daily. Metro also had one to two planners or other staff making on-street observations and taking pictures, and one to two additional planners/staff on buses. Likewise, the city had several staffers observing the corridor, and one to two drivers measuring changes to motor vehicle travel times, and executing enforcement. Because the lanes were not too long, and operational for only a few hours each day, they were able to saturate coverage. This was very effective, as there were just two cars ticketed and towed over the course of the three days. Existing staff who might have patrolled elsewhere were reassigned to this project, so there was no net cost increase for enforcement.

(7) PUBLIC ENGAGEMENT

About two months prior to installation, Metro Transit conducted a survey of corridor riders that asked their perceptions on speed and reliability along Hennepin Avenue, which was issued again following the project. To promote the project, they posted on social media, created a web page, sent an email blast to the same survey group, and posted signs at the bus stops.

(8) PUBLIC FEEDBACK + OUTCOMES

The interviewee said that most of the feedback was very positive, even though the impact of the bus lanes ended up being pretty modest. He thinks that most of the positive feedback was a reflection of the public's satisfaction that public agencies were at least trying something to improve travel through the corridor, which will bode well for future tests and/or a permanent intervention on the Hennepin Avenue corridor.

75% of the riders that used the bus lanes responded that they "improved their experience", and 63% said that they'd make them more likely to use transit in the future. 92% of the bus operators thought that there was an advantage to having a bus lane, although the majority expressed concern/dissatisfaction with the bus lane width (the bus lane would be wider if

METRO TRANSIT


METRO TRANSIT

permanently implemented). Both Metro Transit and the city were on the street during the three days collecting a variety of data, with Metro Transit leading on-bus data collection from each bus's automatic vehicle locator, and driving the corridor with the city. Travel speeds for vehicles overall were not changed, and **travel speeds for buses actually slowed overall, most likely due to the lanes' 10' width**, which caused the bus operators to drive more slowly than normal. **Travel speeds for buses were, however, more consistent**, since the buses didn't have to maneuver around stopped traffic. Bus travel speeds did increase between the first and final day of the test (16% northbound and 10% southbound), which could have been because the operators were more comfortable with the new operating environment. Time allocation (in motion, dwell, signal or traffic) also didn't significantly change.

Although the bus lane was slower than the general purpose lanes when traffic was free-flowing, it was very clear that the bus lanes were effective during heavy traffic backups.

(9) QUICK-BUILD LESSONS + ADVANTAGES

The biggest takeaway from the test is that any future lane on this corridor would necessitate changing the right-of-way configuration, and allocating a minimum of 11' for a bus lane. For the test, the project team did not want to change the center line of the road, and wanted to leave two travel lanes in each direction (60' total width, leaving just 10' each direction for the bus lanes).

(10) CHALLENGES

The biggest challenge was the narrow width of the bus lanes. Since these lanes were normally curbside parking lanes, they were 10'. The bus operators drove considerably slower, and also had to be cautious of obstructions like trash cans, tree branches, etc., as the buses were right against the curb and didn't have much wiggle room. Cones being knocked over into the bus lanes posed a challenge for similar reasons. Steps to clear the curbs could be used if future tests were implemented, and the team would likely not use cones again. Motorists struggled with knowing where to enter the bus lane to make right turns, which is something that could have been mitigated with more signage and striping.

(11) FUNDING

The cost of the project was nominal. The cones and signage were less than $5,000, and while staff time was certainly important, Metro Transit doesn't break down staff time by project, so there wasn't a clear cost associated with the project.

(12) WHAT'S NEXT?

The interviewee thinks the test was successful for multiple reasons beyond any data results. Metro Transit developed some new strategies for data analysis, which he thinks they can apply to analyze other corridors. For example, they've developed tools to measure segment delay (delay being considered optimal vs. actual), signal delay, and the effect that both have on riders.

AARON ISAACS PHOTO

He does think that while they could execute similar tests on other corridors, he actually doesn't think they'd need to spend the time and resources doing that if a permanent project on Hennepin Avenue is successful. They could just apply the same treatment elsewhere. The test did get policymakers excited about the concept, and revealed other improvements the team could make to the corridor beyond bus lanes. For example, the team is considering queue jump lanes, stop consolidation, and a peak-hour bus-only lane on a portion of the corridor where parking is already restricted from 7am-9am (outside of the test segment). However, because they're not moving forward with the bus lanes at this time, there isn't as much urgency to implement these other treatments.

The team is keeping in mind that there is an opportunity for bus lanes as the city redesigns and reconstructs Hennepin Avenue in 2022.

KING ST TRANSIT PILOT

PROJECT TEAM: City of Toronto City Planning and Transportation Services Divisions, Toronto Transit Commission

PROJECT LOCATION: King Street between Bathurst + Jarvis Streets, Toronto, CAN

PROJECT INSTALLATION: November 2017

PROJECT DURATION: Planned 1 year, remains until next iteration

MATERIALS: Tactile warning pads, ramps, concrete barriers, pavement markings, public art installations, street furniture

DID IT WORK? Multiple positive outcomes!

COMPLEXITY

A multi-part pilot project including motor vehicle access restriction, stop relocation and enhancements, signal adjustments, signage, and public realm installations.

(1) PROJECT IMPETUS

The pilot came after years of observing that the streetcar service on King Street, the highest ridership surface transit route in the city, was slow and unreliable, and after a few attempts to mitigate the issues didn't have sufficient impact. The city had altered the signal timing on the corridor, tried out Transit Signal Priority, extended peak period restrictions (like no stopping in the lane), and tried a dedicated lane that was unsuccessful because of the enforcement resources required. The city and Toronto Transit Commission were encouraged to take another look at the corridor during the city's most recent initiative, TOCORE: Planning Downtown. As a "spin-off" of this planning process, the Commission and city's City Planning and Transportation Services divisions **initiated the King Street Pilot Study, which developed new concepts for testing strategies to improve the speed and reliability of King Street's streetcar**. In the past, the strategies they tried weren't so obvious to the public, as they were more operational in nature. This time, the project team executed a more robust public engagement process, and the Surface Transit Projects manager at the city (interviewee) said the three-way partnership with the city's two departments is what ultimately made the project feasible. This time, they had "buy-in from everyone".

(2) WHY THE QUICK-BUILD METHODOLOGY

The project team decided to run the pilot for one year, so they needed to execute it with materials that could be relocated or removed if it wasn't performing well by the end. They also wanted to run the pilot during winter to see how it would perform, and similarly, needed to be able to make adjustments to accommodate winter street maintenance if necessary. The interviewee said that **the project gained a lot of political attention, and that they didn't really have "the option of delaying"** since approval to implement would need to be obtained from City Council, whose members were already participating in the conceptual stages of the project. They wanted to implement the project before the election year.

(3) PROJECT TIMELINE: 1.5 years

Concept development started in June 2016, a process led by City Planning, and the Transportation Services division. This division picked up the detailed design starting in April 2017, with the Toronto Transit Commission leading operations, service planning, and much of the public awareness campaign. The pilot was approved by City Council in July, and the team implemented the 1.5-mile long pilot in November.

(4) PROJECT TEAM + ROLES

- City of Toronto
  - Planning

- Transportation Services
  - City contractor
- Toronto Transit Commission

The City of Toronto led the design (after a consultant team helped with the first phase, for the King Street Pilot Study), implementation, and maintenance of the project, with the interviewee as the project manager. City contractors installed any pavement markings and signage. A new subway line to relieve pressure on the current over-burdened system is under design, and the three partner entities saw the King Street pilot as a way to more immediately improve the capacity of downtown's transit, while funding for construction of the new subway line is pending.

Developing the concept was really a joint effort. The team created an organizational structure that also included parking enforcement and police, with an overall project manager and several staff task leads. The team also created a steering committee that they met with regularly about the concept, any foreseeable issues, etc.

Before the launch of the pilot project, they together conducted an education and awareness campaign on the new regulations, and have periodically had renewed general enforcement campaigns, as well as targeted enforcement informed by the data that has so far been collected.

(5) PROJECT ELEMENTS + DESIGN PROCESS

- Motor vehicle corridor access restriction
- Public realm art and street furniture installations
- Streetcar stop relocation + enhancements
- Signal adjustments
- Signage

The focus of the design was mostly on how to reallocate the curbside space. Street parking had to be removed, but the removal on the segment of the pilot project was actually pretty minimal compared to available parking in the area (following a parking study prior to the pilot implementation). The team was also able to find about 100 additional parking spaces elsewhere in the area to compensate. Once the pilot was implemented, the curbside became used for the transit stops, taxi stands, accessible loading, pickup/dropoff/delivery, and public space. Where there were wider sidewalks or greater building setbacks, the curbside lane was not used for public space. The public realm improvements were what took the longest to design. The interviewee said that there was a lot of feedback from the businesses, comprised of particular operational needs and wishes, and these conversations made the process a bit more complex. The city decided to let the public decide how these spaces would be designed, after first giving business owners with these spaces in front the option of an outdoor cafe, and in January 2018 it launched the Everyone is King design-build competition for temporary public space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installations. Over the summer 2018, 18 public spaces were implemented along the curb, and 45 public amenities like parklets, seating, cafes, and art installations were installed in these spaces. The team also moved 18/20 of the streetcar stops in the pilot segment beyond the traffic lights, a move that would facilitate right turns while allowing for more direct boarding.

(6) MATERIALS + IMPLEMENTATION

- Tactile warning pads, ADA ramps, concrete barriers
- Thermoplastic pavement markings
- Public art installations
- Street furniture

Transportation Services, with input from the Transit Commission, began the signal (adjusted signal timing and added right turn green arrow phases, but no transit only signal) and signage (traffic had to turn right at every intersection, with no left turns or thru traffic permitted at most intersections) work a few weeks before the launch, and put the pavement markings down a week before. The biggest push was in the final 2-3 days before the launch, when they put in the concrete barriers to designate the boarding areas at the streetcar stops, un-bagged the new signage, and activated the signal changes.

Along the curb at the transit stops, the project team installed concrete barriers, planters, and tactile pads. They chose to not use materials that would create "raised" platforms flush with the concrete curb because they still wanted bikes to be able to easily pass through. The barriers and planters were meant to demarcate the stops, and to protect pedestrians who would then be utilizing the curbside lane as the waiting area. Signage and pavement markings were also a crucial part of ensuring that the pilot functioned as intended, as the project team knew there would be an adjustment period. Both of these elements were installed with standard, permanent materials, which could nevertheless easily be modified or removed.

Successful enforcement of the pilot required a close partnership and frequent communication with the city's partners at the Toronto Police Service.

(7) PUBLIC ENGAGEMENT

This public engagement period was about six months. At first, some business owners along the corridor were very concerned with the removal of parking, and reallocation of curbside space. The project team was very diligent and communicative with them about what changes would be coming, and how it could actually benefit them. Eventually, after data collection on existing curbside use, the project team gave many business owners the option of a loading zone or public space in front of their business.

The project team took the project conceptual design to the public twice, and worked hard to deliver cohesive and consistent messaging, communicating that it was a pilot through webpages on the city's website, social media, and over 30,000 mailed brochures leading up to the installation. The interviewee said that the public meetings helped them refine their goals

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for the project. The public realm installations heavily involved the public, both in the design competition and through their interactive nature.

(8) PUBLIC FEEDBACK + OUTCOMES

Throughout the pilot period, the project team recorded that customer satisfaction on key measures like travel time, comfort, and wait time significantly improved.

The project team collected a variety of data throughout the life of the pilot, and published monthly/bi-monthly reports on the following metrics: bicycle and pedestrian volumes, transit ridership, transit travel times, transit reliability, car travel times and volumes, economic point-of-sale data, and public realm improvements. The Transit Commission collected the data on the streetcar speed and reliability. Cameras were installed to generate multi-modal counts at key intersections in the study area, and bluetooth sensors at intersections measured general traffic speeds. The team also made limited use of temporary cameras in some locations to gather additional data on curbside use (deliveries, loading, and parking).

The final pilot report, released to the public in April 2019, portrayed a successful project. **King Street became the second most popular cycling route in the downtown core, with cycling volumes having increased 440% during the afternoon commute as of October 2018**. Car travel times did not change much, and the parallel streets have absorbed the rerouted car traffic well. Pedestrian volumes also didn't change much, but **all-day, weekday streetcar ridership increased approximately 16% (approx. 12,000 more riders daily)**. As of Summer 2018, 82% of the streetcars were arriving within four minutes westbound during the morning commute, and the final report portrayed an **approximately 5-minute travel time savings** during the afternoon commute for the slowest streetcar travel time. The final report indicates that approximately 30,000 minutes of travel time are saved by streetcar customers daily by the pilot.

Spending in the restaurants along King St. declined by 1.2% in the year period following the pilot's implementation, but spending in the retail and services sector increased by 1.7%, effectively offsetting losses in spending in the pilot area. The pilot project was not entirely without negative feedback, but the Mayor and City Council are pleased that the pilot helped facilitated the accomplishment of one of their priorities: getting people in the city to use transit more.

(9) QUICK-BUILD LESSONS + ADVANTAGES

The pilot demonstrated significant improvements on key metrics, like transit travel times and reliability. Congestion on the corridor has in general been significantly reduced, and the streetcar now has clearer priority than under past conditions. This was the first time that all three entities came together, and they had very clear goals and support from leadership.

(10) CHALLENGES

The interviewee said the largest challenge was probably allaying the different concerns, especially those of the businesses along the corridor. A lot of time went into configuring the curbside space in a way that would serve the needs of the businesses, taxis, etc. Deciding on the final treatment at the stops was also a challenge, to arrive at one that wouldn't obstruct bicycle movement, and that would provide a safe boarding area for transit riders.

(11) FUNDING

The project received **federal funding from Canada's Public Transit Infrastructure Fund**, which covered 50% of the cost of the project. The city matched those funds using **existing capital funding resources**. In total, the project had a $1.1 million ($1.5 Canadian) budget.

(12) WHAT'S NEXT?

Since its implementation, slight design changes have included the addition, removal, re-sizing, or relocation of loading zones and public realm spaces. These decisions were made as a result of field observations and consultation with affected parties, including business owners. Signal timing and lane configuration changes have also been made to improve signal coordination and reduce queueing.

In April 2019, the City of Toronto City Council voted (22-3) to make the pilot permanent, including the decision to create 45 new, permanent patios in the pilot's experimental public spaces. The Council also voted unanimously to pass a motion to continue monitoring and evaluating the project.

The interviewee said they may need an intermediate design to try out transitioning some elements of the pilot to a more permanent form, such as stop platform modifications or signal design changes to reinforce the no thru traffic regulation (aside from taxis from 10pm-5am). The city has expressed that it will capitalize on the 2023 King St. track repair project to integrate the pilot project elements, and create a true destination street in the urban core.

LA BUS BOARDING PLATFORMS

PROJECT TEAM: Los Angeles Department of Transportation

PROJECT LOCATION: Two locations in Los Angeles:

- First Street between Main + Spring Streets
- Figueroa Street near 7th Street

PROJECT INSTALLATION: October 2017, September 2018

PROJECT DURATION: First platform remains

MATERIALS: Modular, recycled plastic elevated platform (Spanish manufacturer)

DID IT WORK? The department is planning to install a third in early 2019, and continue expanding their use.

Multiple modular bus boarding platform installations at spot locations, including site-specific design modifications.

(1) PROJECT IMPETUS

The interviewee, Senior Transportation Engineer at the city's Department of Transportation (DOT), was working on the city's Vision Zero initiative at the time that they started hearing about the modular platforms manufactured in Spain. There was a **general willingness and curiosity within the department to try the product**. They chose a location close to their office, serviced by DASH (transit provided by LA DOT), that would be easy to monitor. There weren't any expectations necessarily, or planned evaluation. There was a buffered bike lane passing by this particular bus stop, so the platform would also prevent the buses from pulling into the bike lane.

(2) WHY THE QUICK-BUILD METHODOLOGY

The team ultimately found it to be a good **opportunity to test the product**, and to see if it could be a viable and flexible solution at other locations across the city.

(3) PROJECT TIMELINE: 6 months

Most of the process leading up to the first installation was devoted to iterative conversations about the platform design with the manufacturer.

(4) PROJECT TEAM + ROLES

- City of Los Angeles
  - Department of Transportation
  - Bureau of Street Services
  - City contractor

The department was able to install the first platform relatively free of any permitting process or sign-off from other local agencies/departments. Because it was a DASH (transit provided by the Los Angeles Department of Transportation) bus stop, they didn't need to involve LA Metro (regional transit provider). The city's Bureau of Street Services did some repaving along the curb, where it was necessary to boost the platform a bit to be even with the sidewalk level. A city contractor installed the first platform.

(5) PROJECT ELEMENTS + DESIGN PROCESS

- Modular bus boarding platforms

The manufacturer started by sending them a proposal, and the process became iterative for a while. The city had to ensure that the first platform would be manufactured according to some of its regulations, and site-specific conditions. The most important part to get right was perhaps the bike ramp, to enable cyclists to pass over the ramp to continue in the existing

bike lane. The first ramp that connected to the platform had to be re-ordered because it was too steep. The final design was mostly informed by the physical constraints of the location (available width, bike lane width, and length of the bus stop).

(6) MATERIALS + IMPLEMENTATION

- Recycled plastic boarding platforms w/ striping + markings
- K-71 bollards
- Tactile warning pads (second installation)

A city contractor installed the first platform within a day.

(7) PUBLIC ENGAGEMENT

The department didn't really do any public outreach for the first platform. It wasn't messaged as a Vision Zero project, it was more about the department testing the infrastructure. The bus drivers were educated so that they wouldn't drive over it. The interviewee said that riders quickly adjusted and understood how to interact with it.

(8) PUBLIC FEEDBACK + OUTCOMES

The **city didn't conduct a formal feedback process for the first platform**, and hasn't yet developed a way to formally evaluate the infrastructure for any other metrics like ridership or dwell time, although it plans to. Anecdotally, they observed bikes sometimes go around the first platform if they don't want to slow, but other than that they didn't receive robust feedback. The city plans to create a process for evaluation as it installs more throughout the city.

(9) QUICK-BUILD LESSONS + ADVANTAGES

The first platform was a success in that it proved to the city that it could do it, and helped staff brainstorm other ways the platforms can be useful/other applications.

(10) CHALLENGES

Other than needing to change the first platform's bike ramp, all other changes were considered a part of the design process.

(11) FUNDING

The **manufacturer gave the first platform to the city for free**. Funding for the second platform was acquired through the My Figueroa Streetscape Project, and funding for the third will be acquired through the Great Streets Initiative. The average cost of a platform is approximately $40,000 (at a baseline).

(12) WHAT'S NEXT?

The city has already installed a second platform as a part of its My Figueroa Streetscape Project, and plans to install a third on Robertson Blvd. as a part of one of the city's Great Streets projects. This project includes more public outreach, and will have an evaluative component.


Figueroa Street

LA DOT

First Street

JOE LINTON, STREETSBLOG

MAIN STREET BUS LANE

PROJECT TEAM: City of Cincinnati, Cincinnati Metro, Better Bus Coalition

PROJECT LOCATION: Main Street between E 6th Street + Central Parkway

PROJECT INSTALLATION: November 2018

PROJECT DURATION: Planned one month, remained until next iteration

MATERIALS: Thermoplastic

DID IT WORK? The project team already added more striping and pavement markings as a follow-up in January 2019.

ADVOCACY INITIATION

An AM peak-hour dedicated bus lane demarcated with a single, thick thermoplastic stripe, including signage and bus stop modifications.

(1) PROJECT IMPETUS

The bus lane was about a year in the making, and **had been proposed multiple times by Cincinnati's transit advocacy group, the Better Bus Coalition**. The location of the proposed bus lane was certainly no surprise, as Main Street is one of the most congested corridors in Downtown Cincinnati (transports over 600 buses a day) during the PM peak. The **buses on the approximate six-block stretch of Main St. experience significant delays during rush hour**, often taking almost a half hour to move four blocks. The buses on the test segment have to weave in and out of traffic, which contributes to the congestion all modes experience on the corridor.

The Better Bus Coalition brought data (analysis the group had performed for its Better Bus Plan, published earlier in Summer 2018) to one of the City Councilmen (interviewee) that illustrated how congestion in the urban core was causing a ripple effect throughout the entire network, substantially affecting people's commutes and transportation choices. The group proposed to the Councilman that a bus lane on a particularly backed up segment of Main Street could alleviate some of that effect. The group needed a political ally to champion the lane, and the Councilman put forward a piece of legislation at the end of the summer, on which the City Council voted on and approved in September 2018. Cincinnati Metro (transit agency) wrote a letter of support for the legislation. The interviewee from Metro said that they were skeptical that the city would approve it, and worked together with the Councilman and city staff to figure how to get it approved.

The Councilman said that with the pilot bus lane, the first ever dedicated bus lane in the city, he hoped to "give people back the gift of time", and that the lane would provide more equity for transit riders.

(2) WHY THE QUICK-BUILD METHODOLOGY

According to Metro, there is a general sense of frustration in the city with "endless studies". The project team wanted to get something done relatively quickly to see what advantages it could provide. **They wanted to forego hypothesizing what the effects would be**. The Councilman said that he's a "big believer" in pilots, which to him are more advantageous than millions of dollars in studies, and even a permanent project from the outset. According to the project's manager at the city, "traffic models only do so much". The entire team was aligned that the best way to get an accurate picture of what a bus lane on this corridor would do was to test it.

The project also had to fit within a certain budget. A robust dedicated bus lane wasn't feasible with the amount of money that had been approved for the project. The city didn't have enough funding for the signal timing that would have to accompany a true dedicated lane. The team thought that because on-street parking was already prohibited in the curbside lane

during the AM and PM peak periods, a bus lane using cost-effective striping and signage would still be an effective test. The only obstacle to doing this was to remove a bump-out in the lane at one intersection.

(3) PROJECT TIMELINE: 2 months

The project team took a pretty low barrier to implementation approach, with some line striping and signage. A bumpout in the curbside lane had to be removed, but other than, that process was able to move quickly. The Councilman said that the fact that the argument made sense to people, and that it would be easy to implement, made it a quick process.

(4) PROJECT TEAM + ROLES

- City of Cincinnati
  - Department of Transportation + Engineering
  - Public Services Department
  - Office of the City Manager
- Cincinnati Metro
- Better Bus Coalition

The city and Metro partnered on the project's communication efforts, including a press release, ribbon cutting, social media, and website information dissemination. They also collaborated on the design of the project's signage. Metro will lead the formal evaluation for any time savings the lane will produce. Metro recently launched an initiative called Reinventing Metro, and they're looking at a number of ways to make service better and increase the incentive to use public transit. This initiative ties in well with the pilot lane communications.

Once the lane was approved, Metro and the city worked through the design and implementation through multiple meetings. The city's Department of Transportation and Engineering designed the lane (and implementation plan), with review from Metro, and the two entities coordinated regarding a few bus stop modifications. At one location in particular, there were two bus stops on one block. One stop was within a right turn only lane (for routes making a right), which they removed so they could make the lane both a right turn and thru lane. Metro also trained their operators in the use of the lane.

The city also executed the lane's implementation in-house, using the Public Services Department. This department houses the city's sign shop and pavement marking division. Public Services also implemented the small signal change that had to occur at the intersection where the bumpout was removed (adjusted pedestrian crossing time). The city's Parking Facilities Department, and the Police Department, led the enforcement of the lane during its operational hours.

Metro noted that the process didn't differ much from their standard collaboration with the city. They already have a good process in place, especially for the production and review of new signage, etc.

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Striping in action

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5) PROJECT ELEMENTS + DESIGN PROCESS

- AM + PM peak-hour dedicated bus lane
- Bus stop modifications
- Signage

The design of the lane was done entirely in-house by the city, something that the Councilman said really speaks to the "nature of a pilot". The city felt that the scale of the pilot, and starting off with a lighter design touch, was something it could really wrap its arms around. The lane, which occupies the curbside lane (within which minimal parking is removed during operational hours), from 7am-9am and 4pm-6pm is marked with a single thick stripe and signage. The interviewee from the city said that early deliberations about the lane were how to make it as obvious to motorists as possible without going over budget. He said they were trying to balance adhering to the Manual on Uniform Traffic Control Devices (MUTCD) with "what was actually going to make sense to people". They debated for about three weeks on whether the project should include a lot of pavement markings, overhead signage, curb signage, etc.

(6) MATERIALS + IMPLEMENTATION

- Thermoplastic striping

The bumpout was removed a few weekends before the striping began and the signage went up. That part of the lane was then repaved a week later. The striping, signage, and bus stop removal was done within 48 hours in the first week of November, all with city crews. The interviewee from the city said that it wasn't confident that painted lines would last through the winter, so it decided to use thermoplastic. The street had been repaved a few years ago, so he knew that if they had to remove the striped line for some reason, the pavement would regenerate easily.

In terms of enforcement, the project team said they could have planned a bit better for it. The city's parking enforcement had to ramp up enforcement efforts quickly following implementation after noticing that cars were traveling and idling in the lane when they weren't supposed to.

(7) PUBLIC ENGAGEMENT

The project team promoted the project robustly on social media, and worked with three primary stakeholder groups Downtown to get the word out: Cincinnati Regional Chamber, Downtown Residents Council, and Downtown Cincinnati, Inc. According to the Councilman, this project "belonged to the public". They were very aware of it, and very excited. The interviewee from the city said that the only negative feedback it received prior to the lane's implementation was about parking. The city repeatedly reminded people that parking was already restricted during the lane's operational hours.

CITY OF CINCINNATI


Bump-out removal

CITY OF CINCINNATI

(8) PUBLIC FEEDBACK + OUTCOMES

So far the public response has been very positive. The project team has received positive feedback mostly for the effort of trying something, and compliance has also improved.

Initial data collection revealed a 20% travel time savings. After four months (February 2019), they'll start compiling the data for a final report, which will primarily reflect speed and reliability improvements. At first, the city tried to be lighter with enforcement, and focus on education. In the first half of November, 18 citations were given. Upon realizing it needed to be more strict to ensure compliance, it ended up issuing 43 citations in December.

(9) QUICK-BUILD LESSONS + ADVANTAGES

The Councilman says that if the pilot lane hits the city's goals, it will look to expand bus lanes throughout the city. The interviewee from the city said that they'd like to connect the bus hub Downtown with one in an area north of Downtown with the bus lane in the coming years.

The city said that one of the biggest takeaways was learning to work with its internal departments and partners. Instead of speculating from its offices whether or not a bus lane would work, it was more important to create an opportunity for riders and operators to experience it and give the city direct feedback on what worked and what didn't. Pursuing that line of speculation, as opposed to experiential feedback, would never have gotten it the bus lane.

In regards to enforcement, the interviewee from the city said it now knows to "use as many means as possible".

(10) CHALLENGES

Enforcement was a main challenge, as the city had to "play catch up" to monitor the bus lane. Metro thinks that if the lane were 24 hours, enforcement would be easier as a result of a more consistent mandate to avoid the lane. The city hadn't factored enforcement into the project budget, so it couldn't have designated parking enforcement staff or police officers solely for the enforcement of the lane. Parking enforcement and the police accommodated them, but it was difficult to cover the length of the project during both operational periods.

The interviewee from the city also said that with more funding, he thinks it could have better planned for enforcement, and more obvious pavement markings from the start. He also cited that collaboration with the city's engineers may have delayed implementation had it not been for his department director's mandate to get the project done.

(11) FUNDING

The project cost about $55,000, and was funded by an existing Department of Transportation and Engineering capital program, the Downtown Infrastructure Improvements program, capital funds that the department had received a year prior. The interviewee from the city said that some of the departments had to just bill to a general line item, meaning that some of the soft costs of the design and labor for the review process weren't included in the project budget. The budget was for the creation of the signage, implementation of the pavement markings, and bumpout removal and resulting repavement and signal timing adjustment.

(12) WHAT'S NEXT?

The city is already planning to install "Bus Only" pavement markings as soon as the weather improves (hopefully by February). The interviewee from the city said that although the formal evaluation isn't complete, he's pretty confident that the bus lane will remain permanent. As other street improvement projects come up across the city, they'll look out for more ways to try dedicated bus lanes.

MASS. AVENUE BUS LANE

PROJECT TEAM: Town of Arlington, Massachusetts Bay Transportation Authority (MBTA), City of Cambridge, MA Dept. of Conservation and Recreation (DCR)

PROJECT LOCATION: Massachusetts Avenue eastbound between Lake Street and Alewife Brook Parkway, Arlington, MA

PROJECT INSTALLATION: October 2018

PROJECT DURATION: 1 month, some elements remain

MATERIALS: Cones

DID IT WORK? Significant time savings!

POSITIVE OUTCOME

An AM peak-hour shared bus-bike lane demarcated with cones, including Transit Signal Priority and other signal adjustments, intersection treatments, queue jump lanes, signage, and bus stop relocation.

(1) PROJECT IMPETUS

The town has known of significant delays in bus service on Massachusetts Avenue since 2005, specifically in East Arlington. After years of thinking through first-last mile connections to the MBTA Alewife Station, and after a recent streetscape reconstruction didn't alleviate the issues, **the town wanted to take advantage of the BostonBRT funding program to take another look at ways to improve traffic flow, reduce bus travel times, and improve reliability** on the corridor. The project garnered support from town officials and the town manager, which the town's Director of Planning and Community Development (interviewee) considered a major reason the test was an option in the first place.

(2) WHY THE QUICK-BUILD METHODOLOGY

The interviewee said that **the town was excited at the prospect of testing something**, an otherwise rare opportunity for municipalities. The idea that it was a test made town officials, and the public, more comfortable that the town wasn't going to waste resources. She said they were hopeful that they could try out multiple BRT elements as a part of one project, something that may not have been possible if not for the Quick-Build approach.

(3) PROJECT TIMELINE: 7 months

The interviewee said that staff turnover had an impact early on in getting the project up and running.

(4) PROJECT TEAM + ROLES

- Town of Arlington
  - Consultants
- City of Cambridge
- MA Department of Conservation + Recreation
- MBTA

Arlington, Cambridge, DCR, and the MBTA formed a team that conversed regularly about the project. The Metropolitan Area Planning Council conducted a parking utilization study. The town brought on a consultant for the analysis, design alternatives, and final test design/elements. Within the town, the project touched multiple departments, and coordinated with the City of Cambridge and the state's Department of Conservation and Recreation about the signal changes at Alewife Brook Parkway. The consultant also helped the town with implementation during the final month of their contract (September 2018).

(5) PROJECT ELEMENTS + DESIGN PROCESS

- AM peak-hour shared bus-bike lane
- Transit Signal Priority + other signal adjustments
- Intersection treatments
- Signage
- Queue jump lanes
- Bus stop relocation

The design process portion of the project, for which the town contracted with VHB, was from April through September 2018. The town and VHB divided the test into three segments, or primary components: a curbside shared bus-bike lane which occupied the parking lane and adjacent bike lane, and intersection and signal treatments at Lake Street and Alewife Brook Parkway. The team got feedback from the public on the length of the bus lane, and on the different treatment options at the intersections (shared left-through lane, single through and left turn lanes, or moving the left turn lane north of the median to keep existing two lanes as through lanes at Alewife Brook Parkway, for example). There were three lengths of the shared bus-bike lane presented: .45 miles, .25 miles, or just under .20 miles. These different segments would start at Lake St., Varnum St., or Teel/Thorndike Street, respectively, and end at Alewife Brook Parkway. Each length had different parking removal implications.

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(6) MATERIALS + IMPLEMENTATION

- Cones

Implementation began in August, when the town's Department of Public Works (DPW) removed one pedestrian bump-out in the to-be-tested lane. MBTA moved the bus stop signage and placed temporary signage for the pilot during September. Also in September, the City of Cambridge changed the traffic signal at an intersection to accommodate other signal changes, and align them with new signage. An MBTA contractor installed TSP at three traffic signals (one in the pilot area, Lake Street) during September/early October. The traffic signal at Alewife Brook Parkway was changed to split phase. DPW staff repainted signage at an intersection and bus stop, and installed all signage for the project in September and early October. DPW staff placed and removed the traffic cones along the outer edge of the bike lane at respectively 5:45 a.m. and 9:15 a.m. every day of the pilot along the .25-mile stretch.

The project also included a combination of temporary and traffic signage that closed parking, indicated the bus stop relocation at Lake Street (to beyond the traffic light), and indicated the queue jump lanes at Lake Street and Alewife Brook Parkway (right lane must turn right, except for buses and bikes).

All features of the test, except for the cones delineating the shared bus-bike lane, were to remain from the beginning. For the first two weeks, the town had seven police officers enforcing the test, stationed along the route and at the intersections to make sure people didn't turn into the

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bus lane. They reduced this to two officers on motorcycles for the remaining test period, once drivers and bicyclists better understood the changes.

(7) PUBLIC ENGAGEMENT

The interviewee said that without the public engagement they did, the positive feedback they received may not have been quite as robust. The town made sure to prioritize engagement, and was diligent about notifying people along the corridor about the project (was promoted through town messaging boards and all social media accounts), and meeting face-to-face with businesses.

The town held a kickoff public forum in May 2018, after which a consultant commenced corridor analysis and the conceptual design process. The town had a few smaller stakeholder meetings, a second public forum in August (where attendees voted on their preferred option for each segment of the test corridor), meetings with the police, public works, and MBTA in the final month, and implemented the project on October 9th. A final forum was held in November following the project's implementation.

(8) PUBLIC FEEDBACK + OUTCOMES

The town is very satisfied with the test, which has already informed their next steps. **Nearly 95% of survey respondents (mostly riders) said they want the lane to be made permanent**. Most negative feelings throughout the planning and design process were people concerned about the change, the interviewee said. There was also a feeling of concern expressed by neighbors and businesses adjacent to the corridor because of a previously challenging project.

The test was well received by bicyclists, and evaluation didn't reveal any significant impacts on vehicular flow and/or speeds. No violations or traffic tickets were issued during the pilot's operational hours. Consultants collected data primarily on the bus routes' (77 and 79/350) travel times to assess improvements in speed and reliability.

The test **evaluation showed a 5-6 minute savings (50% reduction in travel times) for the buses**, and a **40% reduction in the variability of the travel times** (comparing the average vs. most delayed trips).

(9) QUICK-BUILD LESSONS + ADVANTAGES

The interviewee also thinks that the test did a good job of making people aware of why treatments that were tested in the project are important for mobility.

(10) CHALLENGES

The interviewee said the main challenge was fielding negative feedback, mostly about the removal of parking. The interviewee said that messaging it as a test and simultaneously trying to inform the public that it would inform a long-term process was also tricky. But, doing the test would ultimately allow them to get the evaluation they needed for this process in a shorter time frame. Another challenge included the messaging about the movement of the bus stop at

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Lake Street, just making sure that riders were aware of the move.

(11) FUNDING

The project was **funded entirely by the $100,000 from the Barr Foundation**. The funds were spent to retain a consultant to study corridor conditions and produce a design for the BRT Pilot ($48,990), police detail during the implementation of the pilot to ensure traffic safety ($27,103), new and temporary signage for the pilot and other materials (traffic cones; $22,840), and marketing materials (approx. $1,000).

(12) WHAT'S NEXT?

The project was so successful that as of Spring 2019, the bus lane will be made permanent. The signal modifications will remain, and the town will continue to look at improvements to the Alewife Brook Parkway intersection. The team will also investigate pedestrian improvements, and more TSP along the corridor, and consider platform level boarding. The team is continuing to look at other BRT elements they could test on the corridor, and other transportation corridors in town.

MT AUBURN STREET BUS LANES

PROJECT TEAM: City of Cambridge, Town of Watertown, Massachusetts Bay Transportation Authority (MBTA), MA Dept. of Conservation + Recreation

PROJECT LOCATION: Mt. Auburn and Belmont Streets, Cambridge and Watertown, MA:

- Mt. Auburn Street between Ralph Piteri Terrace and Coolidge Avenue
- Belmont Street between Brimmer and Mt. Auburn Streets
- Mt. Auburn St. at Walnut St. and School St.

PROJECT INSTALLATION: Oct. - Nov. 2018

PROJECT DURATION: Permanent from outset, iterations pending evaluation

MATERIALS: Thermoplastic, asphalt paint

DID IT WORK? Evaluation is underway.

24-hour shared bus-bike lanes (two segments) with red paint, including Transit Signal Priority and other signal adjustments, queue jump lanes, painted curb extensions, signage, and a conventional bike lane (small portion of corridor where there isn't a bus lane).

(1) PROJECT IMPETUS

The pilot segment of Mt. Auburn and Belmont Streets fell within areas already under study by the Town of Watertown, City of Cambridge, and the state's Department of Conservation and Recreation (DCR). **Cambridge had identified this portion of Mt. Auburn Street as one of the worst in the city for MBTA bus delay and unreliability**. Two intersections within Watertown that touched the pilot project area were also within a long-term, Complete Streets, capital planning process, and DCR had been planning short-term capital improvements at Fresh Pond Parkway. Watertown was also studying a longer portion of Mt. Auburn Street in their jurisdiction, and they had been interested in testing out some solutions to congestion and transit delays.

The DCR's process for Fresh Pond Parkway had showed willingness from the surrounding community to implement transit improvements, and all three entities thought they could apply the solutions tested to each of their study areas. In general, in this area, **there was momentum from both municipalities and the state to push for improvements to the bus service**. The majority of the pilot area is within Cambridge, so they took the lead on the Barr Foundation's BostonBRT program application, in partnership with Watertown.

(2) WHY THE QUICK-BUILD METHODOLOGY

The project team thought with the Barr Foundation funding, they could test out some of the solutions they had been studying to advance each entity's planning process. The interviewee pointed out that pilots carried out with cones can require lots of person-power, are typically intended to be for a short duration, and typically have numerous design challenges that are not intended to be addressed during the pilot. By using the Quick-Build process, C**ambridge could invest slightly more money in modest changes, like restriping with thermoplastic and testing their first use of red paint, without making changes that were difficult to remove or modify**. This way, the project could remain in place for a longer evaluation period.

Cambridge's elements implemented wouldn't be removed, but would be evaluated regularly and could be made more permanent/tweaked based on performance. They will decide which elements of the pilot they can iterate on with more permanent materials based on the formal evaluation. Cambridge has been doing protected bike lane pilot projects, and is getting used to implementing and evaluating projects quickly so that it can arrive at vetted and more informed permanent projects. The city hadn't tested a bus lane.

(3) PROJECT TIMELINE: 10 months (approx.)

The project team initiated the concept design and public outreach process in January 2018,

and the pilot was implemented over a few weeks in October and November. Implementation was originally intended for Summer 2018, but because of the interdependency of the pilot with other with other projects managed by other entities, it had to be pushed back a bit.

(4) PROJECT TEAM + ROLES

- City of Cambridge
  - Community Development Department
  - Traffic, Parking, + Transportation Department
  - Contractors
- MBTA

Cambridge took the lead on the BostonBRT application, and its Traffic, Parking, and Transportation Department finalized the shared bus-bike lane striping plans (after working with a consultant to develop the design). The city used contractors for the implementation of the pavement markings, paint application, and signal changes (TSP at Aberdeen and Homer Avenues, and retiming at Belmont Street). DCR implemented a queue jump signal with detection at Fresh Pond Parkway and Coolidge Avenue (the eastern end of the lane).

Watertown led the implementation of the queue jump lanes at Walnut Street and School Street, as well as a bus stop relocation.

In terms of the municipalities' interaction with the MBTA, it was similar for this project as it was for the other BostonBRT awardees. The MBTA's main liaison was a new position, specifically created to improve collaboration with the municipalities in the Greater Boston Area. Cambridge, Watertown, and MBTA had regular check-ins throughout the process. Cambridge's Transportation Planner said that the city has worked with the service planning team for a long time prior to this project, but the new position made MBTA more accessible and responsive to municipalities.

(5) PROJECT ELEMENTS + DESIGN PROCESS

- 24-hour shared bus-bike lanes (two segments)
- Conventional bike lane
- Queue jump lanes
- Signal adjustments + TSP
- Painted curb extensions
- Signage

Varying existing conditions within the pilot segment of Mt. Auburn Street necessitated a few different treatments. For the majority of the segment, the bus-bike lane was implemented in one of the eastbound travel lanes. Where there was curbside parking, the lane was implemented in the adjacent travel lane. This meant that while no parking was removed, travel eastbound was reduced to one lane where there was a bus lane. For about one block,

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in the Watertown portion (Belmont St. to Ralph Piteri Terrace), the lane was implemented in both directions. The bus-bike lane was demarcated with red paint, "bus only" and shared lane markings, and signage.

There wasn't enough width to implement the lane going both directions for the entire segment, but the team was able to fit a bike lane heading westbound that started at Brattle and Mt. Auburn Streets, and continued along Belmont St. to Brimmer St. This bike lane included green-backed conflict zone treatments, and a bike box at Mt. Auburn and Aberdeen Streets. Cambridge also reduced the asphalt space on Brattle Street where it meets Mt. Auburn St. with buffered striping, to reduce the crossing distance for pedestrians and prevent cars from entering the unsignalized intersection at high speeds.

(6) MATERIALS + IMPLEMENTATION

- High-friction asphalt paint (red + green)
- Thermoplastic pavement markings + striping

Watertown used high-friction red paint and thermoplastic to stripe in right-turn lanes in the existing wide curbside travel lane at Walnut and School Streets. Cambridge also used thermoplastic for the striping and new pavement markings, and high-friction red and green paint for the bus-bike and bike lanes (a type of paint they knew would fade over time, and could be made more permanent). The signage was made permanent from the outset.

The Transportation Planner in Cambridge's Community Development Department (interviewee) said that the success of the bus-bike lane pilot was really contingent on the signal changes, which is why they adjusted the signals about a month before the paint went down in late October. This gave all road users a chance to get used to the new movement patterns before having to adjust to the changes that would result from the lane's implementation. DCR made its signal changes after the red paint went down.

Watertown implemented two eastbound queue jump lanes on Mt. Auburn St. at Walnut and School Streets in August in advance of the lane implementation, two intersections within a mile west of the bus lane pilot (mostly in Cambridge). They also moved a bus stop at the western initiation of the lane within, the segment within Watertown's jurisdiction.

(7) PUBLIC ENGAGEMENT

From other pilot projects that Cambridge has done, they learned that robust public engagement prior to implementation is crucial, and the team thought they successfully engaged the community along the corridor in the design process.

The interviewee said that their part of the pilot was not intended to be removed unless there were safety or significant concerns over it not functioning as intended, and the city messaged it as such, with the caveat that it would be made more permanent if deemed a success. Watertown was more pointed in using the "temporary" messaging, and messaged their queue jump lanes (at Walnut and School Streets, installed in August 2018) as a part of the town's

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Complete Streets efforts. They were more communicative that their part of the pilot would be removed if necessary.

The project team thinks that more of the trust building happened between municipal departments. The cross-jurisdictional communication, and effectively not messaging the project in silos, has greatly strengthened the relationships between Cambridge and Watertown, the MBTA, and DCR.

(8) PUBLIC FEEDBACK + OUTCOMES

It might still be too early to tell, but since the project's implementation, **most of the negative feedback has been from motorists**. It took about three weeks to get the signals working the way they should, which the interviewee says will be difficult for the motorists to forget. Although Cambridge has done pilot projects before, and is always diligent in communicating that the projects don't have set deinstallations, there's still a feeling from motorists that the city is "constantly taking things away from them". Bus operators and riders immediately saw the benefits of the lane, and so far there haven't been any complaints about bus-bike conflicts. The interviewee doubts the project will bring out many more bicyclists, but thinks it will be greatly appreciated for people already riding on the corridor.

Two weeks after the pilot was fully implemented, the project team went out to the street and surveyed 225 riders. **98% of riders said they wanted to make the bus lane permanent**, with 70% saying they think the lane has sped up their rider by at least four minutes.

In December 2018, Cambridge started collecting early data on bus travel times, but there will be a more robust collection of this quantitative data in Spring 2019, at which point they will also collect data on bicyclist usage and travel times for motorists. Data collected at this time will be compared to Spring 2018, before the pilot was implemented.

The Cambridge interviewee said that violations along the corridor have also reduced, even just weeks after the pilot was fully implemented. People were most confused merging from two lanes to one where the bus-bike lane started, and didn't seem sure where they could enter the lane when they wanted to make right turns. The project team has also heard from bicyclists that the point where the bus lane drops for a block and a half feels most uncomfortable because the lane becomes a general travel lane with drivers merging with buses.

Watertown didn't collect feedback on just the queue jump lanes, but its Complete Streets project has a website where people can submit comments. The Watertown interviewee said that in general, the interventions were well-received specifically because they removed the no-turn-on-red restrictions, making traffic flow better for all users.

(9) QUICK-BUILD LESSONS + ADVANTAGES

The Cambridge interviewee is confident that one of the biggest benefits of the process has been the cross-jurisdictional relationship building. Without political pressure, existing planning processes to springboard from, and departments willing to try innovating things, the project

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wouldn't have been a success. Their desire to implement quickly meant they were forced to arrive at solutions together faster, even during times of frustration. For a region that the interviewee claims isn't "good at crossing (municipal) boundaries", the project implementation alone is a success.

Additionally, the lane inadvertently helped the city enforce good driver behavior in general on the corridor. Aside from enforcing the bus-bike lane, the police officers on-site were able to catch other violations that were already happening, but worsening because of the lane (cars using left turn lanes to jump ahead of traffic, for example).

The process has also helped advance conversations about similar treatments on other corridors in Cambridge, and has overall moved the needle on addressing region-wide MBTA service improvements. For Watertown, the queue jump lanes will inform their Mt. Auburn St. planning process, and Complete Streets goals. They didn't get conclusive data on speed and reliability because of the isolated nature of the interventions.

(10) CHALLENGES

Cambridge's project manager said that it would be ideal in the future to streamline the implementation so that it doesn't have to be over multiple weeks. She also said that future signal work performed by contractors should be more closely supervised by the city to ensure quality control.

Consistent enforcement for the first month or so of the pilot was also difficult. The team had to pay police officers overtime, and they sometimes got pulled away for other jobs. Choosing the enforcement strategy was also challenging. The team was deciding between heavy enforcement (more officers) for a shorter, but more consistent, period of time, or fewer officers over a few more weeks. They found that having too many police officers on the corridor was counterproductive, as they didn't want roadway users to get used to any conditions that wouldn't be the permanent ones. Where there was no parking, it was difficult to pull people over for violations. The interviewee said that the buses are all equipped with cameras, but that the city isn't able to use them for enforcement at this time.

For Watertown, the implementation of the jump lanes was smooth, but there was initial confusion from drivers since there were new right turn lanes where there hadn't been before. Signage was adjusted to improve visibility.

(11) FUNDING

With **$100,000 of the BostonBRT program funding, plus extra contributions from Cambridge for its portion**. $10,000 of the program funds were allocated for Watertown's portion. Cambridge spent $120,000 on signage, pavement markings, and paint (double what it had proposed), $27,000 on the signal changes ($20,000 proposed), and $25,000 for enforcement ($10,000 proposed). DCR's work was its own construction project, and did not utilize any of the grant funds.

The extra funds from Cambridge came from its Traffic, Parking, and Transportation Department's general budget. The project was very interdepartmental, and had strong support from that department's director, so there was little need to justify the allocation of that money to the project.

(12) WHAT'S NEXT?

Watertown's jump lanes remain, and there is desire to work with the MBTA to implement TSP at the two intersections. However, the need to upgrade signal equipment is a significant barrier pending implementation of the Complete Streets project.

For Cambridge, they learned a lot about how they might streamline their internal collaboration for similar projects in the future, whether they're Quick-Build in nature or not. The Spring 2019 results will inform whether they upgrade the red paint to something more permanent. The city will also be launching a process to finalize a design for the reconstruction of Belmont Street (one segment of the pilot) in the next few months. Designs should be finalized around the fall and construction (utilities only) will start in late 2019. Surface construction will start in 2020.

NOLENSVILLE CROSSING TREATMENT

PROJECT TEAM: TDOT, Metro Public Works, Walk Bike Nashville

PROJECT LOCATION: Nolensville Pike at Welshwood Drive, Nashville, TN

PROJECT INSTALLATION: December 2017

PROJECT DURATION: Will remain until permanent project is implemented

MATERIALS: Thermoplastic, modular refuge islands, flashing crossing beacon

DID IT WORK? It's functioning well, and there have been zero pedestrian fatalities since its installation!

An interim crossing treatment at a bus stop, including refuge islands and signage, built with new striping, vertical barriers, and flashing pedestrian signals.

(1) PROJECT IMPETUS

The intervention was installed at one of the deadliest intersections in the city, at a stop with one of the highest daily boardings on the Nolensville Pike. **Seven people had been killed in seven years**. In 2016, following a data collection project on fatal crashes throughout the city, local advocacy nonprofit Walk Bike Nashville received a grant from New York City-based foundation TransitCenter to create an outreach project along the Nolensville Pike. The organization teamed up with another advocacy group on the corridor (Conexion Americas), and conducted public meetings to brainstorm revitalization efforts and ways to make it safer for pedestrians. As a part of the project, the team hosted walk audits to identify the most challenging areas. A week after one of their walk audits with TDOT and the Metropolitan Government of Nashville (Metro), one more person was killed.

There is a TDOT Highway Safety Improvement Program project to signalize the intersection, but it's still about a year away, so the organization started encouraging the local government, with which they have a very positive relationship, to implement a solution immediately.

TDOT had already been invested in an interim solution for the intersection. With this revived impetus to act, the pilot project was conceived.

(2) WHY THE QUICK-BUILD METHODOLOGY

The intervention is temporary only because **there's a permanent project planned for the intersection, but the materials are sturdy**. The "quickest" part of the project was the process leading up to the implementation. The entities involved had decided it was imperative to find resources and work together fast.

(3) PROJECT TIMELINE: 3 months

The high profile nature of the location encouraged the project team to work together quickly to procure the materials and install the intervention.

(4) PROJECT TEAM + ROLES

- Metro Government of Nashville + Davidson County
  - Public Works
- Tennessee Department of Transportation
- Walk Bike Nashville

Because the project involved an installation in the right-of-way, although it's a state road, Metro Public Works led the design and installation of the project. Metro is also responsible for maintaining the intervention, like replacing posts that have been hit, for example. TDOT provided support in materials and labor, and both entities communicated efficiently (bypassing

most of the capital project permitting process) to get the intervention in the ground as quickly as possible. Because they weren't moving the curblines, some permits, like stormwater and water quality, weren't needed. The number of permits required would have added weeks to the project's timeline.

Both TDOT and Metro interviewees said that there's already regular communication between each entity, but this project helped them see how to "mobilize the troops" for quick implementation of projects in the future. The Nashville MTA liked the project, since it enhanced access to their transit. They were minimally involved in the process, and didn't have any permitting power over its execution.

(5) PROJECT ELEMENTS + DESIGN PROCESS

- Refuge islands
- Pedestrian signals
- Signage

Two doweled refuge islands were installed in the right-of-way, one in the existing buffered median, and another between the curbside lane and the first southbound travel lane, to create a buffered lane where the bus would pull up to the shelter. At the edges of the curbing are delineator posts and reflective thermoplastic striping. Signage indicates to drivers to yield to pedestrians when the flashing beacon is on. A continental crosswalk was installed even with the southbound bus shelter (slightly up the street from the northbound shelter), and yield ("sharks teeth") pavement markings were installed leading up to the crosswalk. New ADA ramps were constructed.

The interviewees from Metro Public Works expressed an initial level of discomfort with installing a crossing at an unsignalized intersection on such a large arterial (approx. 35,000 ADT), although they have observed that cars slow significantly at this location, and so far no one has been hurt. If there hadn't been a permanent project already in the works, they may not have pursued an interim design. Temporary interventions to them are especially valuable when they need to test things like dimensions, or evaluate roadway user response. But if they know that a treatment is needed somewhere, they typically just develop a permanent project from the outset.

(6) MATERIALS + IMPLEMENTATION

- Rubber, doweled refuge islands
- Thermoplastic pavement markings + striping
- Delineator posts
- Tactile warning pads
- Flashing beacon

The equipment/materials were a lot of things Metro Public Works and TDOT had on-hand. The materials had to be sturdy enough to be effective, but not difficult to remove once it became


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WALK BIKE NASHVILLE

time for the permanent traffic signal to be installed. It was more a question of who had what equipment, and how could they make the intervention the most cost effective. The Director of Project Development for TDOT's middle Tennessee region (interviewee) said that they needed to find a solution that wouldn't involve major changes to the right-of-way, and that they had to avoid an installation that would normally have to go through a much longer process. The refuge islands were the first ones Metro Public Works had ever used.

The city provided the pedestrian beacon, and took the lead on installing the striping, modular pedestrian refuge islands (doweled into the asphalt), posts, and signage, and installing ADA accessible curb ramps. TDOT contributed labor for the installation through their existing on-call contracts. In Tennessee, TDOT owns the roads, but Metro maintains the signals, and pavement markings, striping, etc. Luckily, there weren't too many limitations in terms of the roadway at this location (could fit the crossing between existing driveways, drains, etc.), so the customization of the equipment to fit the context didn't take too long.

(7) PUBLIC ENGAGEMENT

There wasn't a public engagement or input element of the project, but all parties interviewed think it has been a success purely because they were able to respond quickly to an urgent matter.

(8) PUBLIC FEEDBACK + OUTCOMES

The project team has observed that **people are driving more cautiously at the crossing**. To them, it seems to be functioning well so far. The interviewee from TDOT says that because of this project, the conversation about using interim materials is "alive and well".

In January 2019, Walk Bike Nashville observed the crosswalk for pedestrian compliance, and recorded pedestrian counts. The organization actually thinks the interim solution will be safer for pedestrians, as signalizing the intersection will result in longer crossing cycles, making pedestrians more likely to use the crosswalk outside of the signalized cycles if they don't want to wait as long.

(9) QUICK-BUILD LESSONS + ADVANTAGES

The Executive Director of Walk Bike Nashville (interviewee) said that she's optimistic that this will have applications for other arterials in the future, but that there may still be work to do to navigate the city/state permitting processes. Walk Bike Nashville will continue to advocate for improved processes and quicker responses to dangerous roadway conditions in the city, and support other initiatives like the Nashville Civic Design Center's TURBO (Tactical Urbanists) to advance projects that may not garner enough support because of limited resources at the city and state level to collect data or public input.

All three entities said that the project was successful even just for the efficient communication, and ability for all entities to be nimble and work together. It has enhanced their working relationship.

(10) CHALLENGES

The project has been a challenge to maintain. The project team said they'd avoid posting signs within the refuge area in the future, as they're frequently getting hit.

(11) FUNDING

Metro Public Works donated the flashing pedestrian beacon, and procured the refuge islands. **Metro and TDOT contributed up to $25,000 total** in labor and other materials.

(12) WHAT'S NEXT?

Both Metro and TDOT are open to using a quick implementation process again, and Metro is looking at other possible applications. Metro has worked with local initiative TURBO on installing projects they wanted to evaluate temporarily, and is collaborating with the group on the establishment of a permitting process for temporary projects in the city. Metro has been supportive of thinking through ways to streamline permitting when there are temporary projects they feel comfortable testing, and that will yield useful information.

NYC BUS BOARDING PLATFORMS

PROJECT TEAM: New York City Department of Transportation

PROJECT LOCATION: Four locations in New York, NY

- Utica Avenue @ Ave. N, Brooklyn (July '16)
- W 125th St. @ Malcolm X Blvd. (March '18)
- 7th Avenue @ 42nd Street (October '18)
- 7th Avenue @ 37th Street (October '18)

PROJECT INSTALLATION: July 2016 (1st)

PROJECT DURATION: 20 months (1st)

MATERIALS: Modular, recycled plastic elevated platform

DID IT WORK? They've already installed two more, relocated the first one, and have received material for more than 12 more.

Multiple modular bus boarding platform installations at spot locations, with site-specific design modifications.

(1) PROJECT IMPETUS

NYC DOT was familiar with bus bulbs as permanent infrastructure, and had been building them since 2007, a year before the launch of the MTA's Select Bus Service program. The department had the quick execution of pedestrian and bicycle projects in-house down pretty well, but **hadn't explored an interim solution for bus bulbs** (these had typically been capital projects). Someone from the department caught wind of a Spanish manufacturer that made modular, recycled plastic bus boarding platforms that could be customized and installed without pouring concrete, and the **department realized that they'd be the first to use this product in the United States**. The project ended up being managed by the Deputy Director of the Select Bus Service program (interviewee), housed within the Division of Transportation Planning and Management. This program was responsible for working with MTA to improve bus operations and customer experience where possible. The Deputy Director and staff ended up choosing a location in Brooklyn along Utica Avenue, a corridor that would be getting a new Select Bus Service route. The bus stop they chose for the platform was a low ridership stop, chosen intentionally because they hadn't used the product before, and weren't sure how it would perform in the winter.

(2) WHY THE QUICK-BUILD METHODOLOGY

The department was already working on the design of permanent bus bulbs along the same corridor. The platform wasn't meant to inform the permanent design necessarily, but rather be an interim solution to get platform-level boarding in the ground sooner. The department could have easily not implemented an interim intervention, but **wanted to test out the new product in case they could reuse it elsewhere in the city**. If it benefited bus transit at the first location, they'd use it throughout the city, tailoring it to site-specific conditions if need be.

(3) PROJECT TIMELINE: 1 year +

Installation happened over a year after the department first contacted the Spanish manufacturer (which was in April 2015).

(4) PROJECT TEAM + ROLES

- New York City Department of Transportation
  - Select Bus Service program
- Metropolitan Transportation Authority

The interviewee's division is engaged in a 50/50 partnership with the MTA through its Select Bus Service program, which enables efficient communication and collaboration between the transit agency and the entity that governs the streets (DOT). The process for joint execution of projects had been in place for a long time, so trying out the platforms followed that process.

The interviewee commented that this partnership was particularly advantageous, because there was an existing formal structure for collaboration. Furthermore, he thinks that the fact that there's always a need for these types of interventions in the city makes it easier to justify moving quickly to install projects that improve transit service.

(5) PROJECT ELEMENTS + DESIGN PROCESS

- Modular bus boarding platform w/ edge striping

The platforms and/or installation sites are customized as needed. The interviewee cited things like leveling the asphalt (if the platform isn't flush against the curb), adjusting the height of the existing curbs if need be, and removing obstructions at the curb. The department also had to avoid utilities, either by not placing the platform over them, or having removable pieces cover them. The striping around the edges had to conform with regulations, and the platforms on 7th Avenue had additional ramps for pedestrians to access the platforms from the painted curb extensions. At these locations, the department used white reflective tape and planters to make the ramps more visible.

(6) MATERIALS + IMPLEMENTATION

- Recycled plastic boarding platform

The department has only used internal crews for the installations. At first, the installations took about three days, but the interviewee said that once the crews become better trained, installation will likely happen within a day.

(7) PUBLIC ENGAGEMENT

There was not a robust public engagement process for the first platform beforehand, aside from flyers at the stop letting riders know when to expect the installation. The interviewee said that New Yorkers are typically used to the city trying out new things.

(8) PUBLIC FEEDBACK + OUTCOMES

The department surveyed bus riders for the first platform, mostly regarding whether or not they found the platform an improvement to their commute/overall experience. **94% of riders surveyed said it was easier to enter and exit the bus** since the installation of the bus boarding platform; 92% of riders surveyed said it was easy to walk from the sidewalk to the bus boarding platform; and **94% of riders surveyed said they were satisfied with the bus boarding platform**.

One anecdote the interviewee recalls is a rider saying the platform "added prestige to her neighborhood", an indication that neighbors were pleased with the investment in their local transit system. The interviewee said that anecdotally, people didn't have a hard time understanding how to use/engage with the platform.

Utica Avenue

ZICLA

W 125th Street

EVAN BIALOSTOZKY, MTA NEW YORK CITY

(9) QUICK-BUILD LESSONS + ADVANTAGES

The interviewee is confident that the use of these consecutively along a corridor will speed up service by reducing boarding times (more room for people to line up, and the buses don't have to pull in and out of the curb). From the interviewee's observations, the modular platforms improve accessibility because the buses don't have to awkwardly pull up to the curb. Because the platform edge is aligned parallel to the bus, there aren't gaps between the platform and bus door. He also noticed that less cars park illegally in the bus area, and that riders have more room to wait without feeling crowded.

The department is working on how to quantify the impact of bus bulbs in general (not just the modular platforms), and select the appropriate measures of success to evaluate.

(10) CHALLENGES

The manufacturer had not manually disassembled and reassembled the platforms before, because locally the company uses them permanently from the outset. But when the department told them of their plans, the manufacturer created instructions for them to do so. The department is learning how to order them according to the city's regulations (right color of striping around the edges, addition of tactile warning pads), but the interviewee said that they're still not using them much to inform permanent design (aside from one or two cases).

The platforms are very customizable, and so the project team was able to request adjustments to them according to the unique right-of-way conditions in the city. For example, the length of them had to match their bus length, the platforms had to be installed in a way that avoided manhole covers and utilities (these platforms had to be customized on more of a site-by-site basis), etc. This made the procurement process a bit more complex, but the interviewee still says their use is "worth it" and valuable to the city. The manufacturer has been helpful in working with the department to modify the platforms if necessary.

(11) FUNDING

The city purchased the initial Utica Avenue platform from the Spanish manufacturer through a micro-purchase mechanism. Because the city's procurement limit was $20,000, and the platform cost $40,000, the **manufacturer sold it to the city for half-off**. More recently, the **city committed to $3 million of the platforms over three years**, which will amount to about 40 platforms to be deployed as needed throughout the city. City funds allocated to the Select Bus Service program were used for this contract. Extra costs for the installations included site preparation like asphalt leveling or minor curb preparations, but these were done with in-house crews to minimize expense.

(12) WHAT'S NEXT?

The Utica Avenue platform was disassembled and reassembled in Harlem in March 2018. The materials to install platforms in at least a dozen more locations (Cypress Hills Street in Queens,

7th Avenue

NYCDOT

other locations TBD) will be arriving in the coming months, and in October 2018 two more platforms were installed on 7th Avenue at 42nd Street and 37th Street. As far as identifying other locations for future installations, the interviewee said that at first he thought it would be good to install them at locations where there were already capital projects planned, or on corridors that were launching new Select Bus Service. However, he said other criteria have since "trumped" that rationale. For example, on 7th Avenue, the city is widening the sidewalk with paint. At the bus stops, however, you still need a curb or platform to be level with the bus to accommodate wheelchair boarding, and to allow pedestrians to step onto the platform from the painted curbs. The department will also look for locations where buses are pulling into protected bike lanes to reach the curb. Platforms at locations like this will problematize permanent design solutions to address pedestrian, transit, and bicycle conflicts.

OAKLAND BUS BOARDING PLATFORMS

PROJECT TEAM: City of Oakland Department of Transportation, Alameda-Contra Costa Transit (AC Transit)

PROJECT LOCATION: Four platforms on Telegraph Avenue, Oakland, CA:

- Telegraph Avenue and 24th Street (x2)
- Telegraph Avenue and 27th Street (x2)

PROJECT INSTALLATION: First two in January 2018, second pair in August 2018

PROJECT DURATION: 1-2 years, until permanent islands are implemented

MATERIALS: Modular, recycled plastic elevated platform

DID IT WORK? The project team is still compiling the data.

Multiple modular bus boarding platform installations at spot locations along a pilot project corridor.

(1) PROJECT IMPETUS

The platforms were installed as a **part of the Telegraph Avenue Complete Streets project**, a series of pilot projects and transformations to Telegraph Avenue guided by the Telegraph Avenue Complete Streets Plan, adopted in 2014, aimed at improving the safety and increasing the mode share on one of the city's most dangerous corridors. These pilot projects will serve as interim solutions until a grant-funded capital project will make them permanent (concrete bike lane medians and boarding islands).

In 2015, the city identified an opportunity to pilot some of the Complete Streets elements through a repaving project planned for the corridor. As a part of the first pilot installations in April 2016, the city added high visibility crosswalks and new lane lines for nine blocks of Telegraph Avenue. In anticipation of the permanent median-protected bike lanes, it incorporated a protected bike lane (the city's first) into the 2016 Complete Streets project implementation, along with painted curb extensions/buffer zones and a new parking configuration. One piece missing from the bike lane, however, was an interim boarding island. The city had also observed buses pulling into the bike lane at the bus stops, which reinforced that an interim intervention could help resolve this issue.

Before the interim boarding islands were installed, a progress report on the pilot projects revealed a 40% reduction in bicyclist and vehicular collisions, 27% (northbound) and 45% (southbound) reductions in travel speeds, and no pedestrian crosswalk collisions had been reported for the first time in five years.

(2) WHY THE QUICK-BUILD METHODOLOGY

The permanent boarding islands were going to take too long, and the **city wanted an interim solution it could implement as soon as possible**. The recycled plastic platforms (Spanish manufacturer) seemed like a good interim strategy, especially because they could be reused and customized, and were still cost-effective relative to a permanent project. The project team said that the city is typically resource constrained, which encourages it to get creative and seize opportunities (like it did with the repaving project) to get infrastructure in the ground.

(3) PROJECT TIMELINE: 6 months

It took about six months to plan for and install the first two temporary platforms.

(4) PROJECT TEAM + ROLES

- City of Oakland
  - Department of Transportation
  - Contractors
- AC Transit

The city and AC Transit worked very closely on the design and deployment of the boarding islands. AC Transit was very excited about them, and did a lot of work with the bus operators to educate them on how to use the platforms. OakDOT planners also brought the boarding island design to AC Transit's Accessibility Advisory Committee for review. The city used internal funds for the platforms, and installed the islands with the same contractors it used for the bike lane.

(5) PROJECT ELEMENTS + DESIGN PROCESS

- Modular bus boarding platforms w/ edge striping + markings

The boarding islands "float" in the bike lane buffer space, meaning they are not flush against the curb. The city had to accommodate bicyclists in the bike lane and pedestrians accessing the bus with ramps that were placed in the bike lane, and connected the curb to the platforms. The platforms did come with reflective striping around the edges, but the city wanted to add additional striping to ensure the platforms were visible to both drivers and bicyclists. After the installation of the second two platforms arrived, the city finalized the platforms with added another set of tactile domes on the sidewalk-side, added yield markings, and added crosswalk markings across the ramps. It also added striping and posts around the edges of all four platforms.

(6) MATERIALS + IMPLEMENTATION

- Recycled plastic boarding platforms

The platforms were an intriguing and cost-effective interim solution. Originally, the city wanted to install all four in January, but the vendor shipped the wrong number of pieces and in order to implement the full platforms, the vendor needed to use parts of two of the platforms to make the first two fit the right length and width they wanted, and they made some tweaks to the platforms (see above) for a second delivery and installation in August.

(7) PUBLIC ENGAGEMENT

The city installed notices at each location with a photo simulation of the boarding islands and indicated that the boarding islands were coming.

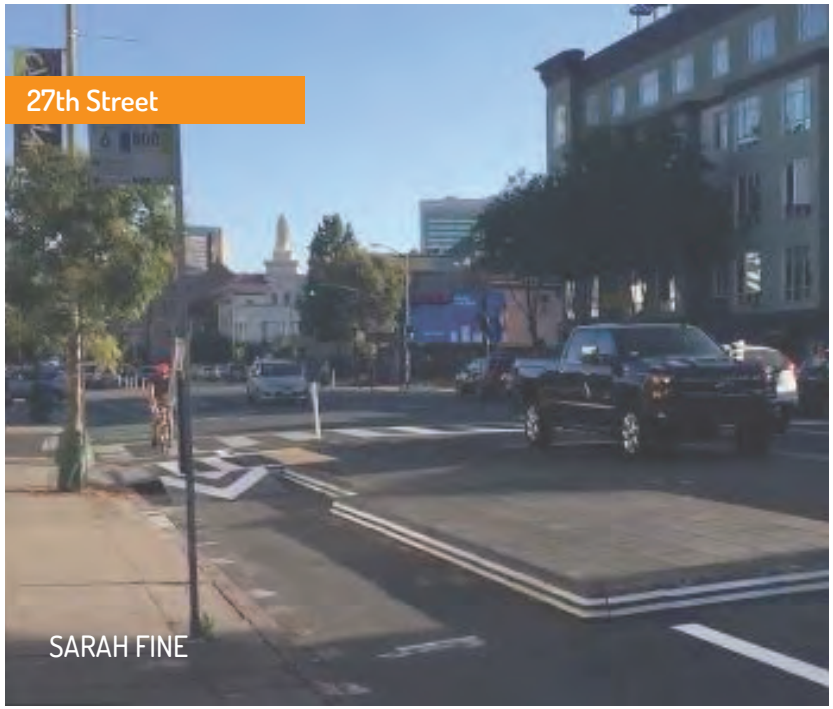
The city continues public outreach for the entire Complete Streets project, and so far has been receiving a lot of positive feedback. It has been trying out different kinds of outreach, not just community meetings, like mobile workshops and sidewalk decals, to keep the public engaged and preview them on the next iterations and possible new projects. The current project manager (interviewee) said that they think they can do even more regular outreach.

(8) PUBLIC FEEDBACK + OUTCOMES

The city is **still compiling data on the performance/impact of the boarding islands**. As for the bike lane data, presented in 2017's progress report, 52% of bicyclists that travel on the corridor have said they've increased their travel on Telegraph because of the bike lane. As of January 2017, there was a 9% increase in retail sales along the corridor.

24th Street

TRANSITCENTER


27th Street

SARAH FINE

(9) QUICK-BUILD LESSONS + ADVANTAGES

There's no data just yet, but the city feels as though implementing the pilot projects on the corridor in general have been beneficial for their internal process and communication. The Complete Streets project was the first for the city, and it has since become much more confident in testing infrastructure. There is urgency from department leadership to address the most unsafe corridors in the city, and it would like to continue to apply the Quick-Build methodology to implement solutions. The city team said they continue to realize how important ongoing public outreach and communication is for the pilot process.

(10) CHALLENGES

In the beginning, all four platforms couldn't be installed at the same time, because of a vendor mix-up. Any other observations of the entire pilot, including the bike lane, were able to be addressed fairly quickly by the city and AC Transit.

(11) FUNDING

The city was able to tap into **an OakDOT fund programmed for bicycle and pedestrian improvements**. The procurement and installation of each platform was approximately $50,000.

(12) WHAT'S NEXT?

The concrete boarding islands are still in the works, and the city thinks the interim platforms will help inform its permanent design. It has already begun other pilot projects in other parts of the city (non-transit related), but are sticking to those that have an eventual permanent component for now, because the structure and process for implementation is already in place. The project manager continues to keep a log of permanent projects that could be tested with interim elements, and other possible pilot projects throughout the city.


ZICLA

RHODE ISLAND AVENUE BUS LANE

PROJECT TEAM: District Department of Transportation, Washington Metropolitan Transportation Authority (WMATA)

PROJECT LOCATION: Rhode Island Avenue NE between North Capitol Street and 12th Street NE (both directions)

PROJECT INSTALLATION: July 2018

PROJECT DURATION: 6 weeks

MATERIALS: Traffic paint

DID IT WORK? The results were mixed, but the team learned a lot!

A 12-hour shared bus-bike lane including signage, demarcated with temporary "Bus Only" pavement markings.

(1) PROJECT IMPETUS

The project was a **solution to the temporary shutdown of WMATA's Red Line** (subway) between Fort Totten and NoMA-Gallaudet stations. Two stations would be under construction along the Red Line between Rhode Island and Michigan Avenues. To compensate for the resulting less accessible subway line, WMATA added shuttle buses and additional service on local Metrobus routes, many of which would operate along the Rhode Island Avenue corridor. Advocates had been vocal about the District trying out bus lanes on Rhode Island Avenue ever since the area's Advisory Neighborhood Commission (ANC) 5E (a non-partisan, neighborhood body made up of locally elected representatives) unanimously passed a Comprehensive Transportation Resolution in January 2018. This resolution included a number of ideas to improve transit access for the area, one of them being taking advantage of the Red Line shutdown to implement bus lanes on the Rhode Island Avenue Corridor. DDOT **decided to take advantage of an opportunity to test a priority bus lane**, and show the community that bus lanes were something that could improve bus travel time and reliability in the District. DDOT and WMATA collaborated to implement a bus-only lane for 12 blocks in the existing curbside parking/travel lanes in both directions, active from 7am-7pm Monday-Saturday. Because the lane would be taking away a combined travel/parking lane, DDOT thought it would be a good opportunity to test something that would be applicable to other conditions throughout the city.

(2) WHY THE QUICK-BUILD METHODOLOGY

Mostly **because of the time constraints of the subway station shutdown**. DDOT had also seen examples of "pop-up" bus lanes in the Greater Boston Area, and were encouraged by the methodology.

(3) PROJECT TIMELINE: 5 months

WMATA announced in February that the stations would be closed, and the project team acted fast to implement the bus lanes five months later.

(4) PROJECT TEAM + ROLES

- Mayor's Office of Community Relations + Services
- District Department of Transportation
  - Transportation Operations + Safety Division
- District Department of Public Works
- Washington Metropolitan Area Transit Authority

As one of WMATA's funding partners, DDOT already has an ongoing working relationship with WMATA. Leading up to the pilot implementation, DDOT and WMATA worked closely to finalize

the shuttle routes and other operational details. WMATA and DDOT, as well as the Mayor's Office of Community Relations and Services (MOCRS), went out together to ANCs for the messaging effort of the project.

(5) PROJECT ELEMENTS + DESIGN PROCESS

- 12-hour shared bus-bike lane
- Signage

Because the parking lane operates as a travel lane during peak hours and this lane was repurposed as a bus lane, there wasn't much to be done for design. DDOT's Transportation Operations and Safety Division used their previous templates for the "Bus Only" pavement markings and "Emergency No Parking" and other signage, and installed them on site.

(6) MATERIALS + IMPLEMENTATION

- Traffic paint

DDOT implemented the pavement markings and signage with the help of their signage department, and deployed Traffic Control Officers to manage the higher-than-usual volumes of buses at key locations. The pavement markings and the temporary signage were installed the weekend before the bus lane went into effect. Beginning in April, DDOT and WMATA met bi-weekly with the District's Department of Public Works (a separate agency) to enforce the no parking regulations, as well as the District's Metropolitan Police Department for enforcing illegal travel in the bus lanes (no additional funds were spent on enforcement). Once the project was underway, DDOT collected and compiled a variety of performance data from WMATA to evaluate the performance of the buses. The pavement markings were not removed after the project, and will fade over time.

The project team didn't want to use red paint, because it would be so short-term. They wanted the materials to be easily removable, but early evaluation of the lane reveals that more robust markings and signage, and maybe even physical barriers, may have made it more effective, and reduced violations. DDOT used red paint for a permanent bus lane on another short corridor in the District, which in that location has been shown to be helpful in reducing violations, and the project team believes that red paint would have made a big difference in bus lane compliance for the pilot.

(7) PUBLIC ENGAGEMENT

The project team did a lot of outreach with the area's three ANCs and a civic association leading up to the project. WMATA posted signage and staff at closed stations and transfer locations to inform riders in advance of the closure and DDOT posted notices/doorknob hangers at residences and businesses along Rhode Island Avenue. The team was diligent to communicate that the bus lanes would not be implemented permanently.

DDOT

DDOT

(8) PUBLIC FEEDBACK + OUTCOMES

The project team says the community is happy that DDOT performed the pilot, especially following their advocacy earlier in 2018. As DC has few existing bus lanes, any successes that could be documented are helpful in gaining momentum for future projects. In general, the team says that public engagement is a critical part of bus lane projects. They do have support from their department leadership, but it is important to document any successes.

Compliance with the bus lane was poor over the study period, as **over 70 percent of vehicles in the bus lane in most sections of the corridor were private vehicles**, either parked or driving. It is possible that many motorists were unaware of the bus lane, as pavement markings were only installed near intersections, and because many of the temporary parking restriction signs were torn down. Ridership on the MetroExtra G9 (which operates along Rhode Island Avenue) following the reopening of the Red Line continued to be higher than the ridership before the closure for a few weeks. In the 3 months before the Red Line closure, average monthly ridership on the G9 was 684 riders a day. This increased to an average of 1,095 in the weeks of the closure, and in the three months following the reopening, the average is 742, an increase of about 8 percent since July 2018.

The **test had mixed results from initial data collection and observation**. While bus speeds decreased during the bus lane pilot, general travel speeds also decreased during this time period, which suggests that increased vehicle volumes were a major contributor to the cause of the decreased bus speeds. Because WMATA includes dwell time in their bus travel speed calculations, increased ridership also probably led to slower segment bus speeds as additional passengers took more time to load.

(9) QUICK-BUILD LESSONS + ADVANTAGES

The public enjoyed seeing the lane implemented, but the project team thinks that some critical design factors limited its effectiveness (not using red paint and limited use of bus lane markings, for example). Regardless, the team thinks the Quick-Build process served them well in other ways. The test was another opportunity to see how the District could improve bus operations by implementing bus lanes, so that the different entities will be even more ready for permanent bus lane implementation at other locations across the District.

Doing bus improvement projects quickly is also a priority for the District, and they're working on identifying solutions for slow or unreliable bus service that will get them the "most bang for their buck". The test helped them think about how they may tackle the "low hanging fruit", and make incremental corridor improvements. They're "building their best practices" for when and where different treatments are warranted.

(10) CHALLENGES

The team said that they'd have red painted bus lanes, more signage, more frequent pavement markings, and better enforcement. They'd also be out with other staff in reflective vests and in

greater numbers on launch week for higher visibility around the project corridor and remind operators and motorists about the project. This will likely improve the compliance rate of motorists and bus operators with bus lanes.

(11) FUNDING

The project team was unable to provide funding information.

(12) WHAT'S NEXT?

The city will have three miles of bus lanes in the next few years. There's a desire to formalize the process for delivering these projects, possibly with the formation of a dedicated bus infrastructure focused team. The test was a good way to build momentum for their upcoming permanent bus lane project on 16th Street, and pilot bus lane project on 14th Street. Rhode Island Avenue's bus volumes don't warrant bus lanes under ordinary conditions, but the team identified some things they'd do better for temporary bus lanes next time.

SOLANO AVENUE BUS PARKLET

PROJECT TEAM: City of Albany, Alameda-Contra Costa Transit (AC Transit), Business Owners

PROJECT LOCATION: Solano + Cornell Avenues, Albany, CA

PROJECT INSTALLATION: February 2018

PROJECT DURATION: Permanent

MATERIALS: Doweled concrete, treated wood, pavers, steel, plant material

DID IT WORK? It's looking good so far!

LONG-TERM OUTCOME

A parklet at a bus stop, which incited the production of an AC Transit's Bus Parklet Design Manual.

(1) PROJECT IMPETUS

The AC Transit project manager (interviewee) **initiated the project with an application for a Safe Routes to Transit grant** from TransForm, a California foundation. He socialized the concept by engaging local high school students through UC Berkeley's Y-PLAN program, asking them to reimagine bus stops as communal spaces. Coincidentally, around the same time the **City of Albany was approached by two business owners requesting to replace an existing bus stop with a parklet**. In lieu of removing the bus stop, this presented an ideal opportunity to develop a "stoplet"-- the first of its kind in the country, and the first parklet in the City of Albany.

(2) WHY THE QUICK-BUILD METHODOLOGY

Public opposition to transit improvements on a similar corridor had delayed implementation and resulted in dramatic reductions to transit benefits. **Messaging this project as "temporary" was thought to reduce opposition and simplify environmental review processes**. The design and installation process was **fast-tracked within the city administration thanks to strong support from the City Manager**. Although technically a pilot project, strong public support emboldened project stakeholders to use durable materials that could remain long-term. The parklet was designed, however, with ease of removability in mind. A maintenance agreement with the business owners clarifies that it could be removed if need be, pending any future street capital projects or major damage.

(3) PROJECT TIMELINE: 1.5 years

The business owners designed the infrastructure, based on a few minimum design regulations from AC Transit. This process was what took the longest, in addition to finding a contractor that could install it.

(4) PROJECT TEAM + ROLES

- City of Albany
  - Department of Recreation + Community Services
  - Department of Public Works
  - Department of Community Development
- Alameda-Contra Costa Transit (AC Transit)

The project was led primarily by the Recreation & Community Services Director of the City of Albany, after being initiated by the former AC Transit project manager. These two and the business owners met regularly throughout the process. The city was responsible for the site inspection, issued the encroachment permit, and worked closely with the contractors chosen

to install it by the business owners. The business owners are now in charge of the maintenance, and assumed liability for it like they would have to for sidewalk dining. This system of stewardship was based on San Francisco's parklet program. The city will inspect it each year for major damage, and reissue the encroachment permit. The parklet has "hours" that coincide with the bus service to prevent loitering, and the city has added police patrolling at certain hours to ensure compliance.

(5) PROJECT ELEMENTS + DESIGN PROCESS

- Bus stop parklet

Business owners designed the parklet based on a set of design requirements provided by AC Transit (ADA accessible, clearance at door zones, durable curbs, wayfinding signage) with review by the city's Recreation & Community Services and Public Works Departments. The city project manager (interviewee) said that she didn't think the parklet would have had "as much character" if the city had designed it. The final design is unique and something the city is proud of, although more expensive than anticipated. While they used precedents like Los Angeles' People St Program Kit of Parts, and San Francisco's parklet program to guide their process, they didn't want to uniformly replicate what had been done in these cities. The AC Transit project manager suggested that more specific guidelines about design and materials may have improved efficiency.

(6) MATERIALS + IMPLEMENTATION

- Concrete pavers + curbing
- Steel levelers
- Wood + steel planters

The designers of the parklet chose materials that would be durable, as it was planned to be permanent from the beginning (unless any changes needed to be made). Pavers comprise the foundation, and sit on top of steel levelers bolted into the ground. A doweled cement curb was built around the edge of the parklet to protect the structure from incidental contact with the wall of the bus tires during pull-in and pull-out, and the seating and planting fixtures are a combination of treated wood and welded steel.

Contractors chosen by the business owners, and approved by the city, were used for the installation.

(7) PUBLIC ENGAGEMENT

The design of the parklet heavily involved the business owners and community, so a formal public engagement process wasn't necessary. Other adjacent business owners on the corridor were aware of the project.


COMMUNITY DESIGN + ARCHITECTURE

STEPHEN NEWHOUSE

(8) PUBLIC FEEDBACK + OUTCOMES

The parklet was **immediately positively received by transit riders**. AC Transit began data collection on metrics like ridership and dwell times for the bus stop late Summer 2018, and will be collecting more formal feedback from operators and riders to isolate if there have been any behavioral changes since the installation (are more people choosing to use this stop, is the ADA access adequate, etc.). The data collection will be for six months, and the public surveying for one month.

(9) QUICK-BUILD LESSONS + ADVANTAGES

Both AC Transit and the city think the process of design and installation can be made even faster and more efficient for future applications, with a unique approval process within the city's Public Works Department. AC Transit hired local design firm Community Design + Architecture to produce a Bus Parklet Design Manual, to be completed early 2019.

The AC Transit project manager also learned that a key to repeating this process would be setting aside regular, internal funds to put toward pilot projects.

(10) CHALLENGES

Solidifying a contractor was a main challenge, in addition to working through the design review process with all the city departments involved.

(11) FUNDING

The **project in total cost just under $95,000**. AC Transit received a grant for $100,000 for a proof of concept (to build the parklet) and a design guideline manual (which was produced after the project's implementation). Of that, $25,000 was transferred to the City of Albany to contract out construction, and about $2,000 was used for rewards for the Kickstarter campaign. The city Department of Recreation & Community Services contributed about $13,500, $21,000 was raised by a Kickstarter campaign, the business owners contributed about $20,500, the project earned about $8,000 in other donations, and the Albany Community Foundation contributed a couple thousand. For the city's contribution, it used the Recreation Reserves, the collection of the city's capital improvement fee from facility rentals which are typically put back into recreation facility and park improvements. It received City Council approval for the allocation to the parklet.

(12) WHAT'S NEXT?

The city's project manager said that it definitely "catalyzed interest" at the city to do more. In creating a more streamlined process, the city would have to work out exactly which departments or divisions should be in charge of the approvals and review, and at what points along the process. They remain open to letting third parties design them if they can use the Bus Parklet Manual produced by Community Design + Architecture.

In January 2018, the project won the Outstanding Facility or Park award from the California Park and Recreation Society (District 3).

STEPHEN NEWHOUSE

COMMUNITY DESIGN + ARCHITECTURE

STREETS FOR PEOPLE

PROJECT TEAM: Miami Downtown Development Authority, Miami-Dade County Department of Transportation and Public Works, City of Miami Depts. of Public Works and Capital Improvements

PROJECT LOCATION: SE/SW 1st Street between SW 2nd Avenue and Biscayne Boulevard, Miami, FL

PROJECT INSTALLATION: September 2017

PROJECT DURATION: Planned 1 year, all elements remain

MATERIALS: Thermoplastic, epoxy traffic paint, delineator posts

DID IT WORK? The project will not be removed!

A 6am-8pm dedicated bus lane with red paint, a buffered bike lane, signal adjustments, and signage.

(1) PROJECT IMPETUS

The project was initiated both as a part of the Miami Downtown Development Authority's (DDA) **Complete Streets goals for Downtown Miami**, and in response to the 2015 U.S. Department of Transportation's Mayor's Challenge for Safer People and Safer Streets. The DDA wanted to **create a project that could be implemented for advocacy and awareness purposes**, and have an impact on the increasing difficulty of moving people around Downtown as a result of recent population growth and development. Furthermore, the project aligned well with **Miami Dade County's Complete Streets Guidelines, and the City of Miami's Complete Street's resolution**. The project manager at the DDA (interviewee) said that they knew it was an ambitious corridor to attack, but that the payoff would be great if the project were successful. There are 15 bus and trolley routes that utilize SE/SW 1st Street at varying lengths, and the corridor has a great "sense of place". The project had four distinct objectives: improve safety for all roadway users, promote economic growth in the area, encourage the use of various transportation modes, and enhance the overall roadway network.

(2) WHY THE QUICK-BUILD METHODOLOGY

The DDA isn't a public agency that focuses on the implementation of capital improvement projects, so **the project needed to be framed as temporary**. Furthermore, dedicated bus lanes are still a new concept in Miami, and approaching it as a pilot project was a good way to communicate that "everyone is learning from it", and to get buy-in from both the public and local government. The pilot approach also helped the DDA justify a less intense technical analysis to acquire approval for the pilot project. The DDA, using consultant CALTRAN, had performed thorough analysis and were confident that even if the pilot were a failure, it could be adjusted. Miami-Dade County Traffic Division

(3) PROJECT TIMELINE: 1 year, 4 months

Acquiring the approvals from the county's Department of Traffic Engineering, and the county's procurement process to secure the contractor, were two elements that contributed to the longer-than-expected timeline. At first, there was some disagreement about the number and type of analysis needed to justify the project, when the DDA had already performed a traffic analysis that indicated that there was enough excess capacity on the corridor to implement the lane repurposement. The project team held a stakeholder workshop in April 2016 to gather input from stakeholders and develop concept alternatives for the corridor, followed by a project report in June 2017. Coordination discussions for implementation with the city and the county started immediately thereafter, in order to line up responsibilities from each of the agencies. Implementation of the lane started in Spring 2017. The project became fully operational in September 2017.

(4) PROJECT TEAM + ROLES

- Miami Downtown Development Authority (DDA)
  - Consultants
- City of Miami
  - Department of Public Works
- Miami-Dade County Dept. of Transportation + Public Works
  - Traffic Division

The Miami DDA was responsible for leading the development of concept alternatives and inter-agency coordination for the project. Consultants were hired by the DDA to develop a traffic/technical analysis, concept plan alternatives, an implementation strategy, and permit plans for the preferred alternative. Because it wasn't a construction project, only signage and striping plans were needed.

These plans were reviewed by the county's Traffic Division, and the city's Capital Improvement Projects office and Department of Public Works. The project was installed using a county-procured contractor. The data collection and evaluation was executed and published by a consultant. In the months prior to the installation, the City of Miami repaved the street where it was in particularly bad shape. The city told the project team that it didn't want the striping or pavement markings to go down without a resurfacing.

(5) PROJECT ELEMENTS + DESIGN PROCESS

- 6am-8pm dedicated bus lane
- Buffered bike lane
- Signal adjustments
- Signage

SE/SW 1st Street was originally a three-lane, one-way thoroughfare. The DDA's traffic analysis, informed by FDOT's Lane Elimination Guidance (streets with moderate volumes of 8,000-15,000 ADT are candidates for road diets) revealed that the corridor had excess capacity, which offered an opportunity to create room for other modes without compromising the street's existing or projected car carrying capacity. They opted for a pilot project that included both a buffered bike lane (in the northernmost lane, in specific segments, adjacent to parallel on-street parking) and a dedicated transit lane (southernmost lane), leaving one central travel lane for through traffic and turn lanes at each intersection. This alternative was preferred in the stakeholder workshop in April 2016, and was also chosen using guidance from a computer simulation model. The project team was considering a shared bus and bike lane in the southernmost lane as the second alternative.

The pilot tested progressive bicycle and transit lane design features, like high visibility paint and wide bike lane buffers, inspired by NACTO's Urban Street Design Guide. The design also

included signal adjustments and two Leading Pedestrian Intervals (LPI), which the team acknowledged were crucial to the bus lane's effectiveness and efficiency for all modes on the corridor. The AM peak-hour LPIs were installed at the intersections of SW 2nd and S Miami Avenues, which replaced all-pedestrian signal phases and gave pedestrians a six-second head start crossing the street.

(6) MATERIALS + IMPLEMENTATION

- Epoxy traffic paint
- Thermoplastic pavement markings + striping
- Delineator posts

The striping and pavement markings are thermoplastic, and the green and red paint is epoxy traffic paint. These materials aren't "temporary", but were the ones required by the county to be able to install the project. The team installed vertical surface mount delineator posts in the bike lane's buffer zones as protective barriers.

(7) PUBLIC ENGAGEMENT

The team held a stakeholder design workshop in August 2016 to choose the final design, followed by a project report in June 2017. The implementation of the project happened through 2017, and became operational in September. The interviewee said that because the county's contractor procurement and selection timeline was a bit unclear at times, the DDA didn't end up executing proper outreach efforts about the project until only a month before implementation started. For the first few weeks, some people felt they hadn't been adequately informed.

(8) PUBLIC FEEDBACK + OUTCOMES

The project received some negative feedback in October and November (the first two months following the pilot's full implementation). **Most complaints came from motor vehicle commuters**— who referenced added delays on the corridor— and there was confusion on the corridor at first about how to interact with the bus lane. According to the project's final evaluation report, completed by a consultant, public approval of the bus lane, single through lane, sidewalk walkability, and street crossing safety all increased between March 2018 and September 2018 (the first and last six months of the planned pilot). Approval for the bus lane went up from 51% to 79.5%.

Per a post implementation evaluation report, the consultant measured crash incidents, volumes of vehicles, bus ridership, pedestrian and bicycle volumes, traffic speeds and travel time for vehicles and buses, and economic viability at two points during the life of the pilot: March 2018 and September 2018. **Peak-hour bicycle volumes in September showed an increase of 40%** compared to volumes from March 2016. Vehicular travel speeds decreased an average of 5.7 mph along the corridor since March 2016. AM peak-hour vehicular travel times also decreased by 18.8% between March 2016 and March 2018, indicating that vehicular traffic is moving more efficiently during the morning rush hour. Between September 2017 and September 2018, there was a 65% reduction in crashes on the corridor compared to yearly averages between 2012 and 2015. Four out of seven transit routes along the corridor experienced an increase in ridership compared to the previous year. Peak-hour pedestrian volumes decreased between March 2016 and September 2018, which is likely a seasonal effect, and economic data is still not available.

Transit travel speeds did not change significantly over the course of the first year of the pilot. On average, they stayed the same across all routes. However, the **improved vehicular travel times are a strong indication that the bus lane improved the flow of traffic along the corridor as a whole**.

(9) QUICK-BUILD LESSONS + ADVANTAGES

The project team acknowledges that speeds did not decrease overall, and given the other positive results of the pilot, they consider it an overall success. The interviewee said that the pilot was important for all involved parties to show an interest in implementing projects quickly, something they could all practice to apply to future permanent and Quick-Build projects.The process was also a good lesson in the approval/implementation and communications of a pilot and Complete Streets projects for the future, and was a good opportunity for the government agencies to work toward much- needed public infrastructure and transit improvements.

(10) CHALLENGES

The traffic signal adjustments were not implemented until months after the paint and striping was completed, which likely contributed to the frustration expressed by commuters right after traffic patterns changed following implementation. Not only had the roadway been reduced to a single traffic lane, but two of the largest intersections still had 26-second exclusive pedestrian signals (the longer duration of the signal phase before the signal adjustments). Had the implementation not been drawn out over many weeks, the initial public response may have been less critical, although it hasn't seemed to taint public opinion now that the pilot has been in effect for over a year. Additionally, in part because the pilot project was to remain in place for a year, a maintenance plan was not created or enacted in the beginning. Delineator posts have been hit, considerably damaged, or removed since the pilot's implementation, and have not been replaced as quickly as they've been hit.

There was also initial criticism about the bike lane not connecting to any other bicycle facilities. Part of the message from the DDA/city/county was that the implementation of the bike lane along SE/SW 1st street was one connector piece across downtown, within a planned network included in the City of Miami Bike Master Plan.

(11) FUNDING

The project was jump-started through a $10,000 grant from the Health Foundation of South Florida, and **jointly funded by the City of Miami, Miami-Dade County, and the DDA**. The county contributed $300,000 for the striping, pavement markings, and bike lane delineators, the DDA contributed $80,000 (for the traffic analysis and alternatives development), and the City of Miami contributed $100,000 in the form of repaving the street.

(12) WHAT'S NEXT?

There are not any other pilot or bus lane projects in the works at this time. Solutions to transit woes and first-last mile challenges are still being evaluated as a part of the region's Strategic Miami Area Rapid Transit (SMART) Plan. The plan identified and prioritized seven corridors slated for transit improvements, but these corridors remain under study.

WASHINGTON ST BUS LANE

PROJECT TEAM: City of Boston Transportation Department, Massachusetts Bay Transportation Authority (MBTA)

PROJECT LOCATION: Washington St. between Roslindale Square and Forest Hills subway stations (Orange Line), Boston, MA

PROJECT INSTALLATION: November 2017 (2-day demonstration), May 2018 (4-week pilot)

PROJECT DURATION: 2 days, 4 weeks

MATERIALS: Cones

DID IT WORK? It's already permanent!

An AM peak-hour shared bus-bike lane including signage, first demarcated with cones and has since been made permanent.

(1) PROJECT IMPETUS

As a part of the GoBoston 2030 comprehensive mobility planning effort, the city **Transportation Department had identified routes that would greatly benefit from improved bus service**. The Director of Planning for the city's Transportation Department (interviewee) initiated a test project along one of those corridors that had the highest ridership (19,000 riders per day, 10 bus lines), Washington Street, after verifying riders' complaints of unreliability using MBTA data. **Wait times for the buses were varying from 15 to 30 minutes**. Most users of the corridor were traveling by bus, so it seemed like a good corridor to tackle.

(2) WHY THE QUICK-BUILD METHODOLOGY

Using the Quick-Build methodology just "wasn't something that the city was doing". The **Transportation Department was intrigued by the idea of being able to see what a bus lane on the corridor could look like**, and quickly see if it was feasible, and what impact it could have. The project team decided to ease into it, planning for a two-day demonstration first, and then a four-week pilot. Based on the results of these two tests, they'd decide whether or not to make it permanent.

(3) PROJECT TIMELINE: 3 months (demonstration)

For the demonstration, it was about three months. For the pilot, the city started outreach in April and implemented the longer test in May. Prioritizing transit on Washington Street between the Roslindale Square and Forest Hills stations with a bus lane was specifically identified as a goal in the GoBoston 2030 Action Plan, so the Transportation Department used that to justify the tests, and ease concerns from City Hall about public distress. The department felt strongly that the phased approach of testing the bus lane would make the project more likely to succeed and move quickly toward permanent implementation.

(4) PROJECT TEAM + ROLES

- City of Boston Transportation Department
- Massachusetts Bay Transportation Authority (MBTA)

The Transportation Department has jurisdiction over what happens in the right-of-way, so they only needed internal approval for the tests. The MBTA was very supportive, and were well aware of the issues along the corridor. The city took on the installation of the signage, and the cones from 5am-9am each weekday morning to indicate the shared bus-bike lane (implemented in the curbside parking/travel lane). The city also led the public outreach and messaging. The MBTA helped with reinforcement for the demonstration, and the first few days of the pilot with motorcycle policing. They also educated their drivers about the use of the lane. This route was also particularly busy for school buses, and the MBTA coordinated with the school system so that the school buses could use the lane, too.

(5) PROJECT ELEMENTS + DESIGN PROCESS

- AM peak-hour shared bus-bike lane
- Signage

The demonstration and pilot projects were executed with cones and signage, designs for the permanent lane hadn't been started. The cones were placed on the outer line of the 14' curbside lane (8' parking lane, 6' bike lane) heading inbound (toward Boston) on the mile stretch. The city used a consultant for the detailed design of the permanent lane, which was implemented immediately following the pilot in June of 2017 (conceptual design of the permanent lane had started prior to the pilot; the pilot enforced the need for it). For the permanent lane, parking is not permitted while it is in effect (remains 5am-9am).

(6) MATERIALS + IMPLEMENTATION

- Cones (both demonstration and pilot)

Using cones was the fastest and cheapest way to test the initial impact of a bus lane on this corridor. The Transportation Department knew that they wanted to eventually implement a permanent bus lane on this segment of Washington Street, as put forth in the GoBoston 2030 plan, but used the very impermanent approach for a few reasons.

The demonstration was first to get operations staff comfortable with placing the cones, executing enforcement, and understanding the changes to the road configuration. They used this to create a buzz, and to make sure that nothing really bad would happen before committing to a longer test. For the pilot, the city worked with MBTA to do more data mining, to make sure that the lane was having its intended effect. It also did much more outreach prior to the implementation, and also collected more public feedback during it.

A city contractor installed the permanent lane, which includes the existing bike lane markings, red paint, additional bus-only pavement markings, and permanent signage.

(7) PUBLIC ENGAGEMENT

Before the demonstration, the city had a few discussions with local community groups, and did a survey of the parking on the test stretch, only to learn that the majority of people parking there weren't local residents. The city also performed door-to-door outreach in the neighborhoods bordering the corridor, informing them that the project was coming, and had a face-to-face conversations with every business along the 1-mile project segment of Washington Street. The interviewee said that the local stakeholders didn't need much convincing, since they had expressed a desire for the bus lane, and were aware of its prioritization in GoBoston 2030.

The interviewee said that while the city doesn't take public engagement lightly, the intensity of it varies on a case-by-case basis. It didn't hold a formal public meeting for either test. They weren't receiving much pushback, save for a few particularly concerned businesses that the city helped during the pilot (worked out delivery issues, etc.).

LIVABLESTREETS ALLIANCE

BOSTON TRANSPORTATION DEPARTMENT

(8) PUBLIC FEEDBACK + OUTCOMES

There was **"overwhelming support" from the neighboring community**, and the city received a lot of thank-you's via email and social media.

The city received help from the Livable Streets Alliance in surveying riders and other corridor users during and after the pilot. Survey responses were overwhelmingly positive, in favor of the bus lane. **94% of riders and bicyclists supported making the bus-bike lane permanent**. 92% of respondents said they perceived a travel time savings from the lane, and 89% of riders and bicyclists said they felt safer in the lane.

During the pilot, **bus travel times dropped 20-25%**. That was enough to justify keeping the lane.

(9) QUICK-BUILD LESSONS + ADVANTAGES

The tests helped reinforce that the bus lane was both feasible and necessary. Because the project had been identified in GoBoston 2030, the city was prepared to learn from the tests, and make sure that the basic design of the lane would be effective.

(10) CHALLENGES

The interviewee said that making City Hall comfortable with the test wasn't necessarily a challenge, but it also wasn't immediate. Similarly, the Transportation Department just needed to constantly make sure that they were communicating transparently and often with the MBTA. The city didn't experience much trouble with enforcement. Drivers were generally respectful, and caught on to the test quickly.

(11) FUNDING

The city used its **own equipment and Transportation Department staff time for the tests**. They required over-time labor, which the city was prepared to fund. The permanent lane funding came out of the department's operating budget.

(12) WHAT'S NEXT?

The bus lane was implemented permanently in late June, right after the pilot (still with cones). The city has also set aside resources to create its first ever transit team housed within the Transportation Department for 2019. This six-member team, to be established in the summer, will have planning and operations staff, and engineers, to prepare them for the in-house design of the other bus lanes identified in the GoBoston 2030 comprehensive mobility plan. The interviewee said they will just start "going down the list".

BOSTON TRANSPORTATION DEPARTMENT

BOSTON TRANSPORTATION DEPARTMENT

SPOTLIGHT: ADVOCACY + FUNDING

The entities and programs highlighted in this section were discovered through investigation into Quick-Build projects to be featured in this report.

The advocacy groups in this section have all implemented their own small-scale Quick-Build projects, but the research team found the story of how these groups came about, their relationships with their local government, and how they mobilize their communities to join them in action more robust than featuring their individual projects. One of the groups highlighted, the Better Bus Coalition from Cincinnati, OH, played a pivotal role in the implementation of the Main Street Bus Lane, one of the report's 20 featured projects. The other groups (the MARTA Army and TURBO Nashville), through initiating their own Quick-Build projects, have formed invaluable relationships with their transit agencies and city governments that are advancing both transit improvement projects, and the practice of the Quick-Build methodology.

The funding programs highlighted were also discovered either as being related to one of the projects in the Project List, or from utilizing the Quick-Build methodology in the formation and execution of its duties. The BostonBRT program provided funding and marketing assistance to four projects in the Project List. The ETC Pilot Program is a test in itself, which applies a new partnership between a transit agency and metro government to address the low-hanging fruit of regional transit improvements.

With these entities and programs, the research team hopes to communicate not just additional Quick-Build projects, but also the different ways the methodology can be used to accomplish a variety of, and broader, goals.

ADVOCACY: Better Bus Coalition, MARTA Army, and TURBO Nashville are groups that were formed by community members with a desire to improve their transit and built environments, that have made long-lasting impressions on their cities and local governments through new processes or infrastructure, or both.

FUNDING PROGRAMS: The BostonBRT program and the ETC Pilot Program are programs or collaborations that identified a need for transit improvements in their regions, and through funding, technical assistance, and/or communications resources are helping cities and regions put paper to pavement.

SPOTLIGHT: ADVOCACY

BETTER BUS COALITION

The Better Bus Coalition is an advocacy group in Cincinnati, OH pushing for an improved and expanded bus network for Hamilton County. The group has taken their advocacy to both the pavement and the paper, first by installing modular benches at bus stops, and then through the publishing of its Better Bus Plan in Spring 2018. This plan put forward the transit network's current inadequacies, and identified opportunities for improvement. After months of advocating for a bus lane on Downtown Cincinnati's Main Street, the city installed a pilot bus lane in November 2018.

Better Bus Coalition's Initiatives

Bus Stop Benches:

- Throughout Cincinnati

Main Street Bus Lane:

- Main Street between Sixth Street and Central Parkway

THE STORY

The Better Bus Coalition has been organized for a little over two years, and in this (relatively) short amount of time has become a prominent transit advocacy group in Cincinnati and gotten the attention of local political officials and transportation leaders. The Cincinnati transit system, formerly operated with entirely private funds, has been struggling to adequately serve all of the residents of Hamilton County. Because of the expansion of the greater Cincinnati area, the majority of the jobs are no longer in Downtown Cincinnati, which, according to the Coalition's founder (interviewee), can be alleviated with more cross-town routes. The founder cited other challenges to the bus network, like lackluster wayfinding, and thinks it could be much improved to attract new riders.

CAM HARDY

CITY OF CINCINNATI

Upon its foundation, the Better Bus Coalition set out to tackle some of these challenges to the best of their "tactical" ability. To address the lack of places to sit at over 150 bus stops in Hamilton County, the Better Bus Coalition raises funds for "DIY", tactical benches to install with volunteers. The Coalition can procure the materials for and construct the benches within a week, and they install them usually on weekends with volunteers According to the founder, Cincy Metro neither advocates for nor opposes the benches, they just let them happen. A city ordinance states that citizens are allowed to "donate park benches". The City Manager is obligated to accept the donation, but then can do what he wants with them. So far, none have been removed and the ordinance is the founder's response to questions about the benches' "legality".

The Coalition has received a lot of positive responses from the public, and through the visibility the benches have given them, the group has started to get political officials more engaged and riding transit. Over time, the founder has endorsed City Council members that support transit, and he believes the Better Bus Coalition has started a "groundswell of momentum" in favor of making transit improvements a priority for the city. The Coalition will be working with the city to develop a more streamlined permitting process for the provision of street furniture— an initiative called "Adopt-a-Stop".

In Spring 2018, after months of donated time, the Coalition published its Better Bus Plan, painting a picture of the current outdated service and proposing solutions to both improve and expand it. The plan proposes an updated network that reaches more of Hamilton County, where over 700,000 residents would be within a 5-10 minute walk of a local bus line, and predicts the operating costs of expanding the system.

Building off of its plan, the Coalition began pushing for Cincinnati to test a dedicated bus lane, pointing to other national examples and the congestion in Downtown Cincinnati that causes delays in bus transit. In September 2018, the City Council's Education, Innovation, and Growth Committee approved the city's first ever peak-hour pilot bus lane on Main Street between Government Square and Central Parkway, and the bus lane was implemented in November 2018. Like the next two examples, Quick-Build projects like the Coalition's benches first raised awareness, and over time the group built up a reputation for getting things done through collaboration with the local government to help them arrive at interim solutions.

MARTA ARMY

ATLANTA, GA

The MARTA Army transit Quick-Build projects are the least materials and labor intensive of the projects included in this study, but the impact the group has had within the transit space is great. This project is a strong example of how ongoing and regular collaboration between an advocacy group and transit agency can result in tangible, expedited improvements to a transit network, and it's evidence that with dedicated resources and intentional communication, a partnership between a transit agency and advocacy organization can be mutually beneficial.

The Army's Initiatives

Adopt-a-Stop: 2014 - Current

- Network-wide

Operation Cleanstop: 2016 - 2017

- East Point, GA

MARTA ARMY

MARTA ARMY

MARTA ARMY

THE STORY

The MARTA Army was formed in 2014 following the 2013 TransportationCamp South, an "un-conference" hosted by Georgia Tech University and attended by 200 transportation enthusiasts. According to Army founder and current board member (interviewee), one of the forum's presentations given by MARTA's chief spokesman at the time gave him the idea to take the task of "making MARTA cool again" into his own hands. To him, this was a goal that could be more quickly attained if it came from the riders MARTA transit served. The interviewee came out of that session with a few goals that would improve transit: crowdsource tangible civic improvements, create a direct line of communication between the agency and its patrons, and create a network of riders that could be activated on short notice for things like political advocacy and natural disaster support. Less than a year later, he created the MARTA Army.

Acknowledging that transit can present challenges at a network scale, he set out to develop an organization with scalable initiatives. Inspired by the book Tactical Urbanism, the Army's first initiative was Adopt-a-Stop, one aimed at mobilizing and empowering participants to take ownership of their nearest transit stops (89% of Atlanta residents live within half a mile from a bus stop). At the time, neither the city nor MARTA had the capacity to deliver basic stop amenities, like trash cans and route schedules. With Adopt-a-Stop, Army leadership prints and laminates bus route schedules for members to disseminate and post at their local stops. Army members sign up to participate on the website, and assemble every four months (when route maps are updated by MARTA) at approximately 3-4 events, coordinated by Army leadership, across the region to acquire the new schedules. The events are often executed in partnership with neighborhood organizations.

The Adopt-a-Stop initiative almost immediately started affecting change at a high level within MARTA. In the beginning, MARTA wouldn't post the schedule changes until almost two weeks after they were initiated operationally. When the Army began its program, the organization made it clear that this was inadequate, and that riders needed to be aware of the schedule changes prior to them becoming operational. According to the Army's founder, this had a "ripple effect" throughout the transit agency, and this aspect of MARTA's service has since significantly improved. Additionally, in June 2016, the Atlanta Regional Commission received $3.8

million from the state for multi-system transit wayfinding at bus stops. The signs are not solely for MARTA, but the funding was still a major win for Greater Atlanta's transit network, and was the first time MARTA ever received state funding for transit. Today, there are 450 stops that have been adopted by the program.

The Adopt-a-Stop program would not be nearly as effective as it has been if it weren't for the Army and MARTA's relationship. From the beginning, Army leadership said they would publicly support MARTA, but they also wanted to remain an autonomous organization (there would be no MARTA employees on the Army board). The interviewee said that this autonomy remains an important part of the Army's mission. By continuing to execute initiatives like Adopt-a-Stop, the Army continues to both lightly pressure MARTA to find solutions to its service issues, and demonstrate a vast constituency (volunteer counts are at approximately 200) of community members that desire and demand better transit. This demonstration is helpful for MARTA to justify things like increased funding and staff to address service issues. The Army and MARTA relationship is a positive one, with each entity mutually publicly supporting each other and sharing the MARTA brand, but MARTA is still supportive of the Army maintaining its role primarily as an advocacy organization— one that can mobilize a community and crowdsource innovative solutions to transit shortcomings.

The Army has the full support of higher management at MARTA, but has also established critical relationships at the staff level with employees to help them get things done. To the interviewee, the Army has helped empower MARTA employees who are "just passionate about the mission of transit". The MARTA interviewee said that working with the Army is really fun, and elaborated on some of the specific

MARTA ARM

ways the agency supports the organization. The two entities discuss the Army's work plan and initiatives on a monthly call, and support the Army "filling the gaps" where MARTA doesn't have the resources. MARTA fully supports the Army on its social media channels, and provides in-kind support like data, schedules, and expedited permitting if needed.

The Army's second initiative, Operation Cleanstop, crowdfunds trash cans for every MARTA stop in East Point, Georgia, a suburb southwest of municipal Atlanta that is predominantly African American and where 20% of the population regularly rides the MARTA bus. To date, the Army has raised $16,000 from 150 individual donations, which resulted in the installation of trash cans at 100 bus stops. For this initiative, the Army raised the money and the city took on the procurement and installation of the trash cans. To MARTA's founder, this role taken on by the city has created a platform for the city to work with its constituents on a broad range of transportation issues. This initiative is also an important reminder that MARTA crosses over many jurisdictional lines, and that the buy-in of other municipalities in the Army's initiatives is crucial to helping them scale up solutions to address the broader network. It's also important to the Army that their initiatives be inclusive of all transit riders, and especially those further away from Atlanta's core that perhaps rely even more on transit.

The Army has recently started collecting data using QR codes at bus stops to better measure its Adopt-a-Stop program's impact on things like ridership and rider satisfaction. According to the founder, there are other measures of the Army's success. First, he thinks that the Army is creating momentum for action to improve transit service, measured by the increased involvement of transit officials in the Army's initiatives. Agency members show up to Army events, and interface directly with riders. Agency members witness firsthand the excitement that's building around transit, and are less wary of an open line of communication between them and riders. He also thinks that the impact of the Army's actions is represented by the diversity of its members. Although a small sample size, it's encouraging that actual transit riders from across the metropolitan region are participating in Army initiatives. This intimate reach is not something MARTA is capable of fostering, but with the Army as a conduit, the gap between what transit riders need and implementable transit solutions can be narrowed.

According to the founder, the Quick-Build process has been pivotal in providing transit improvements quickly, and representing a wide spectrum of transit riders. For MARTA, taking advantage of innovation that has come from outside its staff has resulted in increased trust in the agency to fight for expedited and more representative transit projects, no matter the scale.

TURBO

NASHVILLE, TN

What started as a neighborhood group with an interest in Tactical Urbanism has evolved into an arm of a prominent Nashville urban design nonprofit. Through incremental projects of various scales, and research and data collection, Tactical URBanism Organizers has formed a relationship with its local public works and planning departments, and has Nashville's government internalizing the Quick-Build methodology. One of the group's first projects responded to community cries for more beautiful bus stops, and now they're getting closer to making a permanent plaza adjacent to a new BRT stop.

TURBO's Initiatives

Nolensville Pike Bus Stops: March 2015

- Nolensville Pike @ Joyner Avenue stop

Modular Bus Shelter (x2): April 2015

- Nolensville Pike @ Glenrose Avenue stop
- Nolensville Pike @ Fairgrounds Station

TURBO Triangle Triage: March 2018

- Gallatin Avenue and N 11th Street

THE STORY

TURBO, originally called Tactical Urbanism Nashville, was unofficially founded in 2014 by a few neighborhood activists, one of whom is currently the Design Director at the Nashville Civic Design Center, a local nonprofit whose mission is to "elevate the quality of Nashville's built environment" with an emphasis on public participation. The "guerrilla urbanism" neighborhood group debuted the Quick-Build methodology in August 2014 as a part of a block party in Nashville's Nations neighborhood, demonstrating a four-to-two lane road diet, bike lanes, and parklets in the curbside travel lanes on 51st Avenue N. This road diet was officially adopted by City Council in July 2017. The Nashville Civic Design Center (NCDC) was at first a nonprofit partner of the group, but a year later it was integrated into NCDC, and has since become a

TURBO NASHVILLE


TURBO NASHVILLE

part of the organization's Reclaiming Public Space initiative as an "action arm" to help implement concepts based on research from the nonprofit's projects and publications, and push the local government entities toward getting more comfortable with test projects and innovative transportation solutions.

TURBO's projects are driven in large part by their own research, or initiated upon request from the public (most feedback is received through TURBO's website). Having started out as a neighborhood group, their relationship with Nashville communities and other nonprofits is a trustful and collaborative one. The group has gained quite the following, and volunteer participation continues to grow with each project. TURBO has been using the Quick-Build methodology more and more to encourage the city to test its projects slated for permanent construction, and to also keep them accountable for allocating resources to transportation improvements. This allows the city to vet projects in the real world before pulling the trigger, and enables more robust public participation that they otherwise may not do. With TURBO providing the opportunity to test and engage the public, it bumps the projects up to higher priority, increasing the likelihood that they'll be done permanently much faster.

The Nolensville Pike Bus Stops, officially the first TURBO project under NCDC, was implemented in March 2015 and April 2015 along one of the busiest, and deadliest, corridors in Nashville. This project took only a few months to design and implement, and included bus stop beautification and the first of two modular bus shelter installations. For these installations, TURBO only needed permission from the private property owners, and the efforts to make the bus stops more comfortable were very welcomed by neighboring businesses and riders, having been requested by the community in the first place. At the Joyner Avenue stop along Nolensville Pike, TURBO installed planters and benches made with wood and tires, with plants donated from a local nursery. The bus shelters were also primarily made of wood, with the addition of corrugated steel panels as weather-proof roofing. These were constructed using a grant from a local church, and were designed to wrap around and over existing benches and be easily deconstructed and reused. Some remnants of the bus beautification remain today, as well as one of the modular bus stops. The design and fabrication for these installations was done entirely by TURBO, funded either through donations or small grants, and they were implemented with assistance from community volunteers.

The TURBO Triangle Triage project, the activation of an unused triangular median refuge adjacent to a new BRT stop at East Nashville Magnet High School, began in June 2015 with signage TURBO installed asking people what they wanted to see in the space. The signs encouraged people to submit input on TURBO's "get involved" webpage (how the organization solicits project ideas from the public, as well as donations and volunteer requests). A month later, the organization planned an activation in the triangle for Tomato Arts Festival, which included turf, a temporary painted pedestrian path through the triangle, and a feedback board. In 2016, less than a year later, TURBO hosted an after-school workshop with the Public Library across the street from the high school to solicit ideas from the students about how the space they wait for transit in every day could be transformed. Some of this feedback contributed to TURBO's next iteration: an installation in March 2018 in advance of the Complete Streets Conference, when TURBO, a local muralist, and Greater Nashville Realtors transformed the triangle with an asphalt mural, painted a new temporary crosswalk, and installed column wraps.

TURBO is still compiling any transit data that might be available for the Triangle Triage project. Anecdotally, they observed people spending time in the March 2018 installation almost immediately, most often when waiting for the bus. Whether it improved ridership has yet to be determined. They used traffic guns for the first three months of its installation, and noticed that cars were slowing upon approaching the intersection. The asphalt mural remains today, and TURBO is looking into grant opportunities to fund a next round of activation, including reworking the traffic flow on 11th St. The project contributes to an ongoing conversation TURBO has with the city about how traffic calming, pedestrian safety, and public art can work together, and is using it to advocate for the permanent closure of a portion of 11th Street at this intersection.

TURBO partners with other community nonprofits and businesses for its projects, and has more recently been in regular communication/collaboration with the Metro Planning Department to refine and implement its Tactical Urbanism Permit (which went for a trial run for the TURBO Triangle Triage project). In general, the organization has a good relationship with the Mayor's office, which has encouraged Metro to collaborate with them. In the beginning, TURBO was implementing most of their projects through the city's Special Event Permit process, but now they have a contact in the Planning Department that they're in regular communication about formalizing a process for these types of projects. TURBO would approach the city Planning and Public Works Departments with ideas, areas of underutilized asphalt that were canvases for projects, etc., and it was informal at first. Now, the Planning Department is looking to hire an engineer to focus solely on Tactical Urbanism projects, and interface directly with TURBO to more regularly use the new permit.

A Transportation Planner in the city's Planning Department said during his interview that the ideal scenario is that the city internalize this methodology, and he's creating a review board to field the Tactical Urbanism Permit requests. The city has acknowledged their value as an entity that can provide resources (funding, data collection, public engagement, etc.), and sees the process as a good strategy where projects align with their goals. Furthermore, the city is progressive and has support from leadership to collaborate with TURBO. Because the city and county are one entity, the Transportation Planner thinks they have the capacity to move projects along more quickly, once the process is complete and the new staff member (engineer) is brought on board.

TURBO is happy with how their projects have inspired change at the local level, and that the city has realized the value of the methodology. The permit will continue to evolve as both TURBO and the city see a need for refinements to the permit application and process, but what TURBO and the city have so far accomplished is certainly a success story for neighborhood groups and nonprofits trying to shake things up.

SPOTLIGHT: FUNDING PROGRAMS

BOSTONBRT

BOSTON, MA

The Barr Foundation's BostonBRT program has propelled Bus Rapid Transit in the Greater Boston Area from a conversation and research topic to tangible projects within only a few years. In addition to its funding for piloting BRT elements, the program has initiated a station design competition, social media campaigns, and continues to look for opportunities to support iterations of local pilots. The Foundation translated its research into a program that has not just gotten people in Greater Boston excited about the prospect of BRT, but that also makes it more and more of a reality.

BostonBRT's Awardees

Broadway Bus Lane - December 2016

- Everett, MA

Massachusetts Avenue Bus Lane - Oct. 2018

- Arlington, MA

Mt Auburn Street Bus Lane - Oct. 2018

- Cambridge + Watertown, MA

AD HOC INDUSTRIES

AD HOC INDUSTRIES

AD HOC INDUSTRIES

THE STORY

Implementing Bus Rapid Transit in the Greater Boston Area has been a goal of state and local entities in Massachusetts for years. In 2009, the Massachusetts Department of Transportation (MassDOT) made a push for it, but without corridor-level engagement and local political support, community pushback derailed near-term implementation. The Barr Foundation helped advance this conversation as its Climate team became increasingly interested in BRT for the Greater Boston Area in the face of more intense winter storms that interfered with rail transportation. The foundation set out in 2012/2013 to create a working group to study and report on the feasibility of implementing BRT, catalyzing a revived push for the system.

In April 2013, the Climate strategy team, which includes the foundation's mobility focus area, took a trip to Chicago for a two-day charrette to learn BRT best practices from entities pushing for the system there, like the Rockefeller Foundation, the Chicago Community Trust, and AIA's Architects Foundation. This charrette formed the basis of the Barr Foundation's BRT working group, after which they devised a work plan to help them understand what governance issues needed to be solved at the MassDOT and municipal levels for implementation of BRT, and what level of corridor engagement needed to be met to be able to test BRT elements. The foundation put funding aside to study BRT, and published a report in Spring 2015 on the feasibility of implementing BRT in the Greater Boston Area. By the time the foundation published the report, they had witnessed enough BRT in other places to beg the question, "why not get people to experience BRT here?" MassDOT and the Massachusetts Bay Transportation Authority (MBTA) committed to being partners to make this happen if there were capable and willing municipalities to dedicate street space to transit.

As a foundation, the Barr Foundation's role is to catalyze efforts, and they saw an opportunity to bring BRT to the pavement. As a follow-up to their report, in May 2017, they released an RFP for $100,000 in funding, plus additional consultant time, to implement pilot projects to test BRT elements. In addition to their funding supporting actual implementation of BRT pilot projects, the Barr Foundation hoped that the efforts would improve communication between municipalities, MassDOT, and MBTA, and increase the ease and likelihood of expanding BRT across the region. The foundation wanted people to experience BRT features, and they wanted

to continue the momentum their broader initiative started. Pilot projects were also a way to have these projects happen quicker, as a more immediate follow-up to their report and prior research. By the time the RFP was released, the foundation had already done quite a bit of public engagement around BRT, and it was time for people to experience it on the ground.

Three municipalities/teams were selected in June 2017 to receive funding from the Barr Foundation to test elements of BRT: Town of Arlington, City of Everett, and the City of Cambridge/Town of Watertown. The foundation had made it clear that the grants were to be used for planning, design, and execution, and the RFP required that an explicit political champion be included in the applications. Basically, the applications were evaluated for the municipality's "readiness", or ability and enthusiasm to implement a pilot project within a year.

A critical element for the three pilot projects was the MOU between MBTA and each municipality, which put into writing each partner's role in the pilot projects. The Barr Foundation did not draft the MOUs, but facilitated the process. Generally, these several-page MOUs outlined the pilot project goals, each entity's responsibilities (like planning and design, public outreach, implementation, marketing, and evaluation), and joint responsibilities. Each municipality had a project manager who coordinated with the Director of Operations Planning and Outreach on the MBTA side, regarding things like bus stop relocations (if applicable), the education of MBTA's drivers, how the operators would respond to the pilot projects, and any physical constraints of how the buses move down the road that may influence their pilot projects. The Director at the MBTA tried to encourage the municipalities to have some sort of consistency in their striping, markings, and design strategies, as the MBTA played the role of regional entity for the pilot projects. ITDP and Stantec were technical experts made available to the selected municipalities, with communications support from Denterlein and creative branding from Ad Hoc Industries

The BostonBRT program is heavily marketed on social media, and through the program's website. The foundation recognized the importance of creative placemaking, and contributed resources to make the pilot project launches fun and inviting. The foundation actively promotes Everett, Arlington, and Watertown/Cambridge's projects on social media, and conducted additional grantmaking to support the installation of bus shelter art in Arlington and a "flower bomb" at a shelter in Everett. The interviewees believe that their promotion is reaching a broad audience, and getting more people engaged in, and supporting, BRT in the Greater Boston Area. They feel as though they've "truly been catalysts". The foundation wanted to elevate BRT to be considered a viable mode of transportation on par with rail transit, and they think they've really helped moved the needle on this in Greater Boston.

Stantec, ITDP, MassDOT, and MBTA all helped the municipalities collect quantitative data on their pilot projects where necessary. Each municipality produced, or will produce, its own final report or evaluation.

The Director managing the projects on MBTA's side said that the pilots have been effective at encouraging municipalities to still make improvements that don't necessitate major capital investments. There's a lot of low-hanging fruit that can be tested, or implemented permanently from the outset, that would have significant impact. For the Barr Foundation, their program's success was not measured by how many (if any) pilot projects became permanent, but rather how many more municipalities they would encourage to test BRT elements. They were open about the fact that they wanted this program to create a bit of competition within the Greater Boston Area, and an appetite for experimenting with BRT features.

As of September 2018, the MBTA Director secured private funding for a "toolkit" that will summarize the successes and challenges of each city's project, and will be available for other cities to learn about the various resources/tools for making buses more reliable. The Director at the MBTA said that one of the challenges he observed with cities wanting to move quickly was that sometimes short-term tests don't lend themselves well to iteration. For example, using cones is a great way to act quickly and collect fast results, but after that, paint is really the only next option. The length of time between the initial test and paint could be long enough to lose momentum. Additionally, the staff time and enforcement required with just using cones can be something cities underestimate in terms of resources to set aside.

The MBTA also worked with a private consulting firm in 2017 to identify routes in the Greater Boston Area that would benefit from dedicated transit lanes, and they'd like to secure funding to get these communities working on implementing them once the pilot projects are complete and have been evaluated.

Given these next steps, it seems the BostonBRT pilot projects have certainly helped reinvigorate the region's interest in, and commitment to, incremental bus network improvements. The program is a great example of the power of partnerships, and how even modest resources in the grand scheme of transit projects can give municipalities the extra push and confidence they may need to employ the Quick-Build methodology.

ETC PROGRAM PORTLAND, OR

The ETC Pilot Program, a partnership between TriMet and Metro, is gaining momentum as a strategy to increase the frequency with which cities in the Portland metropolitan region implement low-cost speed and reliability improvements along some of the region's highest priority corridors. With three projects fast-tracked to be completed within 2019, the program is a strong example of how such a partnership can advance small-scale improvements across an expansive regional network. With additional funding identified, the program is well under way within just a year following its initiation.

ETC Program's 2019 Projects

Burnside Bridge BAT Lanes

- Central City Portland

MLK/SE Grand Ave BAT Lanes

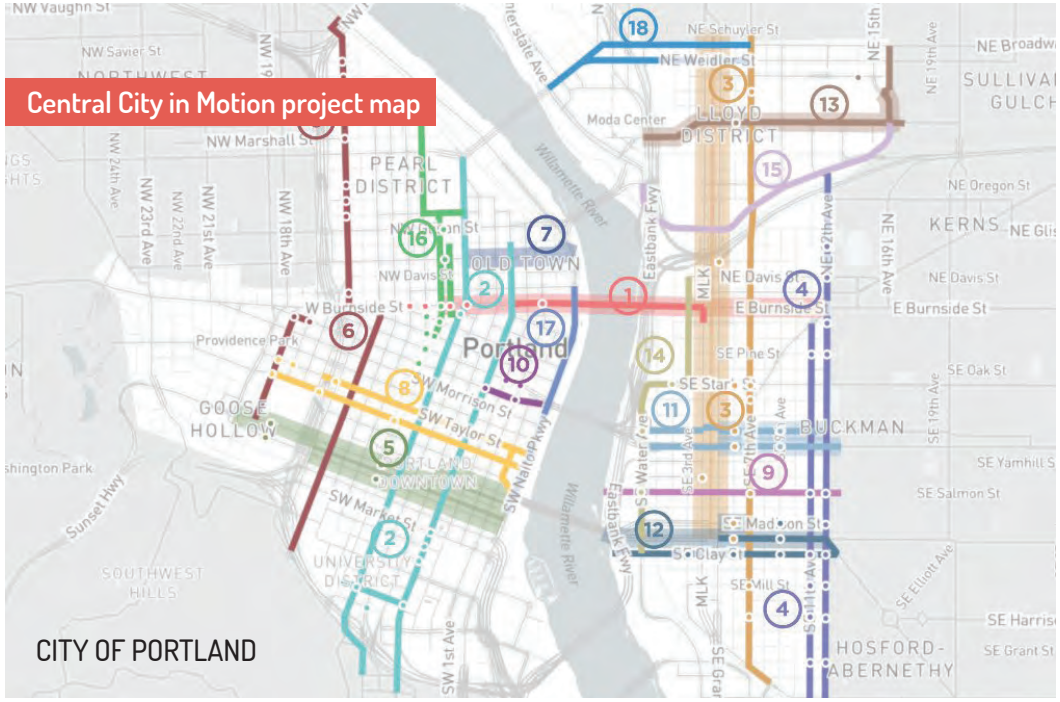
- Central City Portland

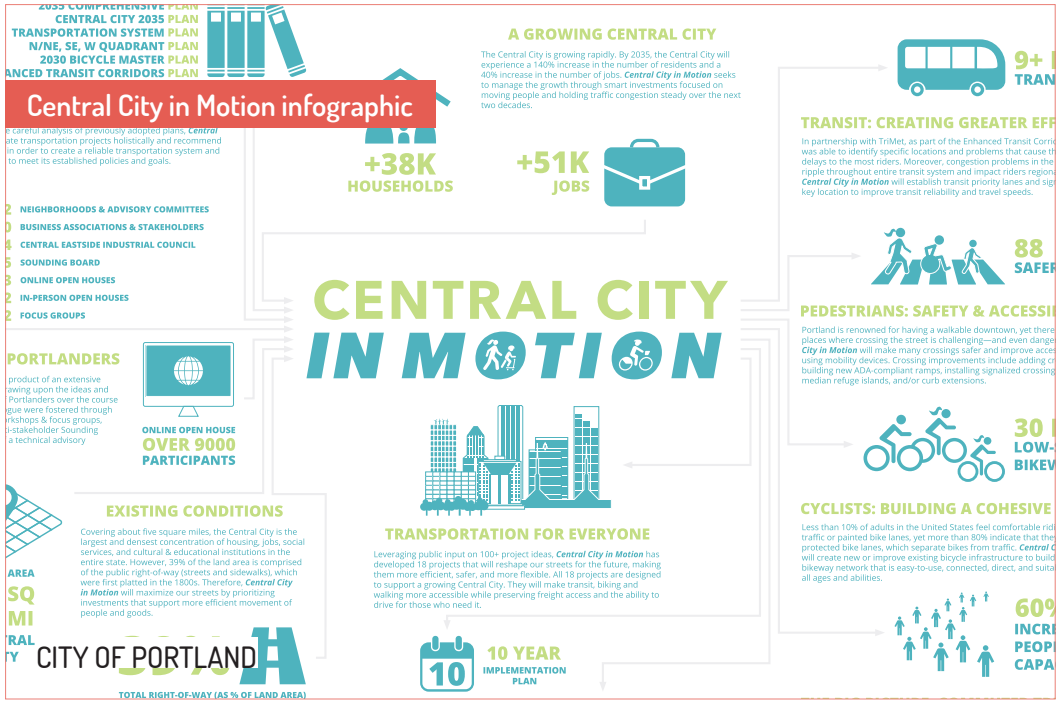
NW Everett St BAT Lanes

- Central City Portland

THE STORY

The Enhanced Transit Corridors Pilot Program, an initiative of TriMet (transit provider for the Portland metropolitan region) and Metro (the Portland metro area's Metropolitan Planning Organization), is a recently developed strategy for encouraging municipalities in the Portland region to incrementally improve their transit networks. The Portland Bureau of Transportation, in collaboration with TriMet, recently wrapped up the planning process for its Enhanced Transit Corridors Plan, which was unanimously adopted by City Council in June 2018, and identifies portions of the existing TriMet Frequent Service in Portland that were deemed high priority corridors for small and tactical improvements to speed and reliability. These corridors are ones that would benefit greatly from improvements that would be quick to implement, and for less relative cost than large transit projects.





The TriMet service within the City of Portland has slowed significantly in the last eight years, leaving jobs less and less accessible to the city's growing population. Realizing that this is something that is happening across the region, TriMet and Metro decided to team up to apply this methodology at a regional level. The project manager from TriMet (interviewee) said that they had been noticing delays and stagnant ridership growth across the region, and thought, "why not set out to try to improve the entire network?" The partners were confident that addressing issues of speed and reliability would also be a great way to improve ridership. Both TriMet and Metro also saw an opportunity to educate both large and small municipalities on treatments that could improve their service.

The City of Portland and TriMet had done a lot of work to develop the Enhanced Transit Toolbox as a part of Portland's plan, a toolbox of transit priority treatments containing capital and operational strategies that could be deployed at different scales and levels of investment. With a region-wide program that would help fund the application of these toolbox elements, TriMet and Metro conceived of the ETC Pilot Program to bring the toolbox to other municipalities as an educational tool, and to help other municipalities think through how they could integrate the tools into their capital projects.

When Metro received $5 million in regional funds, they worked with TriMet to prioritize the regional networks investment needs. They broke up the Frequent Service network into 10-15 minutes of travel, and analyzed the performance of the routes for reliability and dwell times using a scoring system. The routes that scored the highest were those with the most issues with delays and unreliability. In Spring 2018, Metro and TriMet conducted 12 workshops with the region's jurisdictions containing these highest scoring corridors (total of 14), and helped them identify tools they could implement to mitigate the issues. TriMet, Metro, and a consultant design team presented the jurisdictions with high-level concept sketches of treatments that could be applied to the jurisdictions' corridors. Over the course of each intensive three-hour workshop, the jurisdictions' engineers and staff worked through the issues and possible treatments with the consultant team, with the intent of identifying one or a few projects for which they could apply to the pilot program that would be low-cost and quickly implementable. After the workshops, the municipalities were invited to submit applications for the pilot program to fund the design and issue-to-construction of projects that would address these issues. For the

selected projects, Metro would lead the 0-15% concept design process, at which point TriMet would continue to develop the project. The jurisdiction would then be responsible for the implementation.

Metro and TriMet received 38 applications for a total of 49 projects in the first round of the program, at which point they conducted a second screening process to determine which projects were the most "ready", or implementable within two years of selection. This meant that projects that already had funding and/or political support behind them were moved to the top of the list. The program then divided the projects into two categories, ones that were ready for construction, and ones that still needed to go through the design process, to clarify to what aspects of the projects their funding would be allocated.

Following the project evaluation, the program received an additional $10 million in funding (granted to the program from Metro after the state was able to garner more transit funds for its service area) for the implementation of the selected projects, many of which are still being scoped or are in the design process. The partners noted that once a few of the projects got farther along in the design process, they realized that they didn't make sense to implement. This is something the partners said is an important component of the pilot program— the ability to be nimble and "walk away" from projects to allocate the resources elsewhere.

As of January 2019, the program selected three projects to fast-track for construction and completion within 2019. These three projects, which are integrated with Portland's Central City in Motion initiative, are all outbound Business Access and Transit lanes (BAT) on corridors with a combined 80,000 plus riders per day. These projects will cost about $3 million of the recent $10 million received, and Metro and TriMet are hopeful that they'll be able to be implemented by the city's internal crews.

The program is a pilot in itself, although most projects funded by it will be permanent from the outset. So far, both TriMet and Metro think it's been invaluable for the partnership between these two entities. Working out how the program can be sustained has strengthened their collaboration, and has helped them come up with a clear strategy of how to tackle region-wide transit issues. So far, the pilot program only takes on educating the jurisdictions on the tools available, and supporting them through the design process. Getting the jurisdictions to implement is what will be another ultimate indicator of the program's success. Both entities think that the program's focus on scalable treatments will help jurisdictions get in the habit of thinking about, and integrating, transit projects into more of their roadway projects, especially at a time when the appetite for major transit projects is lower. Additionally, the workshops were important for connecting jurisdictions outside Portland with the regional entities, to bring them all to the same table when they may not have ever collaborated or asked TriMet or Metro for resources. Overall, the program has brought the importance of bus transit back to the forefront of all parties' interests at a time when transit ridership is becoming an increasingly important climate change adaptation strategy.

Both the TriMet and Metro project managers interviewed said that they hope this program will result in a more robust, permanent program, and that this process has already helped them envision what that could look like. Both also agree that a designated project manager for the program should be hired within each agency. So far, Metro and Portland have worked in parallel on transit improvements in Portland. The Senior Transportation Planner for the Portland Bureau of Transportation (interviewee) said that she really thinks their work, and the pilot program, will have a "snowball effect" and encourage neighboring jurisdictions to take an equally close look at how to improve transit.

TriMet and Metro are still ironing out not just the permanent funding program's logistics, but also a strategy for how to support municipalities' implementation of the toolkit on a regular basis. They've made great strides, after decades, in facilitating transit improvements together, rather than each jurisdiction operating within silos, and hopefully the pilot program will just be the beginning of a new direction in region-wide transit prioritization.

TERMS SHEET

RESEARCH

Tactical Urbanism/Quick-Build Methodology: These terms are used interchangeably throughout the report. The projects included in the study are most often referred to as "Quick-Build" projects, unless "Tactical Urbanism" was a term used by an interviewee(s). Tactical Urbanism is the name of the original movement, the first term to define the methodology. The term Quick-Build has emerged, although both terms are meant to describe the same process for the purposes of this report.

Tactical Transit project: A transit Quick-Build project. In this report, all Tactical Transit projects addressed bus or streetcar service (surface transit).

Test: Broad term used to describe a project of any duration that sought to test a process, infrastructure, material, etc.

Demonstration (Project): Where used, this term describes a test that did not exceed several days.

Pilot (Project): Where used, this term describes a project that was a minimum of weeks, months, or even years. This term was also used more frequently by the project teams in describing their own projects. If "pilot" was used in the Project Name in Figure 1, Project List, it was because the term was intentionally used in the project name by the project team.

Intervention: Term used interchangeably with the above, that does not specify a duration of the project.

Project Team: The group of entities or individuals who played a role in the featured Quick-Build project, to include the lead and supporting entity(ies).

TACTICAL TRANSIT TOOLS/PROJECT TYPES

Dedicated/Bus-Only Transit Lane: A lane of roadway restricted to buses, either only during peak hours, for 12 hours, or all-day, often implemented on corridors with frequent headways (10 minutes at peak), or where traffic congestion negatively impacts transit speed and reliability. If motorists travel or park in the lane during operational hours, they are subject to a traffic violation.

Shared Bus-Bike Lane: A lane of roadway restricted to buses and bikes, often implemented curbside, and where there is not sufficient roadway to have separate facilities. This is generally recommended on corridors with lower speeds, and moderate headways, as these are not high-comfort bikeways. A variety of pavement markings, like "bike-bus-only" and shared lane markings are used to identify the shared bus-bike lane.

Transit Signal Priority (TSP): Modifications to traffic signals (through either reordering phases or adjusting phase lengths) that remove or minimize bus time spent at signalized intersections, and involve synced communication between the buses and signals. These modifications can be instituted for all arriving transit, or only for when transit is running behind schedule (a more sophisticated system).

Queue Jump Lanes: A short dedicated transit facility that allows buses to enter an intersection with priority by bypassing queuing traffic through a curbside lane, implemented in tandem with signal priority.

BAT Lane (Business Access and Transit Lane): Lanes primarily for dedicated transit use that maintain business and residence access

(general circulation) in limited locations. These lanes are particularly applicable on high-volume, highly-congested corridors where marked separation would allow for more efficient transit movement, but turns and driveway access from general traffic are frequent.

Leading Pedestrian Interval: A pedestrian signal setting that gives pedestrians typically a 3-7 second head start entering an intersection before the green traffic signal, often implemented at intersections where high right and left turning volumes cause frequent pedestrian-vehicle conflicts. This is also used as a tool to reduce overall traffic signal duration, and speed up travel on a corridor for all modes.

Boarding Island: A dedicated waiting and/or boarding area for transit riders that enables in-lane stops, both limiting dwell time at stops for buses and increasing accessibility for pedestrians. These can be curbside, or "floating" (possibly with a bike lane between the island and curb). These are called "bus bulbs" when they are concrete extensions of the curb that occupy the curbside parking lane width, allowing for in-lane stops. The modual bus boarding islands featured in this report are from a Spanish manufacturer, and are highly customizable.

Bus Parklet: A Bus Parklet combines the popular concept of parklets— relatively low-cost structures that function as an extension of the sidewalk into the adjacent parking lane and create a flexible public space to meet the needs of the local community—with a temporary platform for an enhanced transit boarding experience (AC Transit Bus Parklet Design Manual, 2018).

Bus Stop Consolidation: The practice of removing underutilized bus stops to regulate spacing and make for more efficient travel along a corridor (like faster trips and less dwell times). Bus stops with enhanced safety features, that are adjacent to key destinations like parks and health care facilities, etc. are typically prioritized to remain. However, a number of factors unique to the transit corridor influence which stops are removed to better balance the total number and spacing of stops.

MATERIALS

Thermoplastic: A powder-based pavement marking material that is applied to asphalt with intense heat, and is resistant to roadway oil-based chemicals and freezing temperatures. This is the most permanent of roadway marking materials.

Methyl Methacrylate (MMA): A pavement marking material that rapidly cures to the asphalt, and is considered the most durable of traffic paints. The material exists as a solid and is mixed immediately prior to application. It forms a strong bond with the asphalt through a chemical reaction catalyzed by the mixing process.

Epoxy Traffic Paint (Epoxy-modified acrylic asphalt paint): A durable pavement marking material created from two components. Epoxy resin is combined with a curing agent, and applied without heat.