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MOBILITY BONDS

TRANSIT ENHANCEMENT INFRASTRUCTURE REPORT

Austin Transportation and Public Works

September 2023

ACKNOWLEDGMENTS

CITY OF AUSTIN TRANSPORTATION & PUBLIC WORKS DEPARTMENT

Caitlin D'Alton, AICP, Project Manager
Max Schwartz, AICP
Cody Stone, PE, PTOE
Amenity Applewhite
Cole Kitten
Dan Hennessey, PE
Dipti Borkar-Desai, PE, PTOE
Eric Bollich, PE, PTOE
Giovanna Berrocal
Jacob Barrett
Jack Flagler
John Clary
Justin Good, PE
Laura Dierenfield
Lee Austin, PE
Maggie Chan
Mike Schofield, PE
Nathan Wilkes, PE
Tom Gerrity, PE

CAPMETRO

Nadia Barrera-Ramirez, AICP
Emma Martinez
Edna Parra
Jennifer Govea
Jesse Marroquin
Lawrence Deeter
Nicole Taliaferro
Peter Breton
Roberto Gonzalez
Ron Foster
Rose Lisska

AUSTIN TRANSIT PARTNERSHIP

Deron Lozano

CONSULTANTS

DKS ASSOCIATES

Renee Hurtado, PE, PTOE, Project Manager
Randy Johnson, PE, PTOE
Wintana Miller, PE, PTOE
Ben Wallach, PE, PTOE
Sheida Carugati

NELSON\NYGAARD

Amanda Wolfe
Bryan Blanc
Carly Haithcock, PE
Julian Bautista-Rojas, PMP
Stephanie Wright, AICP

AECOM

Abby Tomlinson
Bill Plumley
Devon Engelke

TRANSCEND ENGINEERS & PLANNERS

Radhika Paruchuri
Raj Basavaraju, PE, PTOE

RPS-TETRATECH

Elaine Alvarado
Marcela Aguirre, AICP
James Schwerdtfeger, PE

MWM DESIGN

David Cazares
Tony Buonodono, PE
Adrian Goldberg, EIT

EXECUTIVE SUMMARY

INTRODUCTION

The purpose of the Transit Enhancement Program is to improve mobility and access to opportunity for Austin residents and visitors by fostering collaborative relationships with public transit providers, working directly with communities to understand needs and opportunities, and systematically enhancing areas the built environment to support transit.

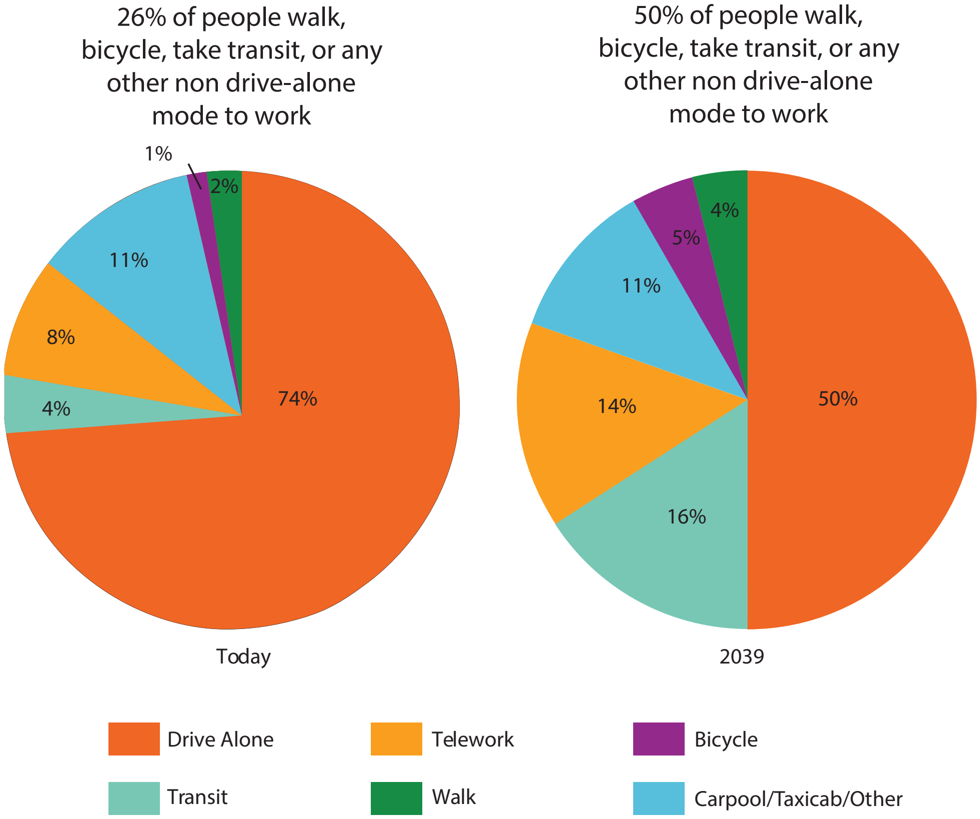
The Transit Enhancement Program formed out of the Transit Priority Working Group, a coalition of staff from Austin Transportation and Public Works (TPW) and CapMetro who have been developing and implementing small-scale infrastructure projects to improve transit speed, reliability, safety and access since 2015. In 2018, the City of Austin and CapMetro executed an interlocal agreement (ILA) that commits $1 million per year towards these transit improvement projects, and in 2020 Austin voters approved $460 million in bonds for transportation infrastructure improvements, including $19 million for Transit Enhancement projects.

This report describes the process that TPW staff, in coordination with CapMetro, used to identify 37 recommended transit infrastructure improvement projects within the city of Austin. The $53 million in improvements recommended by this report are anticipated to be funded by 2020 Mobility Bond funds, CapMetro ILA funds, and potential future grant and bond funding opportunities.

Project recommendations were informed by those who know Austin's bus system best: current transit riders. Over 1,400 community members were engaged in-person and online in Fall 2022 and Spring 2023. During each round of engagement, ten outreach events were held in person at transit stops, where surveys were collected and feedback mapped regarding the public's transit-riding experience. Each round of engagement also included an identical online survey as well as a web-based mapping tool where participants geolocated their comments. In addition, the project team conducted in-person interviews with CapMetro bus operators to gain insights into recurring operational issues. The feedback gathered in-person and online was critical to the development of this report and directly informed project recommendations.

POLICY BACKGROUND

In 2019, Austin City Council unanimously adopted the Austin Strategic Mobility Plan (ASMP), the City's comprehensive multimodal transportation plan that guides transportation decision-making citywide. The ASMP envisions a transportation network that is safe, accessible, reliable, provides choices, and serves the diverse needs of the Austin community. Foundational to the recommendations of the ASMP is a 50/50 mode share goal, which will allow the City to manage growth and congestion while supporting other community values like sustainability and affordability by shifting more trips to non drive-alone modes, including transit.



Source: ASMP 50/50 Mode Share Goal

Making transit an attractive alternative to driving requires the City and our public transit partners to work together to create an experience that attracts and retains riders. The 37 projects recommended by this report will take meaningful steps towards achieving the vision of the ASMP by investing in infrastructure that enhances the speed and reliability of local bus service, and makes that service safer and easier to access. By working with our partners, the City can help make public transit a more viable travel option, moving Austin and the region towards a complete public transportation system that is a true alternative to driving.

REPORT DEVELOPMENT PROCESS

The 37 transit enhancement projects recommended in this report were developed as a result of a deliberative, step-by-step process:

Transit Enhancement Toolbox: First, the Transit Enhancement Toolbox was developed. This is a collection of potential capital and operational treatments that can be applied in Austin to improve transit speed, reliability and access, and create safer, more predictable interactions between transit and other travel modes. The full Transit Enhancement Toolbox is found in the appendix to this report.

Existing Conditions Analysis: Next, existing conditions were analyzed through a data-driven process using the Bus Delay Analysis Tool (BDAT). The BDAT is a web-based dashboard that analyzes and displays a variety of data related to the transit network, including bus operating speeds and passenger ridership, roadway infrastructure, and community demographics.

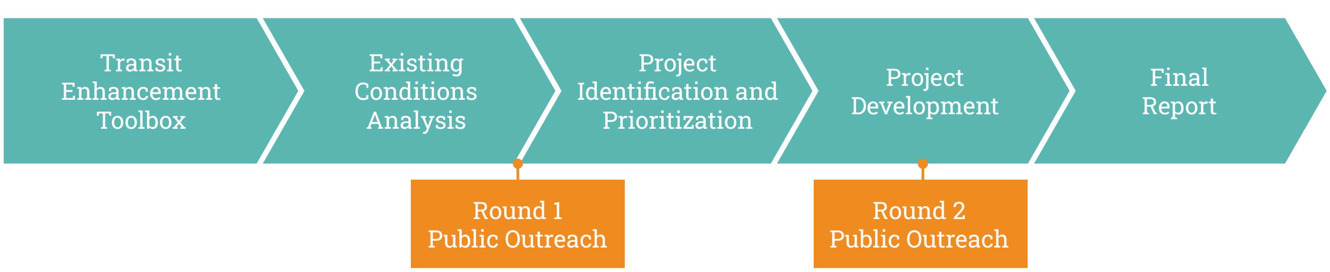
Public Outreach & Stakeholder Engagement: Two rounds of in-person outreach were performed at bus stops across the city. The first round occurred in Fall 2022 and the second in Spring 2023. Digital outreach was also deployed during each round of engagement. In-person interviews with bus operators and regular meetings with a Technical Advisory Group composed of City of Austin, CapMetro, and Austin Transit Partnership staff also informed the study.

Project Identification and Prioritization: Through a data driven process using the BDAT and community priorities expressed during the pubic outreach process, a total of 30 locations were identified as having high needs for transit speed, reliability, safety, and access improvements. Several locations were later subdivided further, therefore the final number of project locations totals 37.

Project Development: Planning-level infrastructure improvements were developed for each of the 37 project locations. The proposed enhancements were pulled from the Transit Enhancement Toolbox and were evaluated using data from the BDAT and feedback received from public outreach and stakeholder engagement.

Final Report: Potential funding sources and next steps were identified to move the proposed projects into design and construction, and the results of the study were compiled into a final summary report.

Report Development



PUBLIC OUTREACH & STAKEHOLDER ENGAGEMENT

Two rounds of public engagement informed the recommendations of this report. Engagement was conducted by Transportation and Public Works staff, together with CapMetro, consultants, and language translators. Each round of engagement included 10 in-person events at transit stops across the city, as well as a digital outreach component promoted through newsletter posts, social media outlets, CapMetro MetroAlert text messages, and on-board bus signage. Participants filled out surveys and mapped feedback related to their transit-riding experience. An overview of the public engagement process, which resulted in more than 1,400 survey responses, is summarized in the following figure:

Round 1: 9/19/22–10/7/22

10 In-Person Events:

1. Tech Ridge Park & Ride
2. North Lamar Transit Center
3. Manor Road at Susquehanna Lane
4. Norwood Transit Center
5. Westgate Transit Center
6. The Drag (University of Texas West Mall)
7. Pleasant Valley Road at Riverside Drive
8. Republic Square
9. Southpark Meadows
10. Bluff Springs Road at William Cannon Drive

599 survey responses

Digital Outreach:

Online Survey and Comment Mapping

117 survey responses

Round 2: 3/30/23–4/7/23

10 In-Person Events:

1. Tech Ridge Park & Ride
2. North Lamar Transit Center
3. Eastside Bus Plaza
4. Norwood Transit Center
5. Westgate Transit Center
6. The Drag (University of Texas West Mall)
7. Pleasant Valley Road at Riverside Drive
8. Republic Square
9. Southpark Meadows
10. Bluff Springs Road at William Cannon Drive

402 survey responses

Digital Outreach:

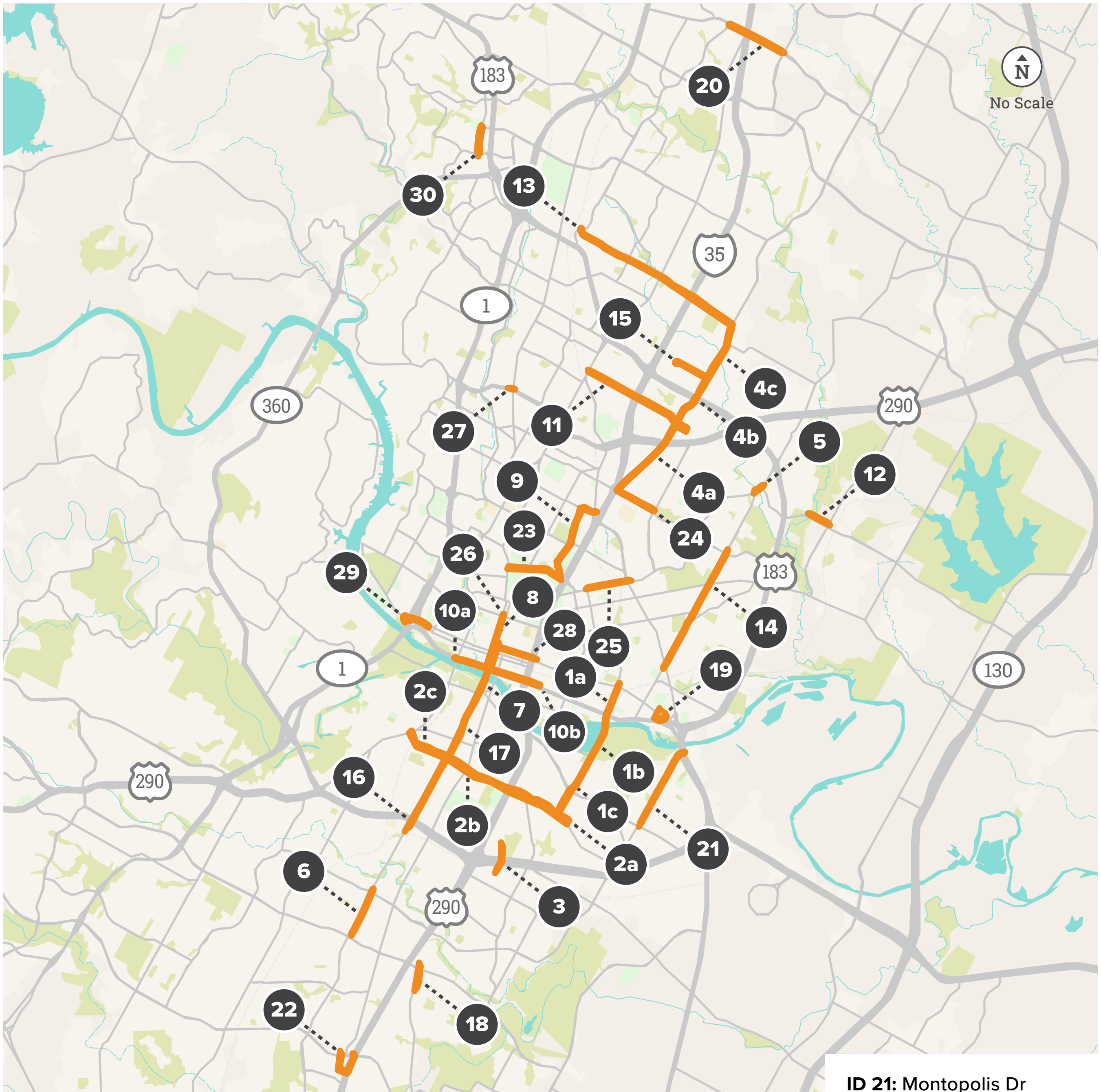
Online Survey and Comment Mapping

370 survey responses

PROJECT MAP

Feedback received during the public engagement process, together with data from the Bus Delay Analysis Tool, resulted in proposed transit infrastructure improvements at 37 locations across the city. These locations were identified as having high needs for transit speed, reliability, safety and access improvements. Please note that Project Identification (ID) numbers on the map below are not indicative of priority ranking and are meant for identification purposes only.

Project Locations



ID 1a: Pleasant Valley Rd
ID 1b: Pleasant Valley Rd
ID 1c: Pleasant Valley Rd
ID 2a: Oltorf St
ID 2b: Oltorf St
ID 2c: Oltorf St
ID 3: Woodward St
ID 4a: Cameron Rd
ID 4b: Cameron Rd
ID 4c: Cameron Rd
ID 5: Manor Rd
ID 6: S 1st St
ID 7: S 1st St
ID 8: Guadalupe St
ID 9: Red River St / 45th St
ID 10a: Cesar Chavez St
ID 10b: Cesar Chavez St
ID 11: St Johns Ave
ID 12: Loyola Ln
ID 13: Rundberg Ln
ID 14: Springdale Rd
ID 15: Rutherford Ln
ID 16: S 1st St
ID 17: S 1st St
ID 18: Bluff Springs Rd
ID 19: 7th St / Shady Ln
ID 20: Howard Ln
ID 21: Montopolis Dr
ID 22: Turk Ln / Cullen Ln
ID 23: Dean Keeton St
ID 24: 51st St
ID 25: Manor Rd
ID 26: Lavaca St
ID 27: Allendale Rd
ID 28: 7th St
ID 29: Veterans Dr / Lake Austin Blvd / 5th St
ID 30: Jollyville Rd

PROJECT RECOMMENDATIONS

Project ID	Project Location	Proposed Enhancements	Project Cost	Project Duration*
1a	Pleasant Valley Road between Webberville Road and Cesar Chavez Street	• Traffic signal • Transit priority lane • Bus stop improvements • Intersection improvements	$2.5M	Long
1b	Pleasant Valley Road between Cesar Chavez Street and Lakeshore Boulevard	• Transit priority lane	$8.5M	Long
1c	Pleasant Valley Road between Lakeshore Boulevard and Oltorf Street	• Transit priority lane • Bus queue jump signal • Bike lane improvements • Pedestrian crossing improvements • Bus stop improvements	$1.6M	Medium
2a	Oltorf Street between Wickersham Lane and I-35	• Access management improvements • Pedestrian crossing improvements • Bus stop improvements	$0.5M	Short
2b	Oltorf Street between I-35 and South First Street	• Pedestrian crossing improvements • Bus stop improvements	$1.4M	Medium
2c	Oltorf Street between South First Street and South Lamar Boulevard	• Traffic signal • Bus stop improvements • Transit priority lane feasibility study	$1.1M	Medium
3	Woodward Street between Parker Lane and Freidrich Lane	• Transit priority lane • Bus queue jump signal • Bus stop improvements	$1.7M	Long
4a	Cameron Road between 51st Street and US 290	• Intersection improvements • Pedestrian crossing improvements • Bus stop improvements	$1.9M	Long
4b	Cameron Road between US 290 and US 183	• Pedestrian crossing improvements • Bus stop improvements • Transit priority lane feasibility study	$1.0M	Medium
4c	Cameron Road between US 183 and Rundberg Lane	• Transit priority lane • Bus queue jump signal • Pedestrian crossing improvements • Bus stop improvements	$3.6M	Medium
5	Manor Road between Springdale Road and Loyola Lane	• Intersection improvements • Bike lane improvements • Bus stop improvements	$0.9M	Medium
6	South First Street between William Cannon Drive and Stassney Lane	• Pedestrian crossing improvements • Bus stop improvements	$0.6M	Short

**Short: 0-2 years; Medium: 2-5 years; Long: 5+ years*

Project ID	Project Location	Proposed Enhancements	Project Cost	Project Duration*
7	South First Street Bridge between Barton Springs Road and Cesar Chavez Street	• Transit priority lane • Turn lane improvements • Bike lane improvements • Bus stop improvements	$0.8M	Short
8	Guadalupe Street between Cesar Chavez Street and 15th Street	• Bus stop improvements	$0.8M	Medium
9	Red River Street/45th Street between Dean Keeton Street and Airport Boulevard	• Turn lane improvements • Pedestrian crossing improvements • Bus stop improvements • Transit priority lane feasibility study	$1.5M	Long
10a	Cesar Chavez Street between B.R. Reynolds Drive and I-35	• Feasibility study of transit priority lanes, median treatments, and turn restrictions	$1.5M	Medium
10b	Cesar Chavez Street between I-35 and Waller Street	• Transit priority lane	$2.9M	Long
11	St Johns Avenue between North Lamar Boulevard and Berkman Drive	• Pedestrian crossing improvements • Bus stop improvements	$0.8M	Medium
12	Loyola Lane between Crystalbrook Drive and Johnny Morris Road	• Pedestrian crossing improvements • Bus stop improvements	$1.2M	Medium
13	Rundberg Lane between Cameron Road and Metric Boulevard	• Bus queue jump signals • Pedestrian crossing improvements • Bus stop improvements	$3.3M	Medium
14	Springdale Road between Airport Boulevard and 51st Street	• Fill sidewalk gap • Pedestrian crossing improvements • Bus stop improvements	$2.2M	Medium
15	Rutherford Lane between Cameron Road and Brettonwoods Lane	• Intersection improvements • Pedestrian crossing improvements • Bus stop improvements	$0.3M	Short
16	South First Street at Ben White Boulevard Interchange	• Bus stop improvements	$25K	Medium
17	South First Street between Ben White Boulevard and Barton Springs Road	• Access management improvements • Pedestrian crossing improvements • Bus stop improvements	$0.8M	Medium
18	Bluff Springs Road between William Cannon Drive and Blue Meadow Drive	• Pedestrian crossing improvements • Bus stop improvements	$0.8M	Short
19	Seventh Street + Shady Lane near Levander Loop	• Fill sidewalk gap	$0.2M	Short

**Short: 0-2 years; Medium: 2-5 years; Long: 5+ years*

Project ID	Project Location	Proposed Enhancements	Project Cost	Project Duration*
20	Howard Lane between Metric Boulevard and McAllen Pass	• Intersection improvements • Turn lane improvements • Pedestrian crossing improvements • Bus stop improvements	$1.0M	Medium
21	Montopolis Drive between Riverside Drive and US 183	• Pedestrian crossing improvements • Bus stop improvements • Transit priority lane feasibility study	$2.3M	Medium
22	Turk Lane and Cullen Lane (Southpark Meadows)	• Pedestrian crossing improvements • Curb management improvements	$0.2M	Short
23	Dean Keeton Street between Guadalupe Street and Red River Street	• Transit priority lane • Bike lane improvements • Bus stop improvements	$3.8M	Medium
24	51st Street between Cameron Road and Berkman Drive	• Access management improvements	$4K	Short
25	Manor Road between Cherrywood Road and Airport Boulevard	• Traffic signal • Pedestrian crossing improvements • Bus stop improvements	$1.6M	Medium
26	Lavaca Street between Cesar Chavez Street and Eighth Street	• Transit priority lane reconfiguration • Bus stop improvements	$0.6M	Short
27	Allendale Road between White Rock Drive and Burnet Road	• Access management improvements • Pedestrian crossing improvements • Bus stop improvements	$0.4M	Short
28	Seventh Street between Lavaca Street and I-35	• Transit priority lane • Bus stop improvements	$0.2M	Medium
29	Lake Austin Boulevard at Veterans Drive	• Bus stop improvements	$50K	Short
30	Jollyville Road between Braker Lane and Great Hills Trail	• Intersection improvements • Pedestrian crossing improvements • Bus stop improvements • Transit priority lane feasibility study	$0.7M	Medium
		Total Cost:	**$53M**	

**Short: 0-2 years; Medium: 2-5 years; Long: 5+ years*

IMPLEMENTATION & NEXT STEPS

Funding

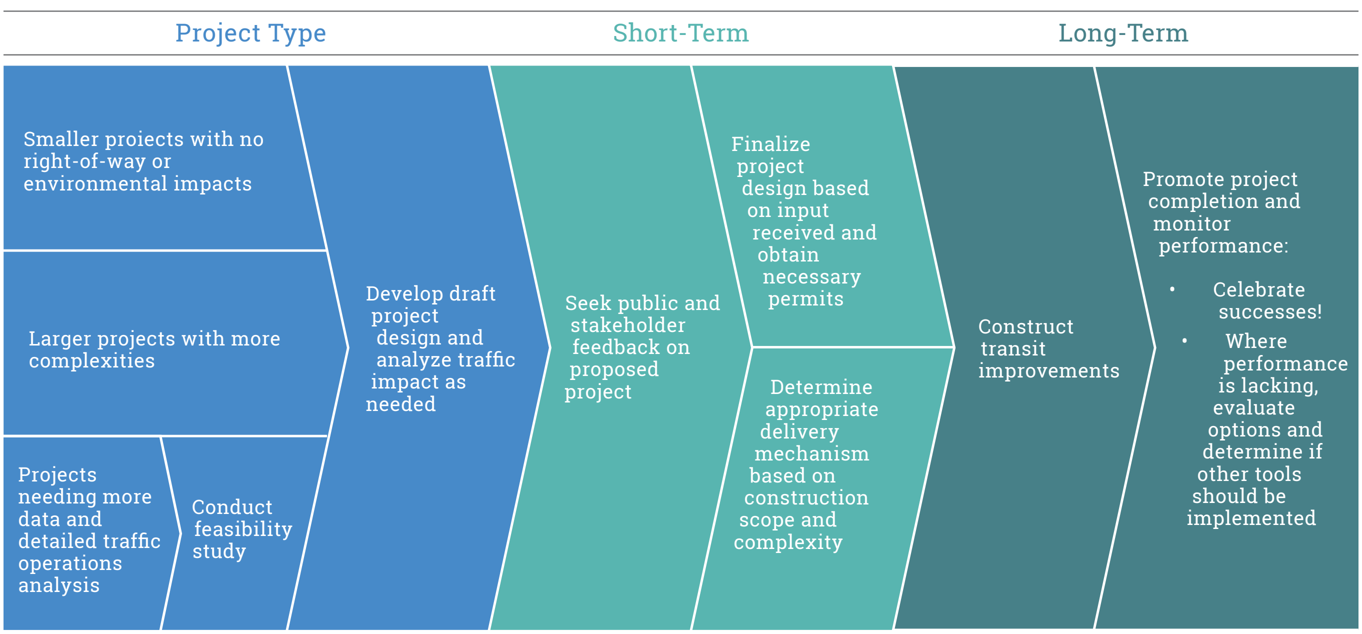
There are currently two main funding sources for implementation:

1. 2020 Austin Mobility Bond funds
2. CapMetro interlocal agreement funds

The $53M in proposed improvements exceeds the available funding from these two sources. To fully implement all projects, other funds may be sought from future mobility bonds, grant opportunities, and other regional, state or federal funding sources.

Project Development

The 37 projects recommended in this report are planning-level proposals to improve transit speed, reliability, safety and access through investment in transit supportive infrastructure. Moving these projects to implementation will require further analysis, design, and community engagement. Many projects will also require collaboration with other City departments and partner agencies, like CapMetro, the Texas Department of Transportation (TxDOT) and Austin Transit Partnership, to ensure proper coordination prior to implementation. In general, moving these projects to implementation will follow this process:



Schedule

The schedule for implementing each project will vary and may depend on a variety of factors including complexity of design, right-of-way availability, partner and community feedback, funding availability, and staff resources. Up to half of the recommended projects may be implemented in the short (0-2 years) and medium terms (3-5 years).

CONTENTS

TRANSIT ENHANCEMENT TOOLBOX

TOOLS

STREETS AND INTERSECTIONS

STATIONS AND STOPS

ACCESS AND MULTIMODAL INTERACTIONS

TRAFFIC SIGNALS AND OPERATIONS

The Transit Enhancement Program works to improve mobility and access to opportunity by enhancing areas of the built environment to support transit riders and transit operations. This Transit Enhancement Toolbox is a collection of potential capital and operational treatments that can be applied in Austin to improve transit speed, reliability and access, and create safer, more predictable interactions between transit and other travel modes.

The Transit Enhacnement Toolbox includes 32 tools across four categories ranging from low-cost, minor infrastructure improvements to high-dollar, major infrastructure improvements. The toolbox is intended to serve as a resource for both agency staff and the community, and not only identifies the tools available to improve transit operations, safety and access in Austin, but informs stakeholders about the benefits, trade-offs, and considerations required to implement these tools across the city.

Tools are grouped into four categories, based on the issue area each tool is meant to address:

- Streets and Intersections
- Stations and Stops
- Access and Multimodal Interactions
- Traffic Signals and Operations

A summary matrix of all 32 tools within the toolbox are provided on the following two pages, and the full Transit Enhancement Toolbox is provided in the appendix of this report. The proposed improvements recommended in this report were pulled from the Transit Enhancement Toolbox. Implementation of most of these tools requires coordination between TPW and its partners, including CapMetro, Austin Transit Partnership, and TxDOT.

TRANSIT ENHANCEMENT TOOLBOX

● Low Benefit
●● Medium Benefit
●●● High Benefit

$: Under $50,000
$$: $50,000-$100,000
$$$: $100,000-$250,000
$$$$: Over $250,000

CHALLENGES	INTERSECTION	CORRIDOR	SIGNAL	RIGHT TURN	LEFT TURN	OTHER TRAFFIC RELATED	INEFFICIENT ROUTE DESIGN	INTERRUPTIONS LEAVING BUS STOP	BUS ZONE DWELL TIME	BUS STOP CAPACITY	PEDESTRIAN CONFLICTS	CYCLIST CONFLICTS	MOTORIST CONFLICTS	
STRATEGY	CONGESTION		TRAFFIC OPERATIONS				TRANSIT OPERATIONS				SAFETY			COST
STREET AND INTERSECTION DESIGN														
Turn Restriction/Exemption	●		●	●●	●●	●	●	●			●	●	●	$-$$
Facilitating Turning Movements				●●	●●	●●					●			$-$$
Roadway Channelization and Turn Pockets	●		●	●●	●●		●				●	●	●	$-$$
Transit Priority Lane (Bus Lane)	●●	●●	●●●	●●		●		●●			●●	●●●	●	$$-$$$$
Queue Jump Lane (Short Bus Lane)	●●●	●●		●●	●●	●●	●●	●●			●	●		$-$$$
Peak-Only Bus Lane	●●	●●	●●					●●		●●		●●	●●	$-$$$
Curbside Bus Lane	●●●	●●●	●●●	●●●				●●		●●		●	●●	$$-$$$$
Offset Bus Lane	●●●	●●●	●●●	●●				●●					●	$$-$$$$
Contraflow Bus Lane	●●●	●●●		●●●	●●●	●●●		●●●				●	●●	$$-$$$$
Reversible / Bidirectional Bus Lane	●●●	●●				●●●		●●●			●●●		●●	$$-$$$$
Median Bus Lane	●	●●●				●●●		●●●		●●	●●●	●●●	●●●	$$-$$$$
STATIONS AND STOPS														
Pull-Out Stop													●	$-$$
Level Boarding									●●●					$-$$
Bus Stop Lengthening							●	●	●	●●●				$-$$
Parking Removal or Alterations		●●						●●		●			●●	$-$$
Bus Stop Consolidation	●						●●●	●	●	●				$-$$
In-Lane Stop								●●●			●●	●●		$$-$$$
Far-Side Bus Stop			●●								●●●		●	$-$$$
Near-Side Stop											●●			$-$$$
Midblock Stop			●●								●●			$-$$$

TRANSIT ENHANCEMENT TOOLBOX

● Low Benefit
●● Medium Benefit
●●● High Benefit

$: Under $50,000
$$: $50,000-$100,000
$$$: $100,000-$250,000
$$$$: Over $250,000

CHALLENGES	INTERSECTION	CORRIDOR	SIGNAL	RIGHT TURN	LEFT TURN	OTHER TRAFFIC RELATED	INEFFICIENT ROUTE DESIGN	INTERRUPTIONS LEAVING BUS STOP	BUS ZONE DWELL TIME	BUS STOP CAPACITY	PEDESTRIAN CONFLICTS	CYCLIST CONFLICTS	MOTORIST CONFLICTS	
STRATEGY	CONGESTION		TRAFFIC OPERATIONS				TRANSIT OPERATIONS				SAFETY			COST
ACCESS AND MULTIMODAL INTEGRATION														
Dedicated Bike Signal	●	●	●	●	●			●●●				●●●		$-$$
Shared Bus-Bike Lane								●●		●		●	●	$-$$
Shared Cycle Track Stop								●●●				●●		$$-$$$
Floating Stop								●●●				●●		$$-$$$
Access Improvements								●●			●●●	●●●		
Bicycle Improvements								●●				●●●		
TRAFFIC SIGNALS AND OPERATIONS														
Traffic Signal Timing Adjustments	●●	●	●●	●	●			●			●	●	●	$-$$
Traffic Signal Phase Modification	●●	●	●	●		●●		●			●	●	●	$-$$
Transit Signal Priority	●●		●●●	●●●	●●●	●●●		●						$-$$$
Bus Signal Phase and Signal Head	●●●		●●●	●●●	●●●			●●			●●●	●●	●●	$-$$$
Reverse Queue Jump	●●	●●			●●			●●					●●	$-$$$
Transit Agency Tools							●●●	●●●	●●●	●●●				

PUBLIC OUTREACH & STAKEHOLDER ENGAGEMENT

Public outreach and stakeholder engagement was critical to the development of this report and directly informed project recommendations. Over 1,400 community members who rely on public transit and its infrastructure provided meaningful feedback on the kinds of improvements needed to enhance transit operations, access and safety in Austin. Those community members were engaged in-person and online during two rounds of public outreach, and engagement opportunities were promoted through newsletter posts, social media outlets, CapMetro MetroAlert text messages, and on-board bus signage.

CapMetro bus operators also provided their input on locations where transit infrastructure improvements are needed most during four operator outreach events held at CapMetro bus garages. Additionally, a Technical Advisory Group composed of City of Austin, CapMetro and Austin Transit Partnership staff provided guidance throughout the report development process and directly supported public outreach.

Outreach Methods

- Webpage, surveys, social media, video translated to **Spanish**
- **1,488** total surveys completed
  186 completed **in Spanish**
- **106** bus operator comments
- **1.8K** newsletter and **22.7K** email contacts reached
- **20** in-person **events at bus stops**
- **830** mapped comments
- **43K** Facebook and
  6.8K Twitter impressions
- **200** advertisements on CapMetro buses

Public outreach summary documents, which detail the methods and findings of the engagement events, are included in the appendix of this report.

OPERATOR OUTREACH

During Spring 2022, project staff conducted a total of four bus operator outreach events at both the North Ops CapMetro garage located off Burnet Road and the main garage located on East Fifth Street. The in-person interviews with CapMetro bus operators were conducted to gain insights about recurring operational issues directly from drivers. During conversations with dozens of bus operators, the project team noted 106 unique locations where operators identified the need for transit infrastructure improvements to address safety and operational issues such as difficult turning movements and sub-optimal traffic signal timing. The insights gained from these interviews were incorporated into the project development process.

IN-PERSON OUTREACH

The project conducted two rounds of in-person outreach events at bus stops across the city. The first round occurred in Fall 2022 and the second in Spring 2023, and each consisted of tabling at 10 different transit stop locations. The stop locations were selected based on ridership data, demographic considerations, and to ensure an equitable distribution across Austin. Events consisted of paper surveys filled out by respondents in English and Spanish, with a Vietnamese translator present at select locations to support engagement. In addition, outreach events included maps showing the roadway and transit network. Participants were able to point to specific locations and provide feedback on their experiences using and accessing transit on the map.

Round 1 (September - October 2022): The first round of public outreach focused on understanding the community's priorities for transit infrastructure improvements. Community memers were asked to rate the importance of investments in:

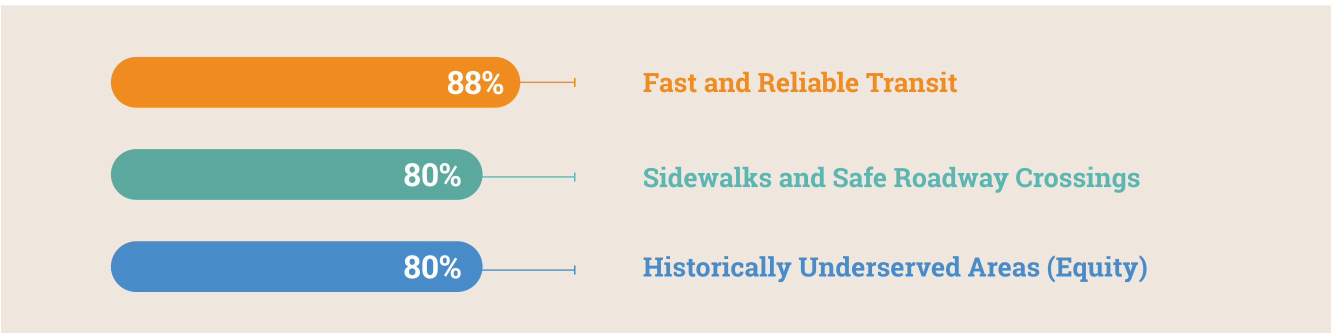
- Making transit fast and reliable by adding infrastructure like bus lanes and signals for transit.
- Making transit easier to access by improving infrastructure like sidewalks and roadway crossings.
- Addressing equity by focusing transit investments in historically underserved communities.

Bus Operator Outreach Events

Event	Date	Time	Location
1	May 24, 2022	7:00 am – 8:30 am	CapMetro Main Garage
2	May 24, 2022	12:30 pm – 2:00 pm	CapMetro Main Garage
3	June 2, 2022	7:00 am – 8:30 am	North Ops CapMetro Garage
4	June 2, 2022	12:30 pm – 2:00 pm	North Ops CapMetro Garage

The results of the survey indicated that an overwhelming majority of the respondents found it was "very important" to prioritize all three kinds of investments. The 599 surveys received during Round 1 of in-person outreach informed the weighting of potential project locations, resulting in a list of 30 locations that allow for investment in all three community priorities. The 131 mapped comments received during Round 1 were incorporated into the BDAT for reference during the project development process.

Community Priorities



In total, 716 online and in-person surveys were filled out in Round 1. A strong majority of respondents rated each of the three primary questions as "Very important" or above, with 88% for the first question, 80% for the second, and 80% for the third. Surveys were filled out in both English and Spanish, with English being the majority at 607 (85%) and Spanish at 109 (15%).

Round 1 of In-Person Outreach

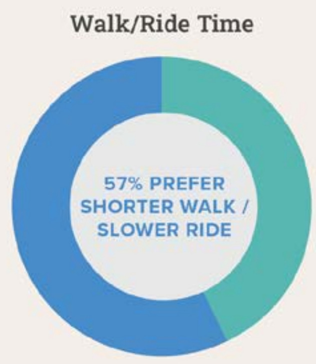
Date	Time	Location
September 22, 2022	8:00 am – 11:00 am	Tech Ridge Park & Ride
September 22, 2022	3:00 pm – 6:00 pm	North Lamar Transit Center
September 27, 2022	11:00 am – 2:00 pm	Manor Road at Susquehanna Lane
September 27, 2022	3:00 pm – 6:00 pm	Norwood Transit Center
September 28, 2022	11:00 am – 2:00 pm	Westgate Transit Center
September 28, 2022	3:00 pm – 6:00 pm	The Drag (University of Texas West Mall)
September 29, 2022	11:00 am – 2:00 pm	Pleasant Valley Road at Riverside Drive
September 29, 2022	3:00 pm – 6:00 pm	Republic Square
October 4, 2022	11:00 am – 2:00 pm	Southpark Meadows
October 4, 2022	3:00 am – 6:00 pm	Bluff Springs Road at William Cannon Drive

Round 2: (March - April 2023): The second round of in-person outreach focused on the trade-offs inherent to improving transit operations and access. The first trade-off question related to willingness to walk farther to a bus stop to allow for faster bus service and the second trade-off question related to prioritizing transit improvements when working with a limited budget. The results to the first question indicated that a slight majority of survey respondents prefer short walking distances to transit stops even if the bus travels at a lower speed due to the increased number of stops. The results to the second question showed that a larger majority of survey respondents prefer funding to be spread to many different lower cost projects across the city as opposed to funding being used for a small number of projects with high capital costs. The 402 surveys received during Round 2 of in-person outreach were used to shape project recommendations such as proposed bus stop additions, relocations, and consolidations. The survey results will also be a valuable resource moving forward to inform the prioritization of project implementation.

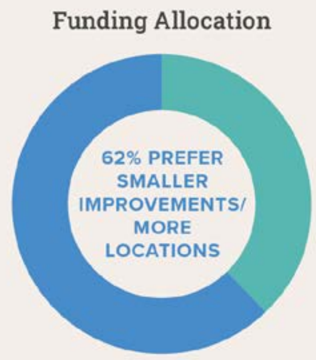
In-Person Outreach Demographics

Demographic information, including age, gender, cultural identity, disability status, and annual income, was collected during each round of in-person public outreach to ensure that the public that was engaged reflected the demographics of Austin and CapMetro riders. All demographic questions were presented as optional to survey participants. The demographic make-up of in-person survey respondents generally aligned with the demographics presented in CapMetro's Origin and Destination Study, which was completed in 2015. For example, people in the lowest income bracket ($0 - $24,999) are over-represented among CapMetro's ridership (43%) compared with Austin as a whole (14%). During Round 1 and Round 2 of the at-stop outreach, the proportions of respondents who identified as being in this income bracket were 47% and 62%, respectively. The survey results showed similar successes in reaching other underserved populations including people of color and those who identify as having a disability. However, it is important to note that younger transit riders, such as those below the age of 18, were underrepresented in both rounds of public outreach. The full breakdown of respondent demographics are presented in the public outreach summaries included in the appendix of this report.

Transit Trade-offs



In total, 772 online and in-person surveys were filled out. A small majority of respondents would rather have a slower ride but a shorter walk to the bus stop.



A larger majority of respondents would like to see smaller improvements in more locations.

Round 2 of In-Person Outreach

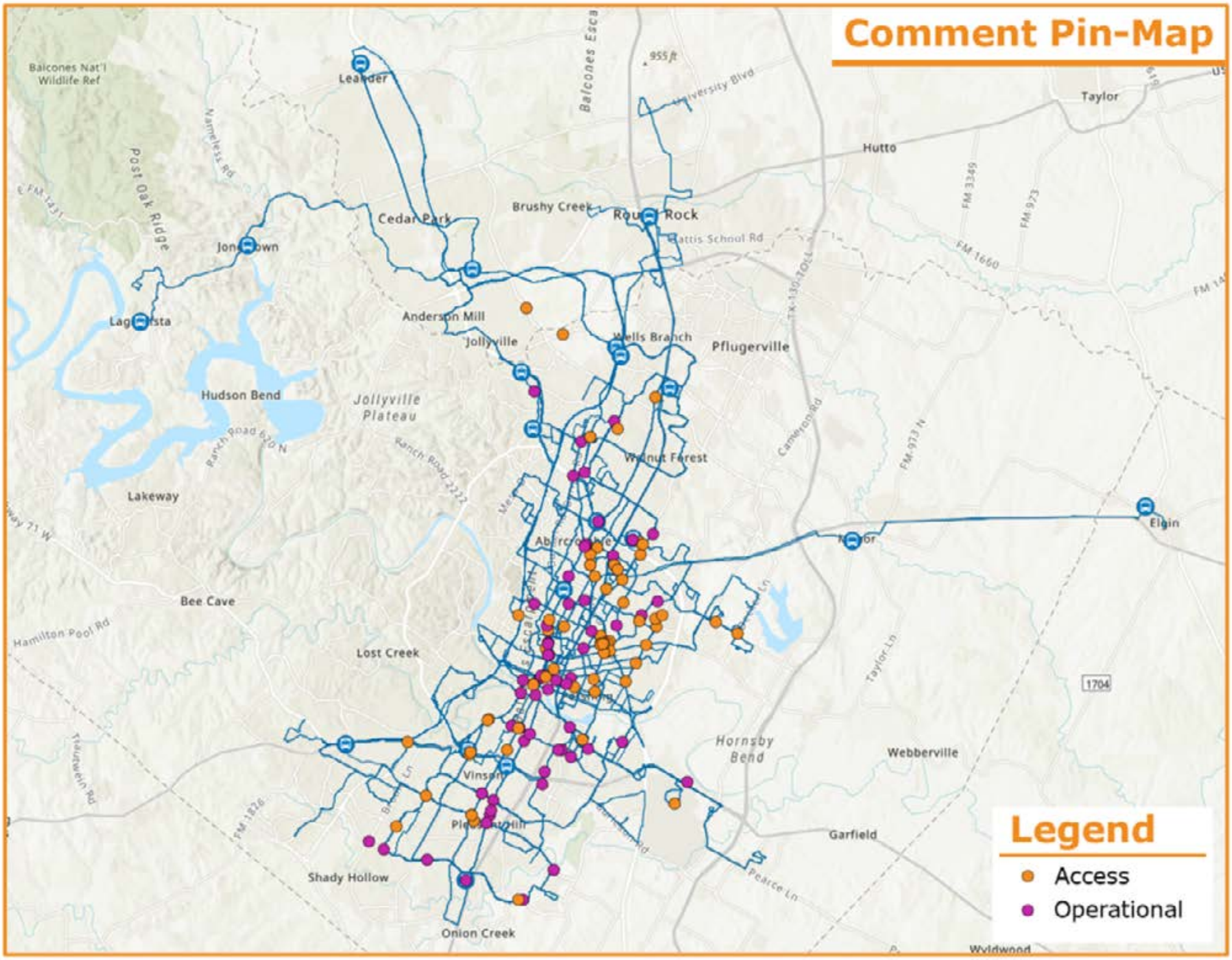
Date	Time	Location
March 21, 2023	7:00 am – 10:00 am	Tech Ridge Park & Ride
March 21, 2023	3:00 pm – 6:00 pm	North Lamar Transit Center
March 23, 2023	11:00 am – 2:00 pm	Eastside Bus Plaza
March 23, 2023	3:00 pm – 6:00 pm	Norwood Transit Center
March 28, 2023	11:00 am – 2:00 pm	Westgate Transit Center
March 28, 2023	3:00 pm – 6:00 pm	The Drag (UT West Mall)
April 4, 2023	11:00 am – 2:00 pm	Southpark Meadows
April 4, 2023	3:00 pm – 6:00 pm	Bluff Springs Road at William Cannon Drive
April 5, 2023	11:00 am – 2:00 pm	Pleasant Valley Road at Riverside Drive
April 5, 2023	3:00 pm – 6:00 pm	Republic Square

ONLINE OUTREACH

In conjunction with the in-person engagement events, an online public outreach campaign was deployed through the use of a project website (https://bit.ly/EnhanceTransitATX) and promoted through social media, online newsletters, targeted advertising campaigns, stakeholder emails, CapMetroAlert text messages, and on-board bus signage. The project website included an identical survey to the ones conducted during each round of in-person engagement. In addition, interactive mapping tools were used so that respondents could geolocate specific locations where they had comments regarding their transit-riding experiences. All online surveys and mapping tools were available to respondents in both English and Spanish. In total, 117 online surveys were filled out during the first round of digital engagement and 370 online surveys were filled out during the second round.

Online Outreach Demographics

Demographic information related to age, gender, cultural identity, disability status, and annual income was collected during each round of online engagement to ensure that the public that was engaged reflected the demographics of Austin and CapMetro riders. It was found that respondents to both rounds of online surveys were more likely to have a White racial background and have a higher annual income compared with demographic make-up of CapMetro's riders overall as presented in the 2015 Origin and Destination survey.



Mapped comments from the first round of online public outreach

TECHNICAL ADVISORY GROUP ENGAGEMENT

Early in the process of developing this study, a Technical Advisory Group (TAG) comprised of City of Austin, CapMetro, and Austin Transit Partnership staff was formed. The TAG included representatives with expertise in accessibility, bicycle and pedestrian facilities, environmental policy, public engagement, signal operations, transportation facility design, transportation safety, transit and transportation planning, and transit operations. This group met 10 times over the course of the project to provide guidance on a variety of relevant technical issues. The feedback provided by the group helped guide and shape the direction of the study from Transit Enhancement Toolbox development and existing conditions analysis through final project recommendations.

Technical Advisory Group Meetings

Date	Meeting Topics
January 25, 2022	Study scope and schedule
March 4, 2022	Existing conditions methods and assumptions
March 23, 2022	Transit Enhancement Toolbox, public outreach plan
May 17, 2022	BDAT overview, site selection process
July 15, 2022	Site selection process, bus operator interview summary, Phase 1 public outreach methodology
November 4, 2022	Phase 1 public outreach results, site selection process, project development
December 2, 2022	Project development
January 26, 2023	Phase 2 public outreach methodology, project development
April 21, 2023	Phase 2 public outreach results, project development and prioritization, performance monitoring
July 14, 2023	Final report

KEY FINDINGS

- The public found it “very important” to prioritize investments in improving transit speed and reliability, making transit easier and safer to access, and investing in historically underserved areas when making transit infrastructure improvements.
- A slight majority of survey respondents prefer shorter walking distances to transit stops even if the bus travels at a lower speed due to the increased number of stops.
- A larger majority of survey respondents prefer funding to be spread across many different project locations throughout the city rather than investing in a small number of transit enhancement projects with high capital costs.

PROJECT IDENTIFICATION

EXISTING CONDITIONS OVERVIEW

The 37 transit enhancement projects recommended in this report were identified as a result of a deliberative, step-by-step process. One of the first steps in that project identification process was the development of a web-based dashboard that visualizes how well the existing transit network is performing. This dashboard is referred to as the Bus Delay Analysis Tool (BDAT) and compiles a variety of data related to transit operations, safety and access including bus operating speeds and passenger ridership, roadway infrastructure and community demographics. The capabilities of the BDAT include:

- Identifying where buses are experiencing delay at the route or corridor level.
- Allowing the user to filter bus delay data in many ways, such as by route or segment, by time of day, or by direction.
- Producing maps, charts, and other visualizations of bus delay data.
- Overlaying delay data with access, safety and demographic information, among other contextual data.
- Making transit data available for download in standard Excel and GIS formats for analysis outside the BDAT.

For this study, the project team imported data from CapMetro's Fall 2021 service period, which ran from September 19, 2021 through December 19, 2021. As more recent data becomes available, additional service periods will be imported into the BDAT. This capability is critical for monitoring the performance of projects after they are implemented, and identifying changing needs.

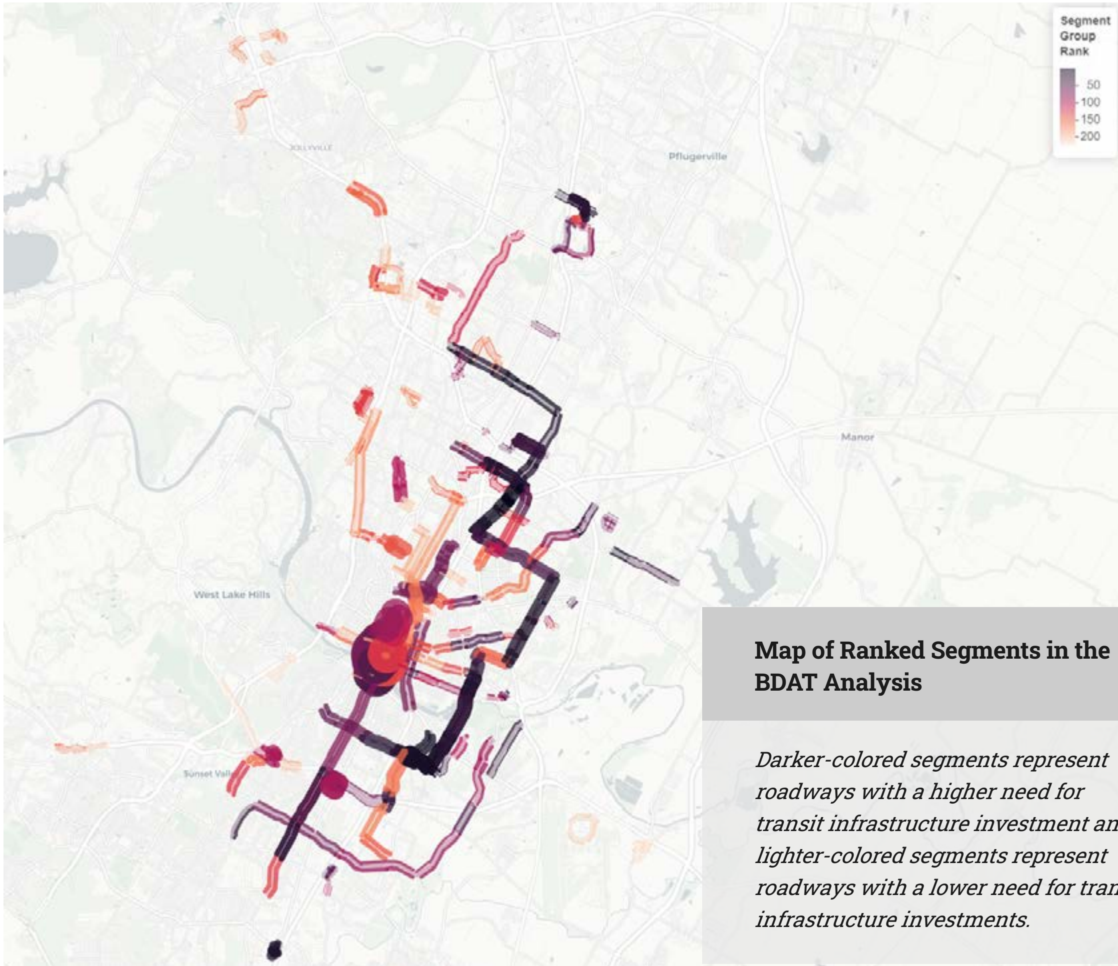
EVALUATING TRANSIT PERFORMANCE

Next, the existing transit network was divided into more than 300 segments in the BDAT. A segment is defined as a continuous link in the roadway network used by transit. Segments are bi-directional and vary in length, and cut-off points between segments were determined using characteristics such as major intersections and changes in roadway type (e.g., highway, local street).

The performance of each segment was then measured in the BDAT based on three categories of analysis — transit speed and reliability, transit access and safety, and equity. The underlying metrics used for this analysis are described below:

- **Transit Speed & Reliability Metrics**
  - **SEGMENT DELAY PER MILE**: This represents the transit delay normalized by segment length.
  - **PASSENGER DELAY PER MILE**: This represents the total delay experienced by passengers, normalized by segment length.
  - **TRAVEL TIME RELIABILITY RATIO**: This compares travel time variability at a given time of day relative to a minimum travel time variability.
  - **RATIO OF AUTO SPEED TO TRANSIT SPEED**: This represents the comparison of average auto speed to transit speed on the segment.
- **Transit Access and Safety Metrics**
  - **MISSING FEET OF SIDEWALK PER MILE:** This measures the proportion of the roadway segment without sidewalks.
  - **CROSSWALK SPACING**: This measures the number of marked crosswalks along segments as a proxy for crosswalk spacing.
  - **CRASHES PER MILE**: This measures the number of crashes per mile for the most recent five years of available data. Separate metrics were developed for total crashes, bicycle crashes, and pedestrian crashes.
  - **NUMBER OF STOPS PER MILE**: This measures the average distance between stops on a segment and is a proxy for the distance traveled to access transit service.
  - **POSTED SPEED LIMIT**: This represents the posted speed limit for the segment.
- **Equity Metrics**
  - **EQUITY INDEX:** This provides a framework for analyzing equity in transportation project development, and is associated with the City's Equity Analysis Zones. The zones (based on census tracts) are scored from 1-100, from low to high concentration of vulnerable populations. For more information on Equity Analysis Zones, refer to the Equity Analysis Zone Report.
  - **PERCENT DAILY LOAD ON MINORITY ROUTES:** This represents ridership on routes that are identified as serving a substantial market of minority populations as determined through a Title VI equity analysis.

Using the BDAT, scores for each metric were then calculated and assigned to all 300+ segments to understand each segment's performance.



Map of Ranked Segments in the BDAT Analysis

Darker-colored segments represent roadways with a higher need for transit infrastructure investment and lighter-colored segments represent roadways with a lower need for transit infrastructure investments.

Map of BDAT Analysis

PRIORITIZING PROJECT LOCATIONS

When working with limited funding, the City has to prioritize projects. To develop a prioritized list of project locations from the more than 300 segments in the BDAT, the scores for each segment were weighted based on the community priorities expressed during the first round of public outreach conducted in Fall 2022. The results of the Round 1 survey indicated that an overwhelming majority of survey respondents found it was “very important” to prioritize investments equally in transit speed and reliability, transit access and safety, and historically underserved areas (equity). As a result, the metrics under the three categories of analysis described above were weighted equally so that the total number of points that a segment could earn was the same for each category of analysis.

Additionally, separate calculations were performed for each Equity Metric to ensure an equal balance of projects in locations where a high density of minority populations reside and in locations where transit ridership among minority populations is high.

Lastly, segments that overlap with Project Connect Light Rail Transit corridors and 2016 Mobility Bond corridors corridors were excluded from the list. This was done so report recommendations could focus on roadway segments that are served by local transit service and are lacking existing corridor plans and future light rail investment as directed by Austin City Council in the development of the 2020 Mobility Bond.

In total, 30 project locations were identified using this prioritization methodology. However, locations along Pleasant Valley Road, Oltorf Street, Cameron Road, and Cesar Chavez Street were later subdivided into separate projects due to their complexity and length. Therefore, the final number of project locations prioritized for investment is 37.

DEVELOPING PROJECT RECOMMENDATIONS

Once the top 37 project locations were identified, recommended transit infrastructure improvements were developed for each location. The proposed improvements were developed based on information in the Transit Enhancement Toolbox discussed in an earlier section of this report.

The project team also referenced a variety of data when recommending improvements, including:

- Bus and passenger delay
- Transit travel time reliability
- Stop activity (boardings and alightings)
- Mapped comments from bus operator engagement and public outreach
- Traffic signal locations
- Pedestrian crossing gaps
- Existing and planned bicycle facilities
- Location of community resources (such as schools, health facilities, and supermarkets)
- Existing bus stop locations

In addition, aerial imagery, traffic counts and local knowledge of traffic patterns, project examples from outside the Austin area, and feedback from the Technical Advisory Group all informed the recommendations at each project location. At a total of 11 singalized intersections with a high amount of complexity, a capacity analysis was performed using Synchro traffic modeling software to evaluate project feasibility.

Examples of transit infrastructure improvements recommended at project locations include but are not limited to transit signal priority, pedestrian crossing improvements, bus stop modifications, and transit priority lanes. The recommended improvements are expected to have the highest impact on transit speed, reliability, access and safety at each of the 37 project locations. The next section of the report provides project overviews for each identified project location including a description of proposed improvements, benefits and issues addressed, and implementation details.

PROJECT RECOMMENDATIONS

The data-driven process outlined in the previous section of this report resulted in the 37 project recommendations described on the following pages. These projects represent planning-level proposals to enhance transit infrastructure through investment in:

- Transit speed and reliability
- Transit access and safety
- Historically underserved areas (equity)

The level of needed investment in these three categories varies by project location, with scores ranging from low (✓) to high (✓✓✓).

The proposed infrastructure improvements at each project location include many of the treatments described in the Transit Enhancement Toolbox found in the appendix of this report. All project recommendations will require additional analysis, design and community engagement prior to implementation. Additionally, all projects will require coordination with other City stakeholders and partner agencies, including CapMetro, Austin Transit Partnership, and the Texas Department of Transportation, as appropriate. This coordination will ensure that a broad spectrum of mobility needs are considered at each location prior to implementation.

PLEASANT VALLEY ROAD

Between Webberville Road and Cesar Chavez Street

PROJECT DESCRIPTION

This project proposes to implement several improvements at intersections along Pleasant Valley Road: adding transit signal priority (TSP) to traffic signals, a new traffic signal at Lyons Road, a transit priority lane at Seventh Street, turn lane improvements, and bus stop modifications.

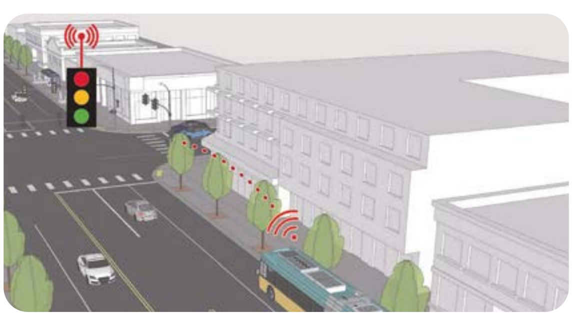
BENEFITS AND ISSUES ADDRESSED

This segment of Pleasant Valley Road serves two Frequent Local bus routes with high ridership. Currently, it has one general purpose lane in each direction north of East Seventh Street and two lanes in each direction south of East Seventh Street, intermittent bike lanes, and sidewalks on each side. CapMetro will begin operating new Project Connect MetroRapid bus service along the Pleasant Valley corridor in 2025. The Transportation and Public Works department is evaluating a holistic re-design of this section of Pleasant Valley Road that, if implemented, may improve transit speeds, pedestrian facilities, and bicycle facilities.

Vehicles, including buses, experience significant delay at intersections with major cross-streets including Lyons Road, East Seventh Street, East Fifth Street, and East Cesar Chavez Street. In addition, bus stops that are closely spaced and have low levels of ridership may unnecessarily result in transit delays. Implementing this project would have the benefit of improving both the speed and reliability of bus service along this corridor, allowing riders to more easily schedule their transit trips.

IMPROVEMENT HIGHLIGHT

According to National Association of City Transportation Officials (NACTO), Transit Signal Priority can reduce transit delay by 10-50% at target intersections and improve the overall reliability of transit service.



Source: King County Metro Speed Reliability Toolbox

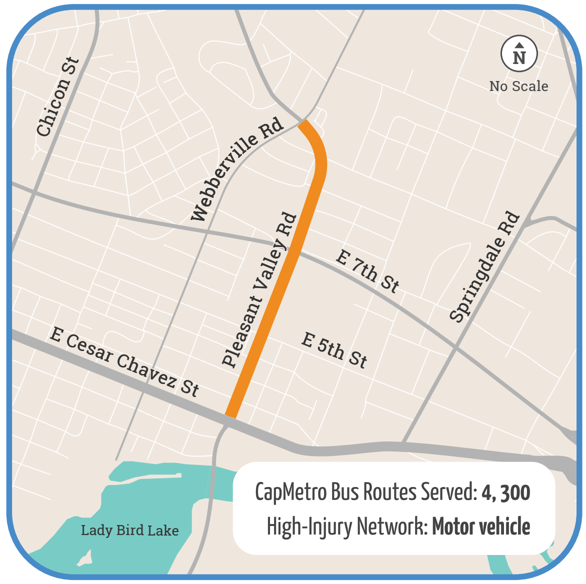
PROJECT SCORE

Speed/Reliability Needs: ✓✓✓

Access Needs: ✓✓✓

Equity Needs: ✓✓✓

PROJECT LOCATION



IMPLEMENTATION

- **Approximate Cost**: $2.5M for design and construction
- **Potential Funding Sources**: 2020 Austin Mobility Bond funds, CapMetro ILA funds, Street Impact Fee funds
- **Project Duration from Conceptual Design through Construction**: Long (5+ years)

PUBLIC FEEDBACK

"Bus should have priority through here."

PLEASANT VALLEY ROAD

Between Cesar Chavez Street and Lakeshore Boulevard

PROJECT DESCRIPTION

This project proposes altering the cross-section over the Longhorn Dam bridge to allow for northbound and southbound transit priority lanes. It is important to note that a wishbone-shaped pedestrian bridge is currently planned on the west side of the Longhorn Dam bridge and is expected to be completed in 2026. Proposed changes to Pleasant Valley Road's cross-section could be implemented after the pedestrian bridge is constructed and active transportation modes are rerouted to the parallel facility.

BENEFITS AND ISSUES ADDRESSED

Multiple CapMetro buses travel over the bridge to get to and from the CapMetro garage located just north of the project limits on 5th Street at Pleasant Valley Road. Additionally, in 2025, CapMetro will begin operating new Project Connect MetroRapid bus service along the Pleasant Valley corridor. The majority of the segment currently has two lanes in the southbound direction and one lane in the northbound direction. Buses currently experience high levels of delay and travel time reliability impacts when traveling over the Longhorn Dam bridge as well as at intersections with Cesar Chavez Street and Lakeshore Boulevard during peak periods.

Transit priority lanes would allow buses to operate separately from general purpose traffic. This would provide improved speed and reliability for bus routes. In addition, the proposed project would allow for a high quality of service on the new MetroRapid route.

BEST PRACTICES

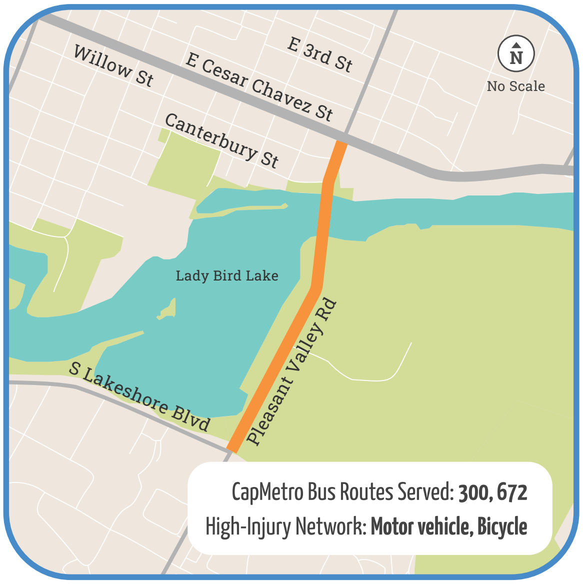
Transit priority lanes have improved travel times and reliability for downtown routes along Guadalupe Street and Lavaca Street.

Guadalupe Street in Austin
Source: Google Street View

PROJECT SCORE

Speed/Reliability Needs: ✓✓
Access Needs: ✓✓✓
Equity Needs: ✓✓✓

PROJECT LOCATION



IMPLEMENTATION

- **Approximate Cost**: $8.5M for design and construction
- **Potential Funding Sources**: 2020 Austin Mobility Bond funds, CapMetro ILA funds, Street Impact Fee funds, grant funding opportunities
- **Project Duration from Conceptual Design through Construction**: Long (5+ years)

PUBLIC FEEDBACK

"Buses get stuck in traffic on the Pleasant Valley Bridge. When the new pedestrian bridge is built, perhaps we convert one lane to bus only."

PLEASANT VALLEY ROAD

Between Lakeshore Boulevard and Oltorf Street

PROJECT DESCRIPTION

This project proposes a southbound transit priority lane through the intersection of Pleasant Valley Road and Riverside Drive and a supporting queue jump signal phase. In conjunction with this improvement, a raised protected bicycle lane is proposed on the west side of the intersection to enhance pedestrian and bicycle connectivity. This project also includes added protection for existing bike lanes, improved pedestrian crossings, and consolidation of one bus stop with low ridership.

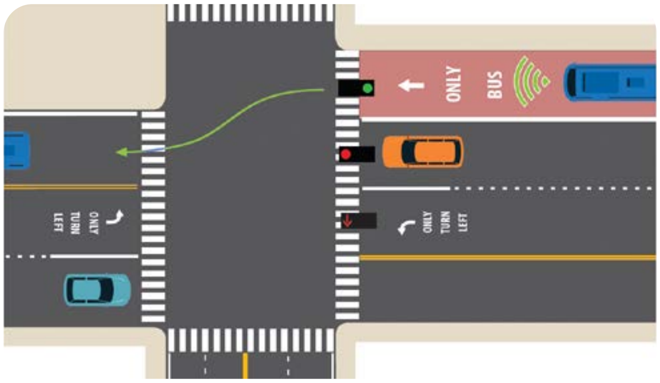
BENEFITS AND ISSUES ADDRESSED

This segment of Pleasant Valley Road serves a Frequent Local Route and a Local Route, and in 2025 CapMetro will begin operating new Project Connect MetroRapid bus service along the corridor. There are currently two lanes in each direction, bike lanes, and sidewalks on each side. Buses along this corridor experience high levels of delay, particularly southbound at the Riverside Drive intersection.

A southbound transit priority lane and queue jump at the Pleasant Valley Road and Riverside Drive intersection would greatly enhance bus speeds and reliability by allowing buses to separate from general purpose traffic and proceed through the intersection first. This intersection is also planned to include a light-rail transit station as part of Project Connect, and these proposed improvements should be coordinated with the Austin Transit Partnership. Improving bus connections to and from the future station will benefit the transit network as a whole.

BEST PRACTICES

Queue jump lanes allow buses to easily enter ahead of traffic flow at a priority intersection.



Source: Maryland DOT Transit Priority Toolkit

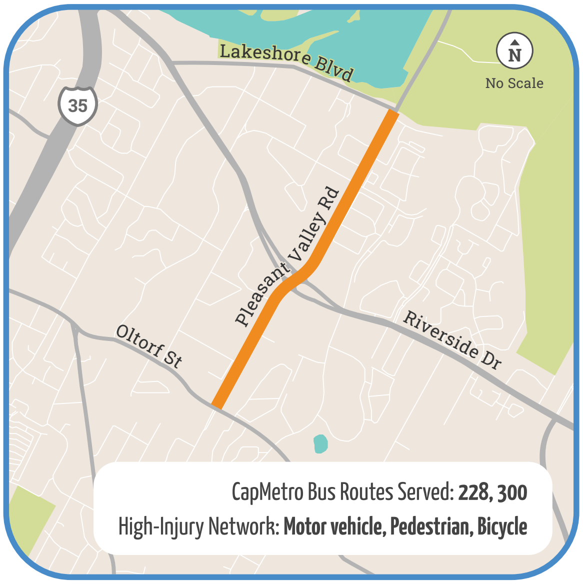
PROJECT SCORE

Speed/Reliability Needs: ✓✓✓

Access Needs: ✓✓✓

Equity Needs: ✓✓✓

PROJECT LOCATION



CapMetro Bus Routes Served: **228, 300**

High-Injury Network: **Motor vehicle, Pedestrian, Bicycle**

IMPLEMENTATION

- **Approximate Cost**: $1.6M for design and construction
- **Potential Funding Sources**: 2020 Austin Mobility Bond funds, CapMetro ILA funds, Street Impact Fee funds
- **Project Duration from Conceptual Design through Construction**: Medium (2-5 years)

PUBLIC FEEDBACK

"300 bus gets [stuck] in traffic from Pleasant Valley to Springdale Road, making it move slowly."

OLTORF STREET

Between Wickersham Lane and I-35

PROJECT DESCRIPTION

This project proposes to improve bus stop spacing, relocate existing midblock stops to safe crossings, and improve access management by prohibiting certain left-turn movements at closely spaced driveways. In addition, a pedestrian hybrid beacon signal is proposed between I-35 and Parker Lane to provide an additional pedestrian crossing opportunity on the corridor.

BENEFITS AND ISSUES ADDRESSED

This segment of Oltorf Street serves two Frequent Local routes and one Local route, and in 2025 CapMetro will begin operating new Project Connect MetroRapid bus service on the corridor. It currently has two lanes in each direction, a center turn lane, sidewalks, and bike lanes on each side. Buses experience high levels of delay between I-35 and Pleasant Valley Road. Removing stops with low ridership and relocating stops to the far-side of intersections will allow for improved transit speeds and reliability, and provide safer access to current midblock stops. In addition, adding a pedestrian hybrid beacon signal between the I-35 northbound frontage road and Parker Lane will reduce the existing 1,200 foot gap between signalized pedestrian crossings, improving safety and access to transit.

Access management, proposed for the driveways east of the I-35 frontage road, would decrease conflicts between through vehicles traveling along Oltorf Street and vehicles turning into and out of driveways by prohibiting certain left-turn movements. This would improve safety along the segment as well as travel speeds for buses. Where left-turns are restricted, access to properties is often maintained through U-turn opportunities.

BEST PRACTICES

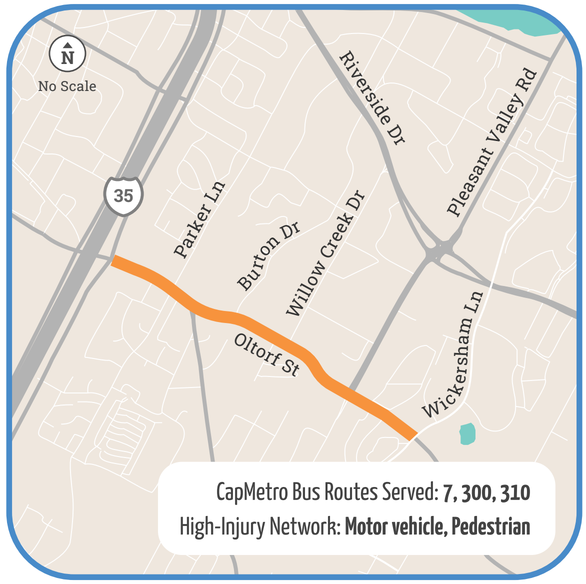
Access management at driveways, such as hardening the centerline with flex posts to restrict left-turn movements, can improve the safety of the roadway and improve traffic flow.

Braker Lane in Austin
Source: Google Street View

PROJECT SCORE

Speed/Reliability Needs: ✓✓✓
Access Needs: ✓✓✓
Equity Needs: ✓✓✓

PROJECT LOCATION



IMPLEMENTATION

- **Approximate Cost**: $0.5M for design and construction
- **Potential Funding Sources**: 2020 Austin Mobility Bond funds, CapMetro ILA funds, Street Impact Fee funds
- **Project Duration from Conceptual Design through Construction**: Short (0-2 years)

OLTORF STREET

Between I-35 and South First Street

PROJECT DESCRIPTION

This project proposes several infrastructure improvements related to enhancing transit access and operations. These improvements include moving bus stops to the far-side of intersections, improving stop spacing by removing some closely-spaced stops and adding new stops where large gaps exist, and adding three new pedestrian hybrid beacons to provide additional crossing opportunities on the corridor.

BENEFITS AND ISSUES ADDRESSED

This segment of Oltorf Street serves Route 300, which is designated as a Frequent Local route and is the second highest ridership route in the CapMetro system. It currently has two lanes in each direction and sidewalks with no dedicated bicycle facility. Buses currently experience a moderate amount of delay throughout the segment and a high levels of delay westbound between South First Street and South Congress Avenue, including at major intersections with Eastside Drive, South Congress Avenue, and South First Street. The intersection of Oltorf Street and South Congress Avenue is planned to include a light-rail transit station as part of Project Connect. Improving bus connections to and from the future station will benefit the transit network as a whole.

The shifting of bus stop locations is proposed to better align with safe pedestrian crossings and key destinations along the segment. In addition, the three proposed pedestrian hybrid beacons will allow for protected crossings in locations with large crossing gaps. Relocating bus stops to the far-side of signalized intersections is also expected to reduce transit delay.

PROJECT HIGHLIGHT

Adding bus stops near key destinations such as high-density residential developments can increase the effectiveness and safety of the transit network. The project proposes adding a new stop pair at Wilson Street that will improve access to transit for residents in nearby homes.

Source: Michael Minasi / KUT

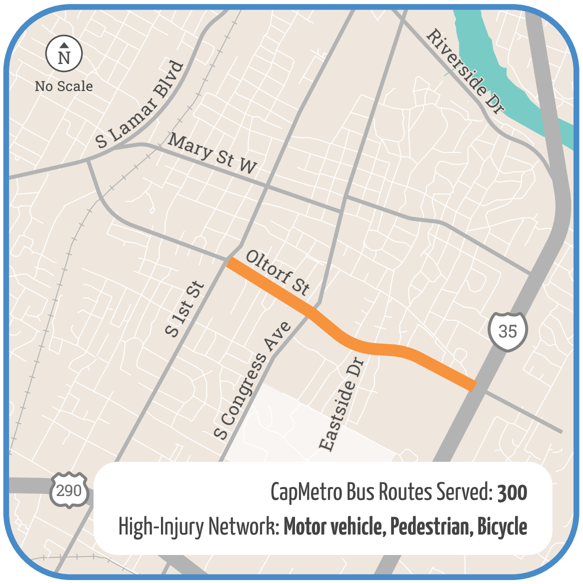
PROJECT SCORE

Speed/Reliability Needs: ✓✓✓

Access Needs: ✓✓✓

Equity Needs: ✓✓

PROJECT LOCATION



CapMetro Bus Routes Served: **300**

High-Injury Network: **Motor vehicle, Pedestrian, Bicycle**

IMPLEMENTATION

- **Approximate Cost**: $1.4M for design and construction
- **Potential Funding Sources**: 2020 Austin Mobility Bond funds, CapMetro ILA funds, Street Impact Fee funds
- **Project Duration from Conceptual Design through Construction**: Medium (2-5 years)

PUBLIC FEEDBACK

"I feel very unsafe crossing at this intersection to catch the 300."

"Bus moves slowly through here."

OLTORF STREET

Between South First Street and South Lamar Boulevard

PROJECT DESCRIPTION

This project proposes moving a bus stop from the near-side to the far-side of a signalized intersection and adding a new traffic signal at the intersection with Thornton Road. In addition, a preliminary engineering study is recommended to explore the possibility of improving lane widths for transit and incorporating protected bicycle facilities along this segment of Oltorf Street.

BENEFITS AND ISSUES ADDRESSED

This segment of Oltorf Street serves Route 300, which is designated as a Frequent Local route and is the second highest ridership route in the CapMetro system. It currently has two lanes in each direction, sidewalks, and no dedicated bicycle facilities. Buses experience high levels of delay throughout the segment, particularly at the intersections with South Lamar Boulevard, Fifth Street, and South First Street. Additionally, a railroad crossing just west of Thornton Road causes considerable traffic congestion during a train crossing event. The current lane widths along this segment of Oltorf Street are narrow at approximately 10 feet wide. This is a contributing factor for crashes and related incidents between CapMetro buses and other roadway users.

Moving stops to the far-side of intersections has the benefit of allowing buses to travel through an intersection before stopping, allowing for more effective use of transit signal priority to reduce signal delay. A traffic signal at Thornton Road would provide protected pedestrian crossings for the stop pair located at the intersection, resulting in improved access and safety. The proposed signal at Thornton Road also addresses a gap of approximately 2,600 feet between signalized pedestrian crossings.

While further study of traffic impacts are needed, a four-lane to three-lane conversion along this segment of Oltorf Street could improve safety for pedestrians and bicyclists accessing transit services. Under this configurtation, transit speed and reliability would be improved by improving lane widths for transit and providing left-turn lanes at major intersections.

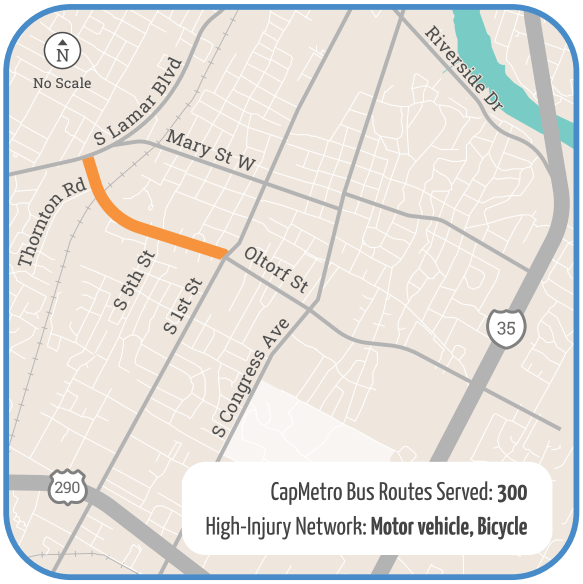
BEST PRACTICES

Installing a new traffic signal facilitates safe pedestrian crossings by forcing conflicting vehicles to stop during the walk phase. Pedestrian safety at signalized intersections can be further enhanced by Leading Pedestrian Intervals that allow pedestrians to enter the intersection 5 to 15 seconds before the associated vehicle movement.

PROJECT SCORE

Speed/Reliability Needs: ✓ ✓ (✓)
Access Needs: ✓ ✓ ✓
Equity Needs: ✓ ✓ (✓)

PROJECT LOCATION



IMPLEMENTATION

- **Approximate Cost**: $1.1M for design and construction
- **Potential Funding Sources**: 2020 Austin Mobility Bond funds, CapMetro ILA funds, Street Impact Fee funds
- **Project Duration from Conceptual Design through Construction**: Medium (2-5 years)

PUBLIC FEEDBACK

> **"Entire section along Oltorf is challenging – consistently stuck in traffic on 300 route."**

WOODWARD STREET

Between Parker Lane and Freidrich Lane

PROJECT DESCRIPTION

This project proposes a southbound transit priority lane plus bus queue jump on Woodward Street at the intersection with westbound Ben White Boulevard. Adjacent to the southbound transit lane, a raised bicycle lane is proposed behind the curb. In addition, improvements are recommended at bus stops to resolve conflicts between buses and bikes.

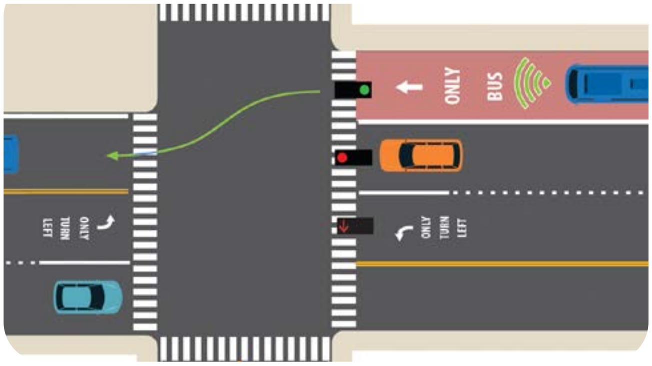
BENEFITS AND ISSUES ADDRESSED

This segment of Woodward Street serves Route 7, which is designated as Frequent Local route and is the third highest ridership route in the CapMetro system, as well as one Local route. It currently has one general purpose lane in each direction, plus a center turn lane north of Ben White Boulevard and two lanes in each direction south of Ben White Boulevard. There are sidewalks and bike lanes on each side of the street.

Buses experience considerable delay at the intersections with Ben White Boulevard. A transit priority lane and bus queue jump would allow southbound buses to bypass congestion at the traffic signal with westbound Ben White Boulevard. Resolving the conflicts between buses and bikes at transit stops will increase bicyclist comfort and safety. Coordination with the Texas Department of Transportation will be required prior to the implementation of improvements.

PROJECT HIGHLIGHT

Transit priority lanes allow buses to separate from general purpose vehicles thereby increasing speed and reliability of bus service. This improvement is particularly effective when paired with an intersection queue jump.



Source: Maryland DOT Transit Priority Toolkit

PROJECT SCORE

Speed/Reliability Needs: ✓✓✓
Access Needs: ✓✓✓
Equity Needs: ✓✓

PROJECT LOCATION

IMPLEMENTATION

- **Approximate Cost**: $1.7M for design and construction
- **Potential Funding Sources**: 2020 Austin Mobility Bond funds, CapMetro ILA funds, Street Impact Fee funds
- **Project Duration from Conceptual Design through Construction**: Long (5+ years)

CAMERON ROAD

Between East 51st Street and US 290

PROJECT DESCRIPTION

This project proposes several changes to bus stop locations and designs, as well as a new pedestrian crossing at Glencrest Drive. In addition, turn lane improvements are proposed at the intersection of southbound Cameron Road at East 51st Street.

BENEFITS AND ISSUES ADDRESSED

This segment of Cameron Road serves two Frequent Local routes. The majority of the segment currently has one general purpose lane in each direction and a center turn lane. There are sidewalks on both sides and bicycle lanes from East 51st Street to East 53rd Street. The Austin Strategic Mobility Plan identifies Cameron Road as a future high-capacity transit corridor and the Project Connect system plan shows future MetroRapid bus service on the corridor. Buses experience high levels of delay throughout the segment.

Bus stop relocations will allow passengers to access transit closer to key destinations and protected pedestrian crossings, while bus stop design improvements will resolve conflicts between buses and bikes. Conversions from pull-out to in-lane bus stops, plus turn lane improvements at 51st Street will help alleviate traffic merging and signal-related delays. Turn lane improvements at the East 51st Street intersection will need to be coordinated with the East 51st Street Mobility Project.

BEST PRACTICES

Converting from pull-out to in-lane bus stops improves speed and reliability by reducing the delay caused by buses merging back into the flow of traffic after making a stop.

Source: CapMetro

PROJECT SCORE

Speed/Reliability Needs: ✓✓✓

Access Needs: ✓✓✓

Equity Needs: ✓✓✓

PROJECT LOCATION

CapMetro Bus Routes Served: **300, 337**

High-Injury Network: **Motor vehicle, Pedestrian, and Bicycle**

IMPLEMENTATION

- **Approximate Cost**: $1.9M for design and construction
- **Potential Funding Sources**: 2020 Austin Mobility Bond funds, CapMetro ILA funds, Street Impact Fee funds
- **Project Duration from Conceptual Design through Construction**: Long (5+ years)

PUBLIC FEEDBACK

"Fixing this [high car speeds] would make transit more accessible here."

CAMERON ROAD

Between US 290 and US 183

PROJECT DESCRIPTION

This project proposes changes to bus stop locations to provide access to safe crossings and improve bus operations, and adds a new pedestrian hybrid beacon signal between Coronado Hills Drive/ McKie Drive and US 183. The project also proposes improvements at the interchange with US 290 to fill bicycle facility gaps and provide a northbound bus queue jump.

BENEFITS AND ISSUES ADDRESSED

This segment of Cameron Road serves three Frequent Local routes, two of which are among the top five highest ridership routes in the CapMetro system. The majority of the segment has three lanes in each direction, sidewalks, and no dedicated bicycle facilities. The Austin Strategic Mobility Plan identifies Cameron Road as a future high-capacity transit corridor and the Project Connect system plan shows future MetroRapid bus service on the corridor. Buses experience delay throughout the segment, particularly approaching US 290.

The bus stop modifications along with the pedestrian hybrid beacon signal will provide greater safety and access to transit services. Adding bicycle facilities and queue jump lanes will improve safety and operations for all users at the US 290 interchange. Coordination with the Texas Department of Transportation will be required prior to the implementation of improvements.

PROJECT HIGHLIGHT

A new northbound bus stop is proposed at the intersection with Camino la Costa. This will increase transit access to adjacent businesses and residences.

Cameron Road at Camino la Costa
Source: Google Street View

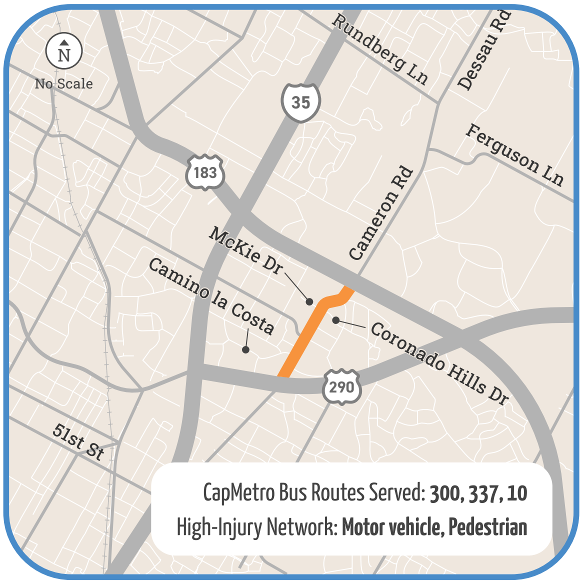
PROJECT SCORE

Speed/Reliability Needs: ✓✓✓

Access Needs: ✓✓✓

Equity Needs: ✓✓✓

PROJECT LOCATION



IMPLEMENTATION

- **Approximate Cost**: $1.0M for design and construction
- **Potential Funding Sources**: 2020 Austin Mobility Bond funds, CapMetro ILA funds
- **Project Duration from Conceptual Design through Construction**: Medium (2-5 years)

CAMERON ROAD

Between US 183 and Rundberg Lane

PROJECT DESCRIPTION

This project proposes several bus stop modifications to improve access to safe crossings and transit operations, plus adds two new pedestrian hybrid beacon signals to further support transit access. In addition, a southbound transit priority lane plus bus queue jump is proposed at the US 183 interchange.

PROJECT SCORE

Speed/Reliability Needs: ✓✓✓

Access Needs: ✓✓✓

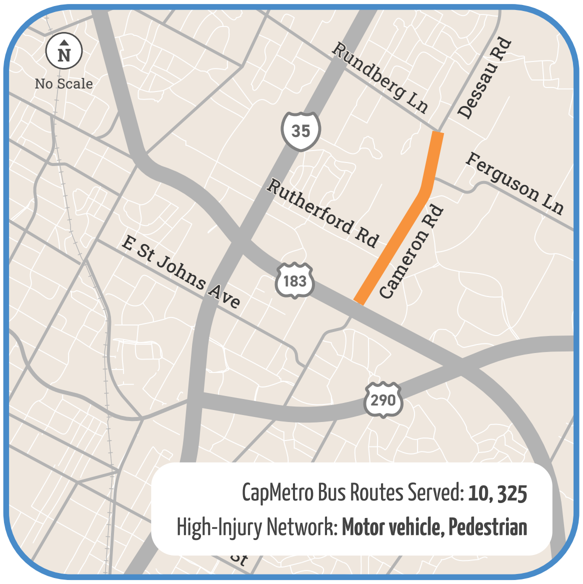
Equity Needs: ✓✓✓

BENEFITS AND ISSUES ADDRESSED

This segment of Cameron Road serves two Frequent Local routes. It has three lanes in each direction, sidewalks, and no dedicated bicycle facilities. The Austin Strategic Mobility Plan identifies Cameron Road as a future high-capacity transit corridor and the Project Connect system plan shows future MetroRapid bus service on the corridor. Buses experience considerable delay between US 183 and Rutherford Lane.

The bus stop modifications will improve safe access to transit along this segment of Cameron Road. The two proposed pedestrian hybrid beacon signals will facilitate protected pedestrian crossings between traffic signals spaced 1,800 feet apart and 2,800 feet apart. A southbound transit priority lane plus queue jump will reduce bus delay and improve travel time reliability at the US 183 interchange. Improvements at the US 183 interchange will be coordinated with the city's Vision Zero project at this location. Coordination with the Texas Department of Transportation will be required prior to the implementation of improvements.

PROJECT LOCATION

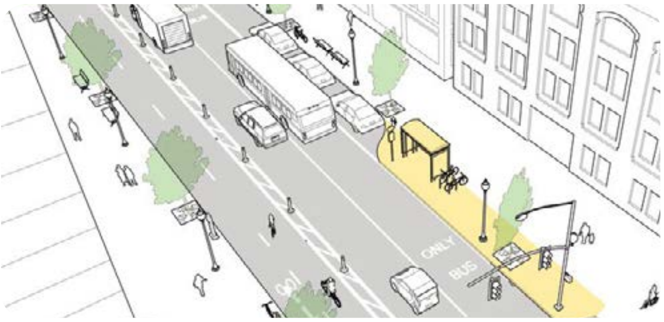


CapMetro Bus Routes Served: **10, 325**

High-Injury Network: **Motor vehicle, Pedestrian**

BEST PRACTICES

Bus stops should be located as close as possible to the nearest signalized crossing to facilitate transfers and discourage unprotected midblock crossings.



Source: NACTO

IMPLEMENTATION

- **Approximate Cost**: $3.6M for design and construction
- **Potential Funding Sources**: 2020 Austin Mobility Bond funds, CapMetro ILA funds
- **Project Duration from Conceptual Design through Construction**: Medium (2-5 years)

MANOR ROAD

Between Springdale Road and Loyola Lane

PROJECT DESCRIPTION

This project proposes several infrastructure improvements at the intersection of Manor Road and Springdale Road to enhance operations for all modes. A near-side to far-side bus stop relocation is also proposed at the intersection with Loyola Lane.

BENEFITS AND ISSUES ADDRESSED

This segment of Manor Road serves Route 20, which is a Frequent Local route and the fourth highest ridership route in the CapMetro system, and in 2025 CapMetro will begin operating new Project Connect MetroRapid bus service on the corridor. Manor Road has two lanes in each direction, sidewalks, and intermittent bicycle facilities. Eastbound buses need to make a left turn at the intersection with Springdale Road to continue along Manor Road. However, buses currently need to use both turn lanes to complete this movement due to narrow lanes. The proposed project will include minor widening to allow for buses to make lefts using a single lane. This project also adds a shared-use path to fill a gap in bicycle facilities at the intersection.

The near-side to far-side bus stop relocation at Loyola Lane will improve the reliability of bus service through efficient use of transit signal priority in addition to facilitating safer pedestrian crossings.

PROJECT HIGHLIGHT

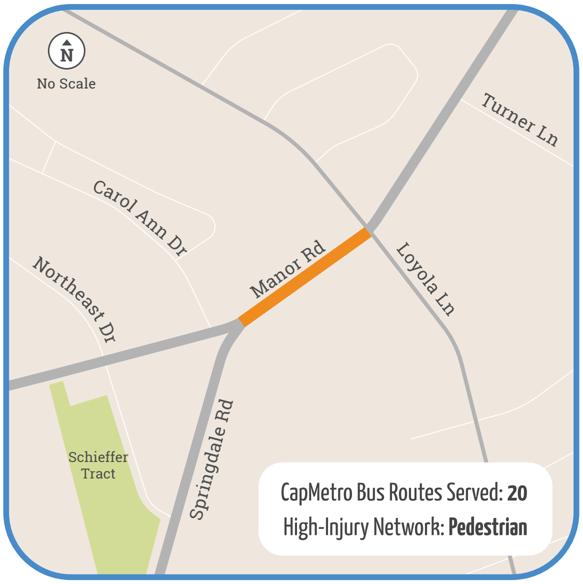
A shared-use path is proposed at the intersection with Springdale Road to connect the eastbound bike lane with the two-way cycle track on the north side of the roadway. Shared-use paths are effective at serving both pedestrians and bicyclists within constrained environments.

Shared-use path along Pleasant Valley Road
Source: Google Street View

PROJECT SCORE

Speed/Reliability Needs: ✓✓✓
Access Needs: ✓✓✓
Equity Needs: ✓✓✓

PROJECT LOCATION



IMPLEMENTATION

- **Approximate Cost**: $0.9M for design and construction
- **Potential Funding Sources**: 2020 Austin Mobility Bond funds, CapMetro ILA funds
- **Project Duration from Conceptual Design through Construction**: Medium (2-5 years)

SOUTH FIRST STREET

Between William Cannon Drive and Stassney Lane

PROJECT DESCRIPTION

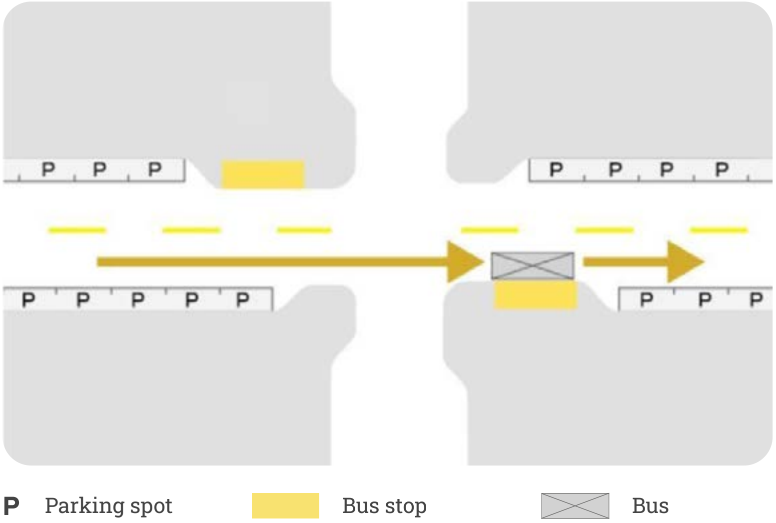
This project proposes to implement several bus stop relocations to provide access to safe crossings and improve bus operations, and proposes a new pedestrian hybrid beacon signal at Bramble Drive.

BENEFITS AND ISSUES ADDRESSED

This segment of South First Street serves one Frequent Local route. It has two lanes in each direction, sidewalks, and no dedicated bicycle facilities. Bus stop relocations from the near-side to the far-side of intersections will reduce bus delay at traffic signals. Adding a pedestrian hybrid beacon signal will allow passengers to safely cross the street when accessing the transit stops near Bramble Drive.

BEST PRACTICES

Far-side bus stops reduce signal delay and encourage passengers to cross behind the bus. This improvement is particularly effective when paired with transit signal priority.

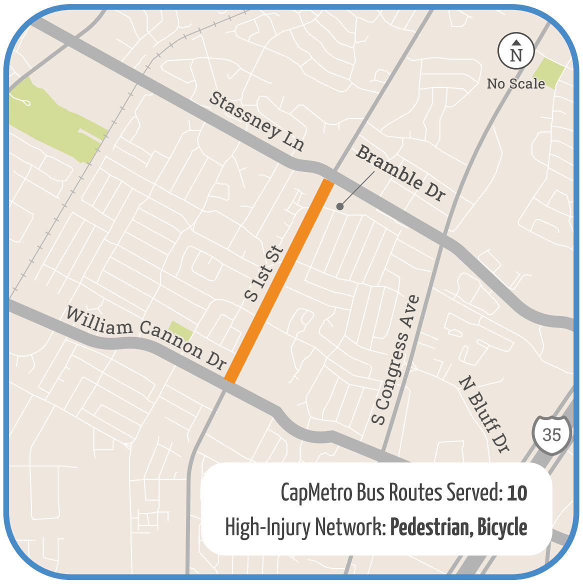


Source: NACTO

PROJECT SCORE

Speed/Reliability Needs: ✓✓✓
Access Needs: ✓✓✓
Equity Needs: ✓✓✓

PROJECT LOCATION



CapMetro Bus Routes Served: **10**
High-Injury Network: **Pedestrian, Bicycle**

IMPLEMENTATION

- **Approximate Cost**: $0.6M for design and construction
- **Potential Funding Sources**: 2020 Austin Mobility Bond funds, CapMetro ILA funds
- **Project Duration from Conceptual Design through Construction**: Short (0-2 years)

SOUTH FIRST STREET BRIDGE

Between Barton Springs Road and Cesar Chavez Street

PROJECT DESCRIPTION

This project proposes several infrastructure improvements including a northbound transit priority lane, turn lane improvements at the intersection with Riverside Drive, and bicycle facility upgrades.

BENEFITS AND ISSUES ADDRESSED

The South First Street bridge is a major crossing over Lady Bird Lake that serves 11 bus routes traversing to and from downtown. The majority of the segment has three lanes in each direction. Pedestrians are served by the Ann and Roy Butler Hike and Bike Trail and there are bicycle lanes on both sides of the street. Buses experience high levels of delay and travel time variability over the bridge and at the intersection with Riverside Drive.

The proposed improvements such as a northbound transit priority lane and southbound turn lane modifications, are expected to increase bus travel speeds and improve reliability. Additionally, bicycle facility upgrades will allow cyclists to access transit more easily along this corridor.

PROJECT HIGHLIGHT

The intersection of South First Street and Riverside Drive experiences recurring traffic congestion. Turn lane improvements are expected to reduce delay and travel time for both transit vehicles and general purpose traffic.

Source: Google Street View

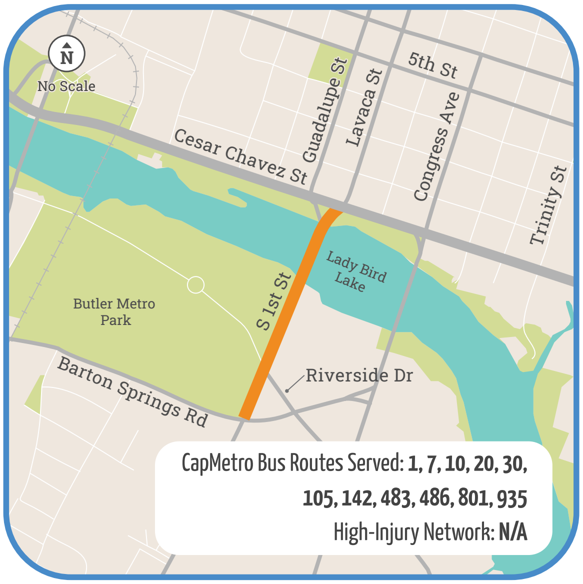
PROJECT SCORE

Speed/Reliability Needs: ✓✓✓

Access Needs: ✓✓

Equity Needs: ✓

PROJECT LOCATION



IMPLEMENTATION

- **Approximate Cost**: $0.8M for design and construction
- **Potential Funding Sources**: 2020 Austin Mobility Bond funds, CapMetro ILA funds, Street Impact Fee funds
- **Project Duration from Conceptual Design through Construction**: Short (0-2 years)

PUBLIC FEEDBACK

"Buses should have their own lane in order to not get caught up with traffic."

"Need a dedicated bus lane on the bridge, which is a natural bottleneck."

GUADALUPE STREET

Between Cesar Chavez Street and 15th Street

PROJECT DESCRIPTION

This project proposes to resolve the conflicts between buses and bikes at multiple bus stops by implementing shared cycle track stops. All proposed improvements along Guadalupe Street may be impacted by Project Connect light rail. Coordination with the Austin Transit Partnership will be required prior to implementation.

BENEFITS AND ISSUES ADDRESSED

The Guadalupe and Lavaca couplet downtown is the highest volume transit corridor in the city, serving 23 bus routes including both existing MetroRapid lines and multiple Frequent Local routes. Through downtown, Guadalupe Street is one-way in the southbound direction. From Cesar Chavez Street to Third Street, it has four general purpose lanes. From Third Street to 15th Street, it has one transit priority lane and three general purpose lanes. This segment of Guadalupe Street has intermittent bike lanes with sections of shared bus/bike lanes. Bi-directional light rail service is planned to operate on Guadalupe Street downtown as part of [Project Connect](). As a result, all proposed improvements must be coordinated with Austin Transit Partnership prior to implementation.

Resolving conflicts between buses and bicycles will improve safety for vulnerable road users and make cycling more comfortable along Guadalupe Street.

BEST PRACTICES

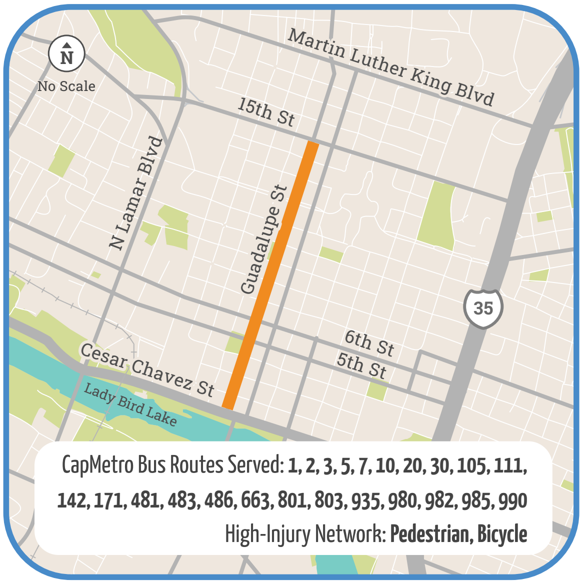
Shared cycle track stops allow for buses to make a stop without blocking the bike lane, while providing clear conflict delineation between cyclists and passengers boarding and alighting.

SE Division Street at 135th Avenue Bus Rapid Transit Station, Portland, OR
Source: Google Street View

PROJECT SCORE

Speed/Reliability Needs: ✓ ✓ ✓
Access Needs: ✓ ✓ ✓
Equity Needs: ✓ ✓ ✓ (1 of 3 highlighted)

PROJECT LOCATION



CapMetro Bus Routes Served: **1, 2, 3, 5, 7, 10, 20, 30, 105, 111, 142, 171, 481, 483, 486, 663, 801, 803, 935, 980, 982, 985, 990**

High-Injury Network: **Pedestrian, Bicycle**

IMPLEMENTATION

- **Approximate Cost**: $0.8M for design and construction
- **Potential Funding Sources**: 2020 Austin Mobility Bond funds, CapMetro ILA funds
- **Project Duration from Conceptual Design through Construction**: Medium (2-5 years)

PUBLIC FEEDBACK

"Bus moves too slowly during afternoon traffic."

RED RIVER STREET/45TH STREET

Between Dean Keeton Street and Airport Boulevard

PROJECT DESCRIPTION

This project proposes turn lane improvements at the intersection of 45th Street and Airport Boulevard, plus bus stop improvements and a new pedestrian hybrid beacon signal along Red River Street. Additionally, it is recommended that a preliminary engineering study is conducted to explore the possibility of incorporating protected bicycle facilities and/or transit priority lanes along this segment of Red River Street.

BENEFITS AND ISSUES ADDRESSED

These segments of Red River Street and 45th Street serve one Frequent Local route and two Local routes. From Dean Keeton Street to 41st Street, Red River Street has two lanes in each direction. The Austin Strategic Mobility Plan identifies Red River Street as a transit priority corridor and the Project Connect system plan shows future MetroRapid bus service on the corridor. From 41st Street to Park Boulevard, Red River Street has two lanes northbound and one general purpose lane southbound. From Park Boulevard to 45th Street, there is one general purpose lane in each direction. There are sidewalks on both sides of Red River Street and bicycle lanes between 41st Street and 45th Street. This segment of 45th Street has two lanes in the eastbound direction and one lane in the westbound direction. Buses experience high delay throughout the segment.

Turn lane improvements at the intersection of 45th Street and Airport Boulevard will help alleviate delay both for transit vehicles and general purpose traffic. The improvements at this intersection require coordination with the Texas Department of Transportation's I-35 CapEx Central project. Bus stop relocations and a new pedestrian hybrid beacon will improve accessibility to transit along the Red River Street corridor.

PROJECT HIGHLIGHT

A pedestrian hybrid beacon and a raised median island are recommended at the existing crosswalk on Red River at 30th Street. These improvements combined will enhance safety for pedestrians crossing Red River Street to access transit.

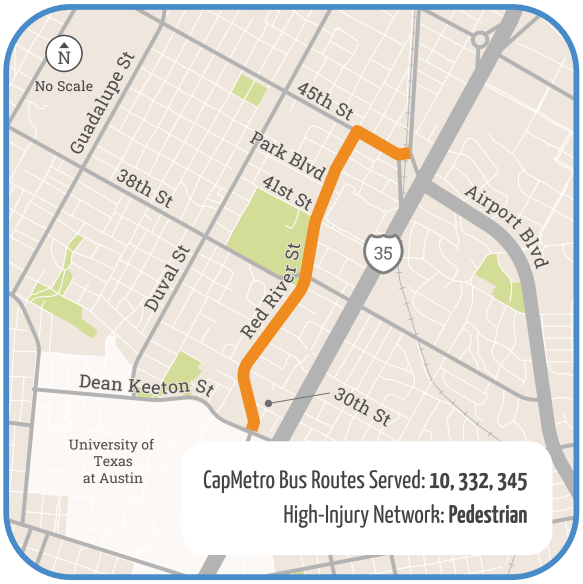
PROJECT SCORE

Speed/Reliability Needs: ✓✓✓

Access Needs: ✓✓✓

Equity Needs: ✓✓

PROJECT LOCATION



CapMetro Bus Routes Served: **10, 332, 345**

High-Injury Network: **Pedestrian**

IMPLEMENTATION

- **Approximate Cost**: $1.5M for design and construction
- **Potential Funding Sources**: 2020 Austin Mobility Bond funds, CapMetro ILA funds, Street Impact Fee funds
- **Project Duration from Conceptual Design through Construction**: Long (5+ years)

PUBLIC FEEDBACK

"Bus caught in traffic at airport/ 45th intersection."

"Difficult to cross safely to #10 stop."

CESAR CHAVEZ STREET

Between B.R. Reynolds Drive and I-35

PROJECT DESCRIPTION

This project proposes evaluating a variety of infrastructure improvements such as transit priority lanes, median treatments, and turn restrictions in order to increase transit speed and reliability along the Cesar Chavez Street corridor. A preliminary engineering study is recommended to determine which combinations of improvements provide the greatest benefit.

BENEFITS AND ISSUES ADDRESSED

This segment of Cesar Chavez Street serves multiple bus routes, including one MetroRapid line and one Frequent Local route. It has two to three lanes in each direction with sidewalks on both sides. Buses experience high levels of delay throughout the segment, particularly at major intersections with Guadalupe Street, Lavaca Street, and South Congress Avenue. This segment of Cesar Chavez Street is a Texas Department of Transportation (TxDOT) on-system roadway.

Due to high traffic volumes, Cesar Chavez Street experiences high congestion during peak travel times. A corridor-specific preliminary engineering study needs to analyze existing and future traffic conditions to make informed recommendations for improvements that increase mobility for all modes, including public transit. Coordination with the Texas Department of Transportation will be required prior to the implementation of improvements.

BEST PRACTICES

A peak-only bus lane can operate as a dedicated bus lane during peak travel periods and serve mixed traffic or general curbside uses at other times of day. This treatment allows transit to take precedence over parking and curbside access during peak hours when it most benefits bus operations.

4th Avenue in Seattle
Source: NACTO Transit Street Design Guide

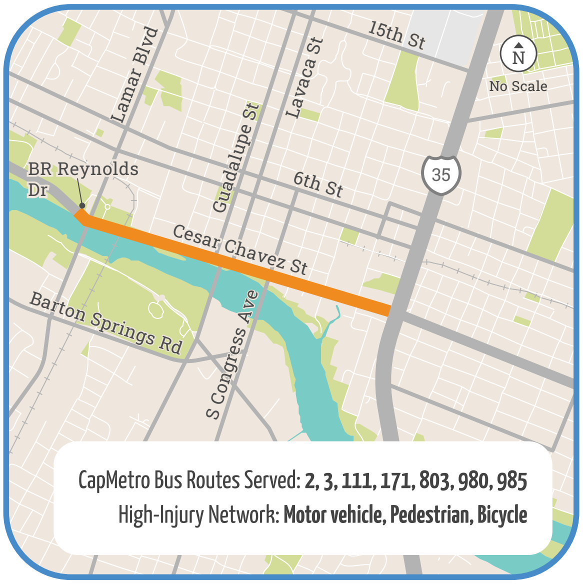
PROJECT SCORE

Speed/Reliability Needs: ✓ ✓ ✓

Access Needs: ✓ ✓ ✓

Equity Needs: ✓ – –

PROJECT LOCATION



IMPLEMENTATION

- **Approximate Cost**: $1.5M for design and construction
- **Potential Funding Sources**: 2020 Austin Mobility Bond funds, CapMetro ILA funds
- **Project Duration from Conceptual Design through Construction**: Medium (2-5 years)

PUBLIC FEEDBACK

"803 and 3 are typically what I'm riding and they come to a stop here. Should have [its] own lane."

CESAR CHAVEZ STREET

Between I-35 and Waller Street

PROJECT DESCRIPTION

This project proposes implementing a transit priority lane at the westbound approach of the intersection with the I-35 northbound frontage road.

BENEFITS AND ISSUES ADDRESSED

This segment of Cesar Chavez Street serves one Frequent Local route. From I-35 to Medina Street, it has one general purpose lane in the eastbound direction and two lanes in the westbound direction. From Medina Street to Waller Street, it has one general purpose lane in each direction. Buses experience high levels of delay when traversing the I-35 interchange. A transit priority lane at the westbound approach of the intersection with the northbound frontage road would allow buses to separate from general purpose traffic thereby improving transit speed and reliability. Coordination with the Texas Department of Transportation will be required prior to the implementation of improvements.

BEST PRACTICES

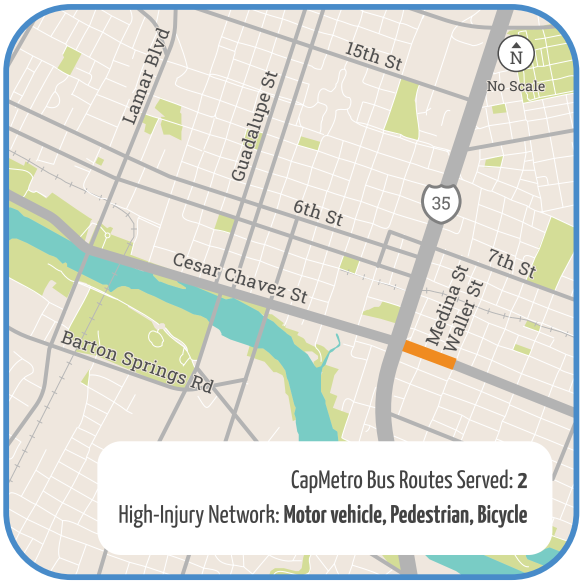
When implementing transit priority lanes, proper signing and marking is critical for conveying what types of vehicles can use each lane.

11h Street in Austin, TX
Source: Google Street View

PROJECT SCORE

Speed/Reliability Needs: ✓✓✓ (2 of 3)
Access Needs: ✓✓✓ (3 of 3)
Equity Needs: ✓✓✓ (2 of 3)

PROJECT LOCATION



CapMetro Bus Routes Served: **2**
High-Injury Network: **Motor vehicle, Pedestrian, Bicycle**

IMPLEMENTATION

- **Approximate Cost**: $2.9M for design and construction
- **Potential Funding Sources**: 2020 Austin Mobility Bond funds, CapMetro ILA funds
- **Project Duration from Conceptual Design through Construction**: Long (5+ years)

ST JOHNS AVENUE

Between North Lamar Boulevard and Berkman Drive

PROJECT DESCRIPTION

This project proposes a number of changes to bus stops including relocation to the far-side of intersections, upgrades from in-lane stops to floating stops, and a new floating bus stop at Berkman Drive. In addition, pedestrian crossing enhancements such as rectangular rapid-flashing beacons (RRFBs) and median islands are proposed along the corridor.

BENEFITS AND ISSUES ADDRESSED

St Johns Avenue serves three Frequent Local routes. It currently has one general purpose lane in each direction with sidewalks and bike lanes on both sides. Buses experience high levels of delay east of I-35.

The existing curbside bus stops currently force buses to stop in the bike lane, which poses a safety risk for both bicyclists and transit users. Upgrading these stops to floating stops will resolve the conflict between buses and bikes to improve safety outcomes. Pedestrian crossing enhancements will allow transit users to access bus stops more directly and more safely.

PROJECT HIGHLIGHT

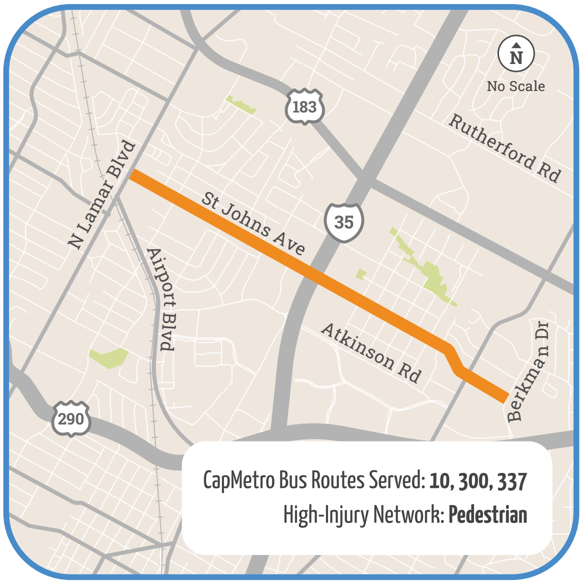
Floating bus stops (or "side boarding islands") are designed to improve safety for bicyclists and pedestrians, and clarify interactions among all modes.

Floating Bus Stop on Stassney Lane at South 1st Street
Source: City of Austin

PROJECT SCORE

Speed/Reliability Needs: ✓ ✓ ✓
Access Needs: ✓ ✓ ✓
Equity Needs: ✓ ✓ ✓

PROJECT LOCATION



IMPLEMENTATION

- **Approximate Cost**: $0.8M for design and construction
- **Potential Funding Sources**: 2020 Austin Mobility Bond funds, CapMetro ILA funds
- **Project Duration from Conceptual Design through Construction**: Medium (2-5 years)

PUBLIC FEEDBACK

"Sidewalks are not wheelchair-accessible."

LOYOLA LANE

Between Crystalbrook Drive and Johnny Morris Road

PROJECT DESCRIPTION

This project proposes converting existing curbside and pull-out stops to floating stops. In addition, a new stop pair plus a pedestrian hybrid beacon signal is proposed at the apartment complex west of Johnny Morris Road.

BENEFITS AND ISSUES ADDRESSED

This segment of Loyola Lane serves one Frequent Local route and two Local routes. The Austin Strategic Mobility Plan designates this section of Loyola Lane as a future high-capacity transit corridor, and in 2025 CapMetro will begin operating new Project Connect MetroRapid bus service on the corridor. Loyola Lane has two lanes in each direction separated by a median with sidewalks and bike lanes on both sides. Buses experience delay at the intersection with Johnny Morris Road. Bus stop upgrades to floating stops will resolve the existing conflict between buses and bikes by bringing the bike lane to curb level at the stops. Adding a new stop pair with a pedestrian hybrid beacon signal at the apartment complex west of Johnny Morris will provide safer, more direct access to transit.

BEST PRACTICES

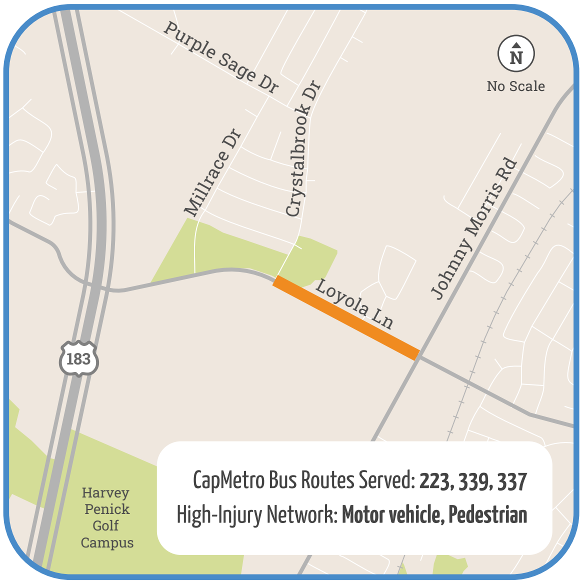
It is important to space bus stops adequately to balance accessibility and mobility of transit service. CapMetro has bus stop spacing standards that vary based on the route service type (Frequent route, Local route, etc.).

Lavaca Street and Eighth Street in Austin
Source: Google Street View

PROJECT SCORE

Speed/Reliability Needs: ✓✓✓
Access Needs: ✓✓✓
Equity Needs: ✓✓✓

PROJECT LOCATION



CapMetro Bus Routes Served: **223, 339, 337**
High-Injury Network: **Motor vehicle, Pedestrian**

IMPLEMENTATION

- **Approximate Cost**: $1.2M for design and construction
- **Potential Funding Sources**: 2020 Austin Mobility Bond funds, CapMetro ILA funds
- **Project Duration from Conceptual Design through Construction**: Medium (2-5 years)

PUBLIC FEEDBACK

"Too much traffic and buses have to cross all lanes to turn onto Johnny Morris."

RUNDBERG LANE

Between Cameron Road and Metric Boulevard

PROJECT DESCRIPTION

This project proposes a variety of infrastructure improvements including bus stop relocations, enhanced crossings using pedestrian hybrid beacon signals, urban trail improvements, bus queue jumps at the I-35 frontage road interchange, and intersection improvements at Metric Boulevard.

BENEFITS AND ISSUES ADDRESSED

This segment of Rundberg Lane serves one Frequent Local route, one Local route, and one Flyer route. It has two lanes in each direction separated by a median with sidewalks on both sides and no dedicated bicycle facilities. Buses experience high levels of delay between Metric Boulevard and Mountain Quail Road and between North Lamar Boulevard and Cameron Road.

Bus stop relocations to the far-side of intersections will improve transit operations and encourage street crossings behind the bus. Pedestrian hybrid beacon signals will provide protected crossings near transit stops so users can safely access bus stops. Urban trail enhancements will allow for easier pedestrian and bike connections between transit on Rundberg Lane and residences on Rutland Drive. Queue jumps and other intersection improvements will improve speed and reliability of bus service along the corridor.

PROJECT HIGHLIGHT

Urban trail enhancements will allow transit users along Rundberg Lane to more easily access destinations along Rutland Drive.

Source: City of Austin

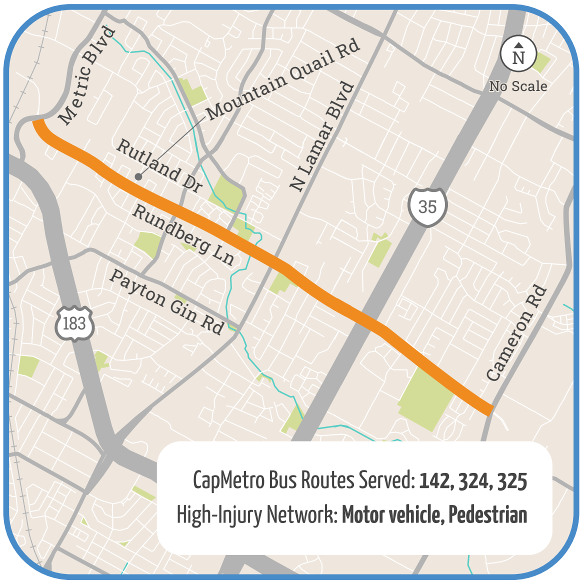
PROJECT SCORE

Speed/Reliability Needs: ✓✓ (2 of 3)

Access Needs: ✓✓✓

Equity Needs: ✓✓✓

PROJECT LOCATION



IMPLEMENTATION

- **Approximate Cost**: $3.3M for design and construction
- **Potential Funding Sources**: 2020 Austin Mobility Bond funds, CapMetro ILA funds
- **Project Duration from Conceptual Design through Construction**: Medium (2-5 years)

PUBLIC FEEDBACK

"Super congested through here. Everything moves too slowly (including fire trucks)."

SPRINGDALE ROAD

Between Airport Boulevard and 51st Street

PROJECT DESCRIPTION

This project proposes several improvements to bus stops including relocating stops to the far-side of intersections, consolidating closely spaced stops, and upgrading in-lane stops to floating stops. In addition, there are multiple new enhanced pedestrian crossings proposed near transit stops and a new sidewalk is proposed where there is currently a gap.

BENEFITS AND ISSUES ADDRESSED

This segment of Springdale Road serves two Frequent Local routes. It has one general purpose lane in each direction with sidewalks and bike lanes on each side. One exception is on the west side of the roadway between E 12th Street and Glomar Avenue/Wally Avenue which does not have a sidewalk. This sidewalk gap is proposed to be filled as a part of this project. Buses experience high levels of delay throughout the corridor.

Transit access will be greatly improved through the installation of enhanced pedestrian crossings and moving bus stops closer to intersections. Moving stops from near-side to far-side and consolidating stops with low ridership is also expected to improve speed and reliability at signalized intersections.

BEST PRACTICES

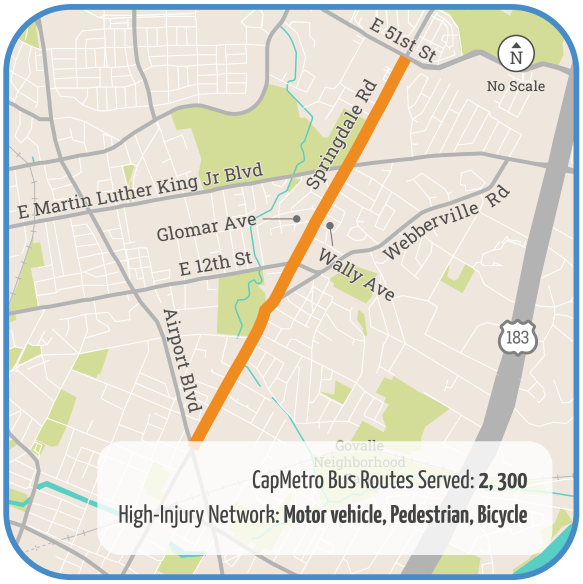
Median crossing islands provide pedestrians a refuge area while crossing the street and also helps to calm traffic along the roadway.

Source: City of Austin

PROJECT SCORE

Speed/Reliability Needs: ✓ ✓ ✓
Access Needs: ✓ ✓ ✓
Equity Needs: ✓ ✓ ✓

PROJECT LOCATION



CapMetro Bus Routes Served: **2, 300**

High-Injury Network: **Motor vehicle, Pedestrian, Bicycle**

IMPLEMENTATION

- **Approximate Cost**: $2.2M for design and construction
- **Potential Funding Sources**: 2020 Austin Mobility Bond funds, CapMetro ILA funds
- **Project Duration from Conceptual Design through Construction**: Medium (2-5 years)

PUBLIC FEEDBACK

"300 bus gets stuck in traffic from Pleasant Valley to Springdale road, making it move slowly."

RUTHERFORD LANE

Between Cameron Road and Brettonwoods Lane

PROJECT DESCRIPTION

This project proposes lane configuration changes at the intersection with Cameron Road to prioritize bus movements. In addition, the project proposes the conversion of two in-lane stops to shared cycle track stops, and consolidating stops at the intersection to encourage safe pedestrian crossings.

BENEFITS AND ISSUES ADDRESSED

This segment of Rutherford Lane directly connects to the Norwood Transit Center and serves two Frequent Local routes and one Local Route. It has one general purpose lane in each direction with sidewalks and bike lanes on both sides. Buses experience high levels of delay throughout the segment.

Lane reconfiguration at Cameron Road will allow buses and right-turning vehicles to have their own lane, separating buses from through traffic and thereby increasing the speed and reliability of transit service. The conversion of in-lane stops to shared cycle track stops will resolve the conflict between buses and bikes by bringing the bike lane to curb level at the stops. This will increase the safety and comfort for cyclists along the corridor.

PROJECT HIGHLIGHT

Shared right-turn/transit lanes allow buses traveling through an intersection to separate from general purpose traffic.

Source: NACTO

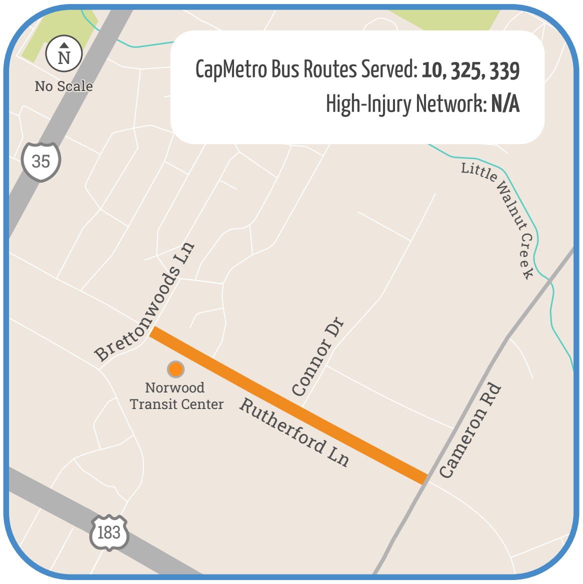
PROJECT SCORE

Speed/Reliability Needs: ✓✓✓

Access Needs: ✓

Equity Needs: ✓✓✓

PROJECT LOCATION



IMPLEMENTATION

- **Approximate Cost**: $0.3M for design and construction
- **Potential Funding Sources**: 2020 Austin Mobility Bond funds, CapMetro ILA funds
- **Project Duration from Conceptual Design through Construction**: Short (0-2 years)

PUBLIC FEEDBACK

"Street has high car travel speeds and a blind corner at this intersection [Rutherford Lane at Furness Drive]. It also is near a school and could use a [pedestrian hybrid beacon]."

SOUTH FIRST STREET

At Ben White Boulevard Interchange

PROJECT DESCRIPTION

This project proposes to relocate a southbound bus stop farther south to be closer to the intersection of South First Street and Radam Lane.

BENEFITS AND ISSUES ADDRESSED

This segment of South First Street serves one Frequent Local route. It has two lanes in each direction approaching the Ben White Boulevard interchange and three lanes in each direction along the bridge structure. There are sidewalks on both sides of the roadway and no dedicated bicycle infrastructure. Buses experience high levels of delay at the Ben White Boulevard interchange; however, limited right-of-way and high traffic demand does not allow for cost-effective use of transit priority lanes through the interchange.

Relocating a bus stop from a midblock location to be closer to a signalized intersection increases safety by encouraging pedestrians to cross at a crosswalk. Additionally, the new bus stop location would better facilitate transfers between Route 10 on South First Street and Route 315 on Radam Lane.

PROJECT HIGHLIGHT

Level or near level boarding at stops or stations provides a platform height that minimizes the vertical gap between the pavement and the bus floor, making it easier and faster to board the bus.

Source: BaltimoreLink Transit Priority Toolkit

PROJECT SCORE

Speed/Reliability Needs: ✓✓✓
Access Needs: ✓✓✓
Equity Needs: ✓✓✓

PROJECT LOCATION

IMPLEMENTATION

- **Approximate Cost**: $25,000 for design and construction
- **Potential Funding Sources**: 2020 Austin Mobility Bond funds, CapMetro ILA funds, Street Impact Fee funds
- **Project Duration from Conceptual Design through Construction**: Medium (2-5 years)

SOUTH FIRST STREET

Between Ben White Boulevard and Barton Springs Road

PROJECT DESCRIPTION

This project proposes several improvements: adding new stops where gaps in spacing exist, relocating stops to the far-side of signals to improve operations and provide access to safe crossings, and consolidating some stops to improve spacing. In addition, the project proposes access management improvements at driveways close to intersections and a new pedestrian hybrid beacon signal at the bus stop pair south of Barton Springs Road.

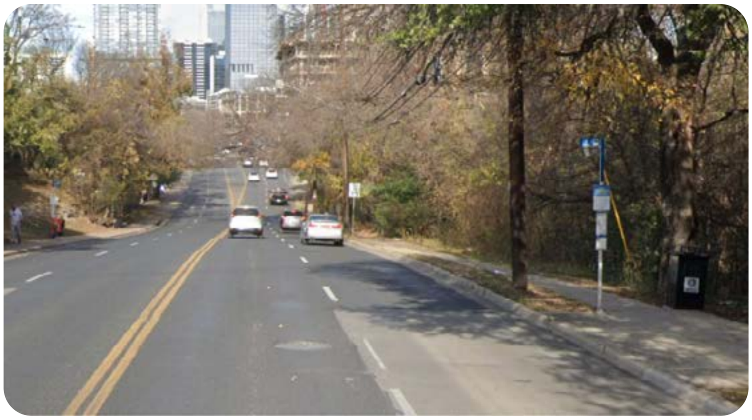
BENEFITS AND ISSUES ADDRESSED

This segment of South First Street serves one Frequent Local route. It has two lanes in each direction, sidewalks on both sides, and no dedicated bicycle facilities. Buses experience moderate delay throughout the segment.

Access to transit will improve along South First Street with the addition of several bus stops and a proposed pedestrian hybrid beacon signal south of Barton Springs Road. It is expected that consolidating bus stops with low levels of ridership, relocating stops to the far-sides of intersections, as well as access management improvements at driveways will increase the speed and reliability of transit service.

PROJECT HIGHLIGHT

A new pedestrian hybrid beacon signal will provide protected crossings at a pair of midblock bus stops south of Barton Springs Road.

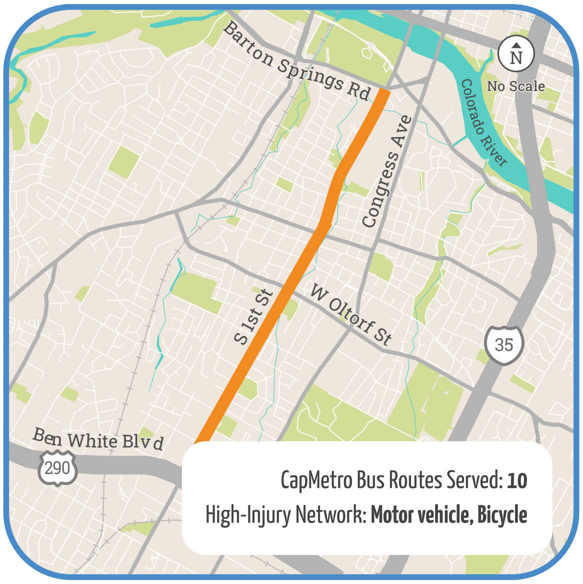


South First Street south of Barton Springs Road
Source: Google Street View

PROJECT SCORE

Speed/Reliability Needs: ✓✓ (2 of 3)
Access Needs: ✓✓✓ (3 of 3)
Equity Needs: ✓✓ (2 of 3)

PROJECT LOCATION



CapMetro Bus Routes Served: **10**
High-Injury Network: **Motor vehicle, Bicycle**

IMPLEMENTATION

- **Approximate Cost**: $0.8M for design and construction
- **Potential Funding Sources**: 2020 Austin Mobility Bond funds, CapMetro ILA funds
- **Project Duration from Conceptual Design through Construction**: Short (0-2 years)

PUBLIC FEEDBACK

"Difficult to get to [bus] stop from Alpine Rd."

BLUFF SPRINGS ROAD

Between William Cannon Drive and Blue Meadow Drive

PROJECT DESCRIPTION

This project proposes to add a new southbound floating bus stop and a pedestrian crossing with a median refuge island, plus convert the existing northbound in-lane stop to a floating stop.

BENEFITS AND ISSUES ADDRESSED

This segment of Bluff Springs Road serves one Frequent Local route. It currently has two general purpose lanes in each direction with sidewalks on both sides and no dedicated bicycle facilities. However, the City is evaluating the option to redesign the corridor to provide one general purpose lane in each direction plus a center left turn lane, protected bike lanes, and several new pedestrian crossings.

There is currently not a pedestrian crossing between the intersections of William Cannon Drive and Blue Meadow Drive, a distance of approximately 2,000 feet. Adding a new crosswalk with a median refuge island will allow transit users to safely cross the street and access the bus stops at Bitter Creek Drive. Floating bus stops will allow bicyclists to travel behind the bus stops so that their journey is not impeded by stopped buses.

BEST PRACTICES

Crosswalks should be spaced so that pedestrians have access to safe crossings at regular intervals. This discourages unprotected midblock crossings and improves the pedestrian environment. The City's Transportation Criteria Manual details the maximum desirable distance between crossings according to Street Level.

Source: City of Austin

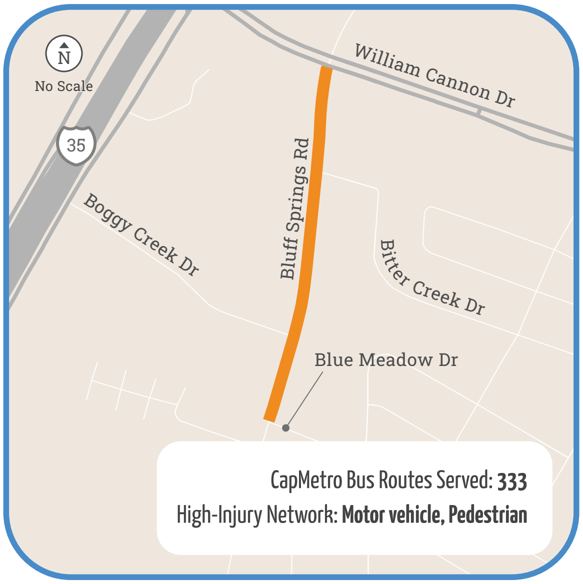
PROJECT SCORE

Speed/Reliability Needs: ✓ ✓ ✓

Access Needs: ✓ ✓ ✓

Equity Needs: ✓ ✓ ✓

PROJECT LOCATION



IMPLEMENTATION

- **Approximate Cost**: $0.8M for design and construction
- **Potential Funding Sources**: 2020 Austin Mobility Bond funds, CapMetro ILA funds, Street Impact Fee funds
- **Project Duration from Conceptual Design through Construction**: Short (0-2 years)

PUBLIC FEEDBACK

"Buses need priority at intersection of [William Cannon Drive] from all directions."

SHADY LANE

Between Fifth Street and Seventh Street

PROJECT DESCRIPTION

This project proposes filling the sidewalk gap along the east side of Shady Lane between East Seventh Street and East Fifth Street.

BENEFITS AND ISSUES ADDRESSED

This project location includes the intersection of Shady Lane and Seventh Street and serves two Frequent Local routes and two Local routes. Within the project area, Shady Lane has one general purpose lane in each direction and East Seventh Street has two general purpose lanes in each direction. In addition, there is a MetroBike station at the northeast corner of East Fifth Street and Shady Lane. Buses experience high levels of delay at making the westbound left movement from East Seventh Street to southbound Shady Lane. The City is currently evaluating potential safety and access management improvements along East Seventh Street that would help address the operational issues at this intersection.

Between East Seventh Street and East Fifth Street, there is a sidewalk on the west side of the roadway but not the east side. This project proposes to fill that sidewalk gap to provide transit users a safe walking environment when accessing the bus stops in the project area and the transit hub located at the intersection of East Fifth Street and Shady Lane.

PROJECT HIGHLIGHT

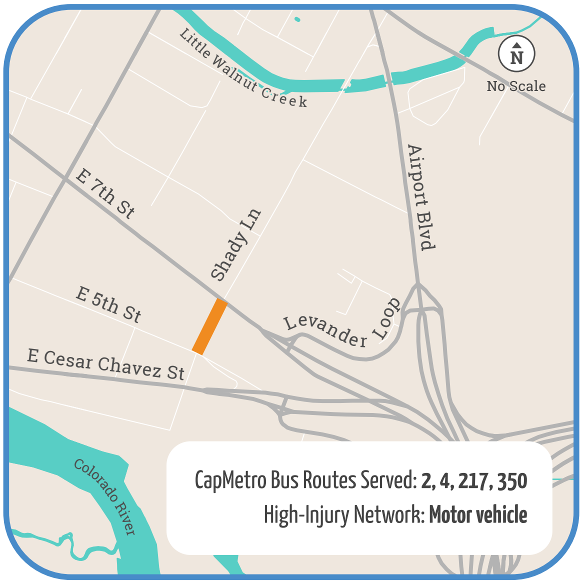
A new sidewalk along the east side of Shady Lane will make both the transit hub and the MetroBike station more accessible.

Shady Lane at East Fifth Street
Source: Google Street View

PROJECT SCORE

Speed/Reliability Needs: ✓✓ (2 of 3)
Access Needs: ✓✓✓
Equity Needs: ✓✓✓

PROJECT LOCATION



CapMetro Bus Routes Served: **2, 4, 217, 350**
High-Injury Network: **Motor vehicle**

IMPLEMENTATION

- **Approximate Cost**: $0.2M for design and construction
- **Potential Funding Sources**: 2020 Austin Mobility Bond funds, CapMetro ILA funds, Street Impact Fee funds
- **Project Duration from Conceptual Design through Construction**: Short (0-2 years)

PUBLIC FEEDBACK

"Left turn signal needed to allow greater traffic flow westbound on 7th turning onto Shady."

HOWARD LANE

Between Metric Boulevard and McAllen Pass

PROJECT DESCRIPTION

This project proposes a bus stop relocation and two new bus stops, plus a new pedestrian hybrid beacon signal between I-35 and The Lakes Boulevard/Center Line Pass. Additionally, several operational improvements are proposed including adding right-turn overlap signal phasing to existing traffic signals and extending left-turn queue storage capacity.

BENEFITS AND ISSUES ADDRESSED

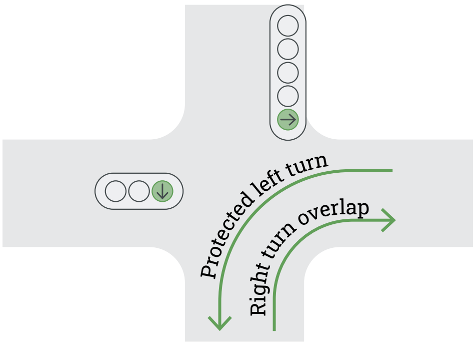
This segment of Howard Lane connects transit riders to CapMetro's Tech Ridge Park & Ride and is served by several bus routes including one MetroRapid route, one Frequent Local route and three Local routes. It currently has two lanes in each direction, separated by a median, with sidewalks on both sides and no dedicated bicycle facilities. Buses experience high levels of delay between I-35 and McCallen Pass when exiting the Tech Ridge Park & Ride.

The bus stop relocation and additions will improve transit access to key destinations along this segment of Howard Lane, including apartment buildings and local businesses. The proposed pedestrian hybrid beacon signal will provide a protected crossing between signalized intersections that are spaced approximately 1,800 feet apart.

The proposed right-turn overlap phases will reduce delay at traffic signals by providing additional green time to turning movements where buses are currently experiencing delay. This would improve the speed and reliability of transit service, thus reducing travel times for bus riders.

BEST PRACTICES

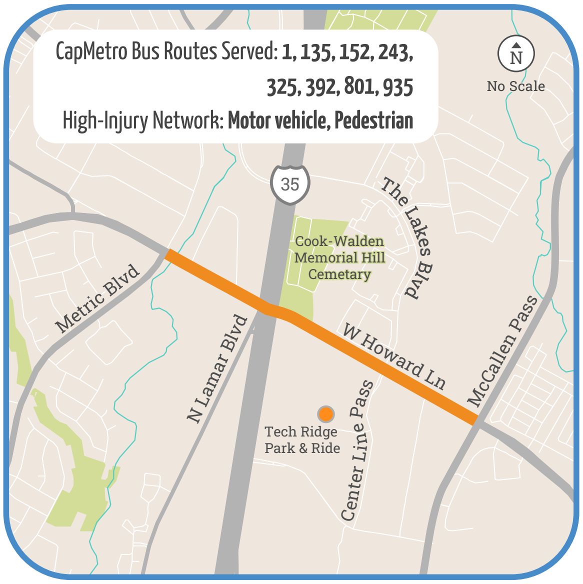
Right-turn overlap phases provide a green arrow for right-turning movements while the adjacent through movement remains red and non-conflicting side street left turn phases are green. This improves the efficiency of the intersection for transit vehicles and general purpose traffic alike.



PROJECT SCORE

Speed/Reliability Needs: ✓✓✓
Access Needs: ✓✓✓
Equity Needs: ✓✓

PROJECT LOCATION



IMPLEMENTATION

- **Approximate Cost**: $1.0M for design and construction
- **Potential Funding Sources**: 2020 Austin Mobility Bond funds, CapMetro ILA funds
- **Project Duration from Conceptual Design through Construction**: Medium (2-5 years)

MONTOPOLIS DRIVE

Between Riverside Drive and US 183

PROJECT DESCRIPTION

This project proposes a number of bus stop relocations to improve access to key destinations and to existing signalized crossings. In addition, several pedestrian crossing enhancements are proposed. A preliminary engineering study is recommended to evaluate the feasibility of implementing transit priority lanes and/or protected bike lanes on the corridor.

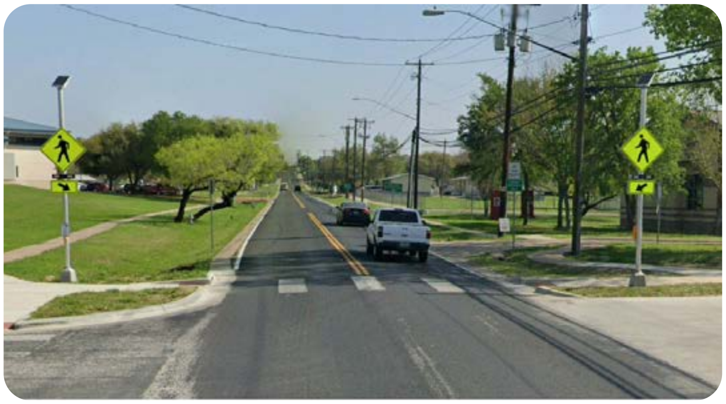
BENEFITS AND ISSUES ADDRESSED

This segment of Montopolis Drive serves three Local Routes. It has two general purpose lanes in each direction with sidewalks on both sides and no dedicated bicycle facilities. Southbound buses experience delays approaching the Riverside Drive intersection.

Bus stop relocations will move several stops closer to key land uses and closer to intersections with protected pedestrian crossings, increasing access to transit along the corridor. Furthermore, adding in new pedestrian crossings will allow transit users to safely cross the street close to their bus stops.

BEST PRACTICES

Pedestrian hybrid beacons or rectangular rapid-flashing beacons (RRFBs) may be used to facilitate pedestrian crossings depending on site conditions such as traffic volumes, distance to cross, visibility, and expected compliance.

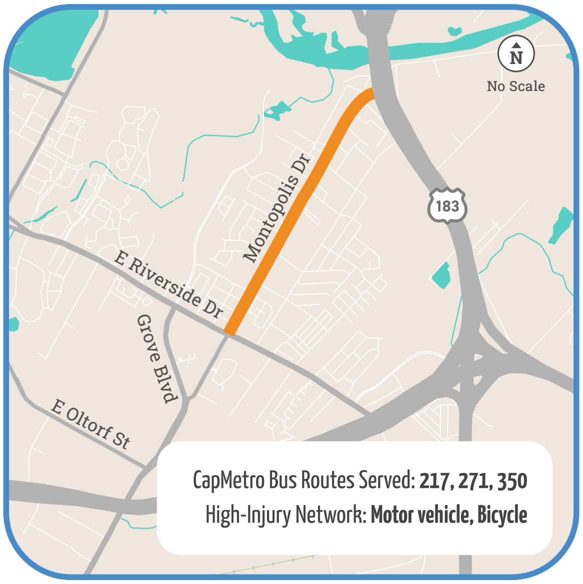


Nuckols Crossing Road and Village Square Drive
Source: Google Street View

PROJECT SCORE

Speed/Reliability Needs: ✓✓
Access Needs: ✓✓✓
Equity Needs: ✓✓✓

PROJECT LOCATION



IMPLEMENTATION

- **Approximate Cost**: $2.3M for design and construction
- **Potential Funding Sources**: 2020 Austin Mobility Bond funds, CapMetro ILA funds
- **Project Duration from Conceptual Design through Construction**: Medium (2-5 years)

TURK LANE AND CULLEN LANE (SOUTHPARK MEADOWS)

PROJECT DESCRIPTION

This project proposes new crosswalks and curb ramps along Turk Lane. In addition, bus layover treatments are recommended for further study, such as the construction of sawtooth bays, to enhance curb management for buses along Turk Lane.

BENEFITS AND ISSUES ADDRESSED

Turk Lane and Cullen Lane are two-lane roadways that run through the Southpark Meadows development at the southwestern quadrant of I-35 and Slaughter Lane. The stops along Turk Lane are the end of the line for one MetroRapid line, one Frequent Local route, and two Local routes. Both roadways have sidewalks on both sides and no dedicated bicycle facilities.

The proposed crosswalks and curb ramps will provide transit users safer and more accessible crossings near bus stops. End of line treatments such as sawtooth bays would improve curb management by more efficiently using the space available along Turk Lane.

BEST PRACTICES

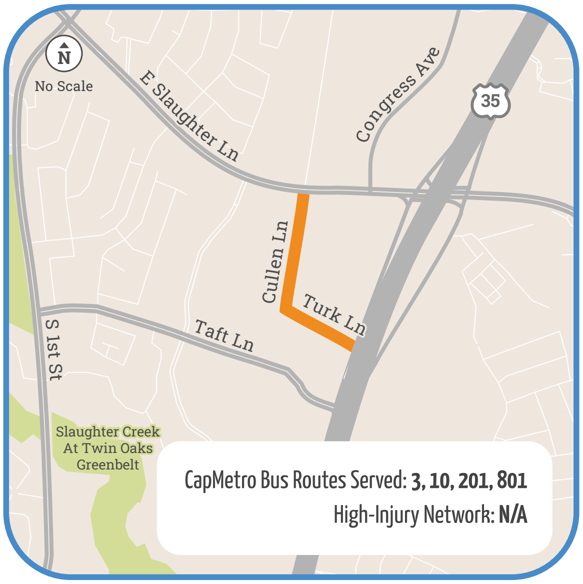
Americans with Disabilities Act (ADA) compliant curb ramps have maximum slope thresholds and tactile detection for vision-impaired pedestrians.

East Slaughter Lane at South First Street
Source: Google Street View

PROJECT SCORE

Speed/Reliability Needs: ✓✓✓
Access Needs: ✓✓
Equity Needs: ✓✓

PROJECT LOCATION



CapMetro Bus Routes Served: **3, 10, 201, 801**
High-Injury Network: **N/A**

IMPLEMENTATION

- **Approximate Cost**: $0.2M for design and construction
- **Potential Funding Sources**: 2020 Austin Mobility Bond funds, CapMetro ILA funds
- **Project Duration from Conceptual Design through Construction**: Short (0-2 years)

PUBLIC FEEDBACK

"Bus slow, waits too long on Turk Lane."

DEAN KEETON STREET

Between Guadalupe Street and Red River Street

PROJECT DESCRIPTION

This project proposes implementing a transit priority lane between Guadalupe Street and Red River Street, and adding bicycle lane enhancements such as added protection from motor vehicle traffic and shared cycle track bus stops.

BENEFITS AND ISSUES ADDRESSED

This segment of Dean Keeton Street runs through the University of Texas campus and serves several routes including two Frequent Local routes, one Flyer route, and five UT Shuttle routes. Between Guadalupe Street and San Jacinto Boulevard, Dean Keeton Street has two general purpose lanes in each direction with sidewalks and bike lanes on both sides and parallel parking along the north side of the roadway. Between San Jacinto Boulevard and Red River Street, Dean Keeton Street has two general purpose lanes in each direction with sidewalks, bike lanes, and back-angled parking on both sides. Buses experience high levels of delay throughout the segment. CapMetro will begin operating new Project Connect MetroRapid bus service along the Dean Keeton Street corridor in 2025.

Separating transit vehicles from general purpose traffic through the use of transit priority lanes will greatly improve speed and reliability of transit service along the corridor. The recommended project calls for side-running transit priority lanes; however, a larger-scale capital improvement project to construct center running transit priority lanes could be explored. Adding protected bike lanes and shared cycle track bus stops will make biking safer and more comfortable, reducing conflicts between transit and bicyclists. Impacts to on-street parking along this segment of Dean Keeton Street requires further evaluation when the project moves into design.

PROJECT HIGHTLIGHT

This project proposes transit priority lanes in both directions along with separated bicycle lanes along both sides of the roadway.

Source: Chicago Transit Authority and Chicago DOT

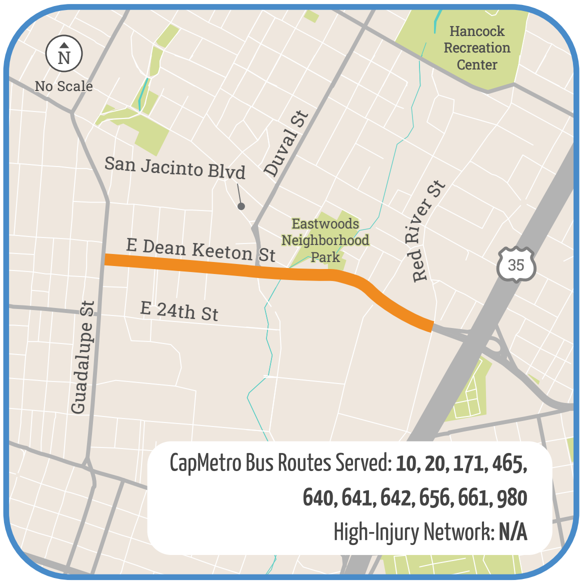
PROJECT SCORE

Speed/Reliability Needs: ✓ ✓ ✓

Access Needs: ✓ ✓ ✓

Equity Needs: ✓ ✓ ✓

PROJECT LOCATION



IMPLEMENTATION

- **Approximate Cost**: $3.8M for design and construction
- **Potential Funding Sources**: 2020 Austin Mobility Bond funds, CapMetro ILA funds
- **Project Duration from Conceptual Design through Construction**: Medium (2-5 years)

PUBLIC FEEDBACK

"Buses unreliable through campus."

51ST STREET

Between Cameron Road and Berkman Drive

PROJECT DESCRIPTION

This project proposes access management improvements to the driveways near the intersection of 51st Street and Berkman Drive.

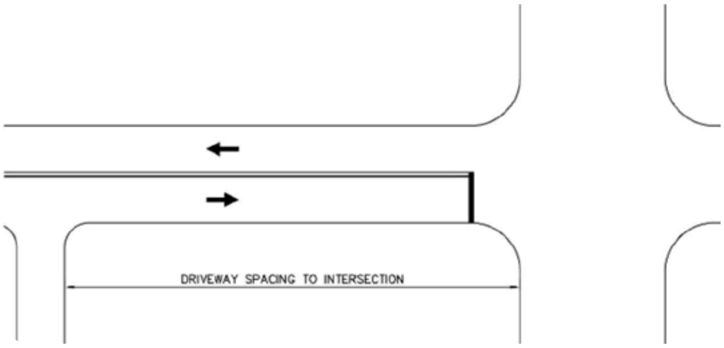
BENEFITS AND ISSUES ADDRESSED

This segment of 51st Street serves one Frequent Local route and one Local route. It has two lanes in each direction with sidewalks on both sides except for the south side of the roadway between Mueller Boulevard and Berkman Drive. Currently, there are no dedicated bicycle facilities. The City is currently constructing the East 51st Street Mobility Project, which will add separated bike lanes, new sidewalks, improved pedestrian crossings, and relocated bus stops throughout the project segment.

In the northwest quadrant of the 51st Street and Berkman Drive intersection, there are multiple driveways that can potentially be consolidated. Removing access points reduces conflicts between motor vehicles and vulnerable road users as well as improves the flow of traffic.

BEST PRACTICES

Spacing driveways per the criteria set forth in the City's Transportation Criteria Manual will maximize the traffic safety, flow, and operations of the street.



Source: City of Austin Transportation Criteria Manual

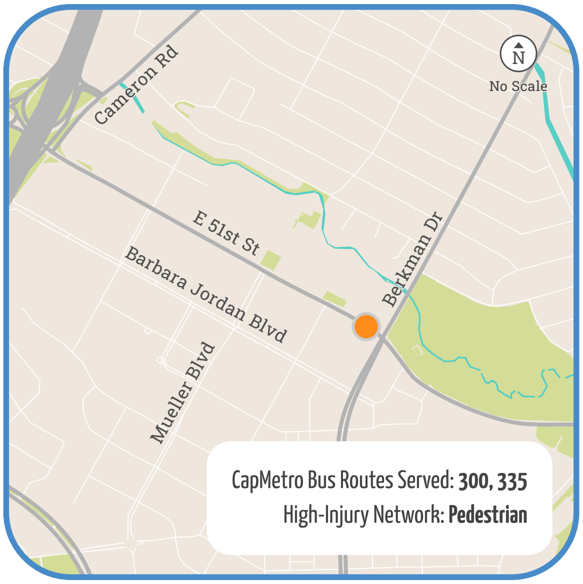
PROJECT SCORE

Speed/Reliability Needs: ✓✓

Access Needs: ✓✓✓

Equity Needs: ✓✓

PROJECT LOCATION



IMPLEMENTATION

- **Approximate Cost**: $4,000 for design and construction
- **Potential Funding Sources**: 2020 Austin Mobility Bond funds, CapMetro ILA funds, Street Impact Fee funds
- **Project Duration from Conceptual Design through Construction**: Short (0-2 years)

MANOR ROAD

Between Cherrywood Road and Airport Boulevard

PROJECT DESCRIPTION

This project proposes converting two in-lane stops to floating bus stops. In addition, a new pedestrian hybrid beacon signal, curb extensions, and daylighting (see below for definition) are proposed at the intersection with Walnut Avenue. Finally, a new traffic signal is proposed at the Alexander Avenue intersection.

PROJECT SCORE

Speed/Reliability Needs: ✓✓

Access Needs: ✓✓✓

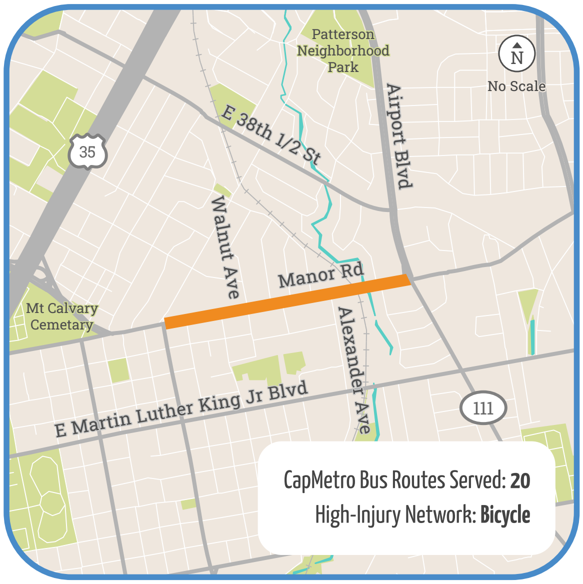
Equity Needs: ✓✓

BENEFITS AND ISSUES ADDRESSED

This segment of Manor Road serves one Frequent Local route. It has one general purpose lane in each direction with sidewalks and bike lanes on both sides. Buses experience moderate delay throughout the segment and high levels of delay approaching the intersection with Airport Boulevard. CapMetro will begin operating new Project Connect MetroRapid bus service along this segment of Manor Road in 2025.

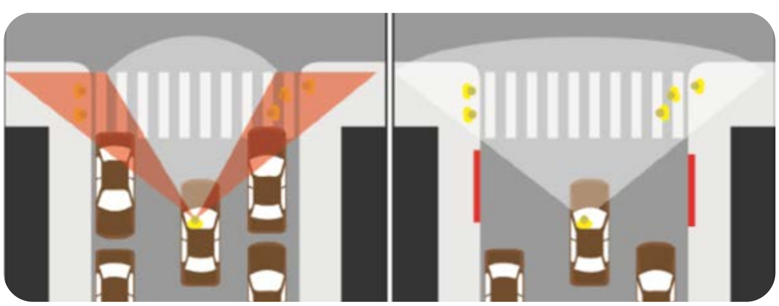
Currently, buses block the bike lanes when stopped at bus stops. Converting in-lane stops to floating bus stops will allow cyclists to proceed unimpeded behind the bus stop and reduce conflicts between transit and bicyclists. A new pedestrian hybrid beacon at Walnut Avenue and a new traffic signal at Alexander Avenue will facilitate safe pedestrian crossings for transit users accessing the bus stops. Curb extensions and daylighting at Walnut Avenue will shorten crossing distances and improve the visibility of pedestrians to motorists.

PROJECT LOCATION



PROJECT HIGHLIGHT

Daylighting is a term that refers to the removal of parking spaces near an intersection to improve pedestrian visibility. This, combined with curb extensions is expected to improve pedestrian safety at Walnut Avenue.



Source: San Francisco Municipal Transportation Agency

IMPLEMENTATION

- **Approximate Cost**: $1.6M for design and construction
- **Potential Funding Sources**: 2020 Austin Mobility Bond funds, CapMetro ILA funds
- **Project Duration from Conceptual Design through Construction**: Medium (2-5 years)

LAVACA STREET

Between Cesar Chavez Street and Eighth Street

PROJECT DESCRIPTION

This project proposes shifting the existing transit priority lane one lane to the left between Fifth Street and Seventh Street, improving bicycle facilities, and resolving conflicts between buses and bikes at bus stops. All proposed improvements along Lavaca Street may be impacted by Project Connect light rail. Coordination with the Austin Transit Partnership will be required prior to implementation.

BENEFITS AND ISSUES ADDRESSED

This segment of Lavaca Street serves multiple bus routes through downtown including MetroRapid, Frequent Local, Local, Flyer and Express routes. It is a one-way street northbound with three general purpose lanes between Cesar Chavez Street and Third Street, and three general purpose lanes and one transit priority lane between Third Street and Eighth Street. Buses experience high levels of delay throughout the segment.

Shifting the bus lanes between Fifth Street and Seventh Street one lane to the left is expected to optimize traffic operations for both buses traveling straight and right-turning vehicles. This will also help simplify lane merging behavior coming out of the parking garage at Fifth Street.

Bicycle facility upgrades, accomplished through improved separation between bike lanes and motorized vehicles, will make biking along this portion of Lavaca Street more comfortable and safe. Resolving conflicts between bikes and buses at transit stops, such as through the use of shared cycle track stops, will further improve safety for cyclists.

BEST PRACTICES

Red paint can improve the visibility of bus lanes and clarify that general purpose traffic should not drive in the transit lane.

Source: City of Austin

PROJECT SCORE

Speed/Reliability Needs: ✓✓✓
Access Needs: ✓✓✓
Equity Needs: ✓✓

PROJECT LOCATION

CapMetro Bus Routes Served: **1, 2, 3, 5, 7, 10, 20, 30, 105, 142, 801, 803, 935, 982, 990**
High-Injury Network: **Pedestrian**

IMPLEMENTATION

- **Approximate Cost**: $0.6M for design and construction
- **Potential Funding Sources**: 2020 Austin Mobility Bond funds, CapMetro ILA funds, development mitigation funds
- **Project Duration from Conceptual Design through Construction**: Short (0-2 years)

PUBLIC FEEDBACK

"Cars park in the bus lane on Lavaca all of the time."

ALLANDALE ROAD

Between Woodview Avenue and Burnet Road

PROJECT DESCRIPTION

This project proposes a new pedestrian hybrid beacon signal at Woodview Avenue, access management improvements at driveways near the intersection with Burnet Road, and bus stop consolidation.

BENEFITS AND ISSUES ADDRESSED

This segment of Allandale Road serves one Frequent Local route. It currently has two lanes in each direction with sidewalks on both sides and no dedicated bicycle facilities. There is a newly completed City project at the Burnet Road intersection, which closed the slip lane in the northwest quadrant and improved pedestrian and bicycle facilities.

The proposed pedestrian hybrid beacon signal at Woodview Avenue will provide a protected crossing near transit stops for improved safety and access to transit. There are currently no protected crossings between the intersections of Burnet Road and Shoal Creek Boulevard, which are spaced approximately 3,000 feet apart. Access management improvements and the consolidation of stops with low ridership is expected to improve the speed and reliability of transit services along this segment.

BEST PRACTICES

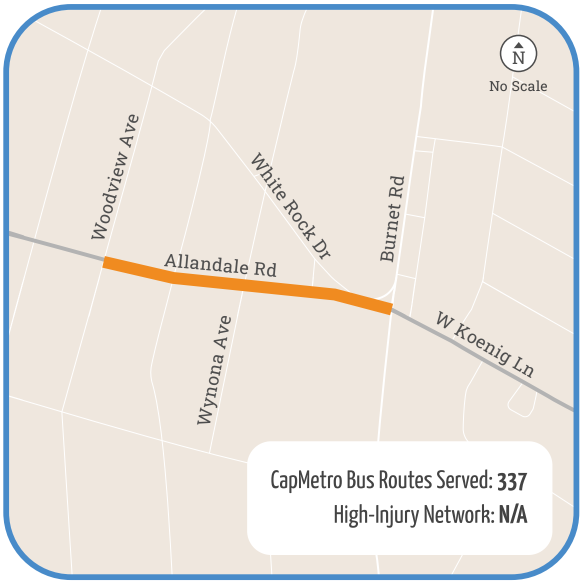
A pedestrian hybrid beacon signal at Woodview Avenue will allow transit users to safely cross Allendale Road to access transit.

Allendale Road at Woodview Avenue
Source: Google Street View

PROJECT SCORE

Speed/Reliability Needs: ✓✓✓
Access Needs: ✓✓✓
Equity Needs: ✓✓

PROJECT LOCATION



CapMetro Bus Routes Served: **337**
High-Injury Network: **N/A**

IMPLEMENTATION

- **Approximate Cost**: $0.4M for design and construction
- **Potential Funding Sources**: 2020 Austin Mobility Bond funds, CapMetro ILA funds
- **Project Duration from Conceptual Design through Construction**: Short (0-2 years)

PUBLIC FEEDBACK

"Crossing street [is] unsafe."

SEVENTH STREET

Between Lavaca Street and I-35

PROJECT DESCRIPTION

This project proposes a new transit priority lane on Seventh Street from west of Congress Avenue to Trinity Street as well as relocating one bus stop to improve transit operations.

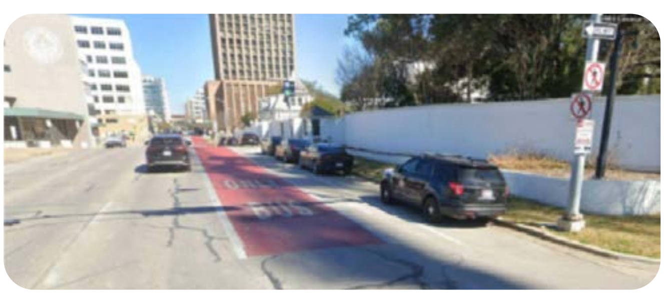
BENEFITS AND ISSUES ADDRESSED

This segment of Seventh Street serves seven routes including four Frequent Local routes. It is a one-way roadway in the eastbound direction and has four lanes with sidewalks on both sides. Buses experience delay throughout the segment, particularly when making the left turn from Seventh Street to Trinity Street, which all routes on this segment make except for Route 4. The Seventh Street corridor is planned to see larger changes in support of the implementation of Project Connect light rail and the Texas Department of Transportation's CapEx I-35 project.

The proposed transit priority lane would separate buses from general purpose traffic, increasing the speed and reliability of transit service. The transit priority lane should be located in the leftmost travel lane to facilitate the left turn movement onto Trinity Street. In addition, relocating the existing bus stop from west of Congress Avenue to near-side Colorado Street will allow buses to more easily enter the transit priority lane after serving the bus stop. Ensuring coordination with Austin Core Transportation Plan recommendations will be required prior to the implementation of improvements.

BEST PRACTICES

An offset bus lane is typically located to the left of the curb (parking) lane but can also be in another non-curb lane. Bus lanes are typically implemented on corridors with heavy congestion and frequent bus service.



Source: Google Street View

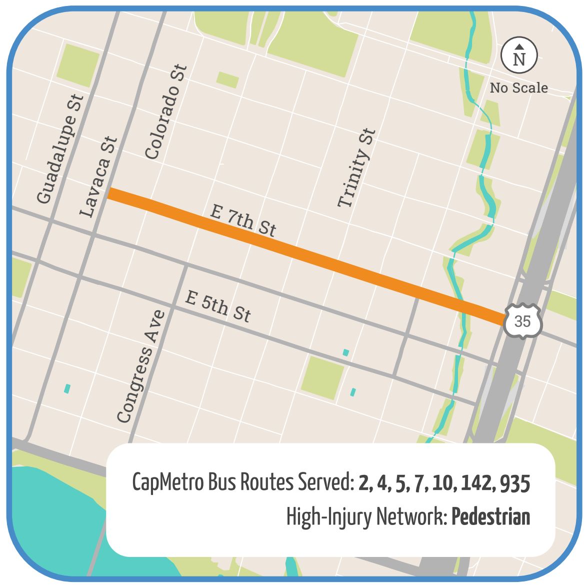
PROJECT SCORE

Speed/Reliability Needs: ✓✓✓

Access Needs: ✓✓✓

Equity Needs: ✓✓✓

PROJECT LOCATION



IMPLEMENTATION

- **Approximate Cost**: $0.2M for design and construction
- **Potential Funding Sources**: 2020 Austin Mobility Bond funds, CapMetro ILA funds
- **Project Duration from Conceptual Design through Construction**: Medium (2-5 years)

PUBLIC FEEDBACK

"Bus has a hard time fighting through double parked cars."

LAKE AUSTIN BOULEVARD

At Veterans Drive

PROJECT DESCRIPTION

This project proposes relocating a pair of bus stops from east of Upson Street closer to the intersection of Veterans Drive.

BENEFITS AND ISSUES ADDRESSED

This project is located just west of a complex intersection with West Fifth Street and the State Loop 1 frontage road and serves one Frequent Local route and one UT Shuttle route. Lake Austin Boulevard has two lanes in each direction with sidewalks on both sides and bike lanes west of Veterans Drive. As Lake Austin Boulevard transitions to West Fifth Street, the roadway transitions to three lanes in the eastbound direction and no bicycle facilities.

The existing bus stop pair east of Upson Street is approximately 150 feet from the crossing at Veterans Drive. Relocating these stops closer to Veterans Drive will encourage safe crossings at the signal. This will also provide through-moving buses with more time to exit the rightmost lane, which transitions to a right turn only lane.

PROJECT HIGHTLIGHT

Relocating the bus stop pair at Upson Street will improve transit rider access to a safe crossing and improve bus operations.

Eastbound Lake Austin Boulevard at Veterans Drive
Source: Google Street View

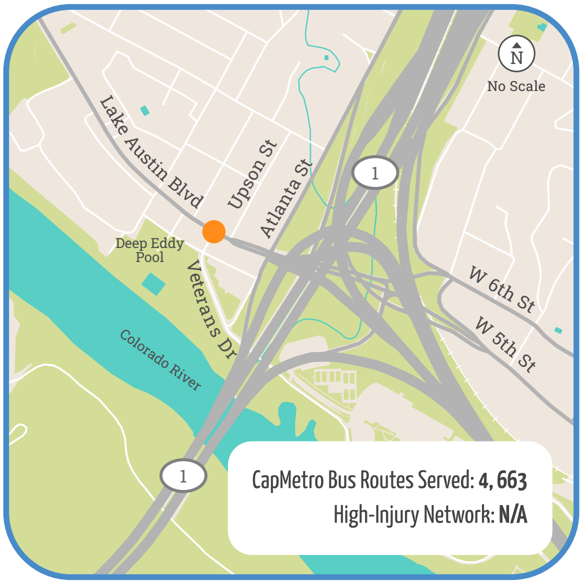
PROJECT SCORE

Speed/Reliability Needs:

Access Needs:

Equity Needs:

PROJECT LOCATION



IMPLEMENTATION

- **Approximate Cost**: $50,000 for design and construction
- **Potential Funding Sources**: 2020 Austin Mobility Bond funds, CapMetro ILA funds
- **Project Duration from Conceptual Design through Construction**: Short (0-2 years)

JOLLYVILLE ROAD

Between Braker Lane and Great Hills Trail

PROJECT DESCRIPTION

This project proposes the addition of one new bus stop, the relocation of another, and the construction of a new pedestrian hybrid beacon signal near the Great Hills Park & Ride. Improvements to lane configuration and signal timing are proposed at the intersection with Great Hills Trail, and a preliminary engineering study is recommended to explore the possibility of incorporating bicycle facilities and/or transit priority lanes along this segment of Jollyville Road.

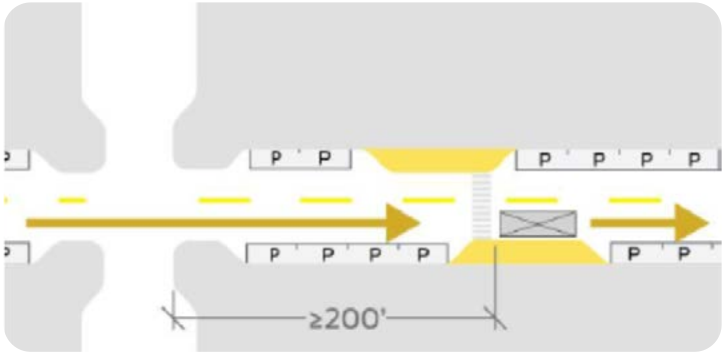
BENEFITS AND ISSUES ADDRESSED

This segment of Jollyville Road serves two Local routes and one Express route. It has two lanes in each direction, a center turn lane, and sidewalks and bike lanes on both sides. Southbound buses experience high levels of delay throughout the segment, particularly at the intersections with Braker Lane and Great Hills Trail.

Adding one new bus stop and relocating another will improve access to transit along this segment of Jollyville Road. Installing a new pedestrian hybrid beacon signal will facilitate safer crossings near the Great Hills Park & Ride. Currently there is no pedestrian crossing between the Braker Lane and Great Hills Trails intersections, which are spaced approximately 2,300 feet apart. Lane configuration and signal timing improvements at the Great Hills Trail intersection are expected to increase the speed and reliability of transit.

BEST PRACTICES

Midblock stops occur when the bus stops in between intersections, and should be placed where a controlled, midblock-marked pedestrian crossing can be installed in tandem with the transit stop.



P Parking spot   Bus stop   Bus

Source: NACTO

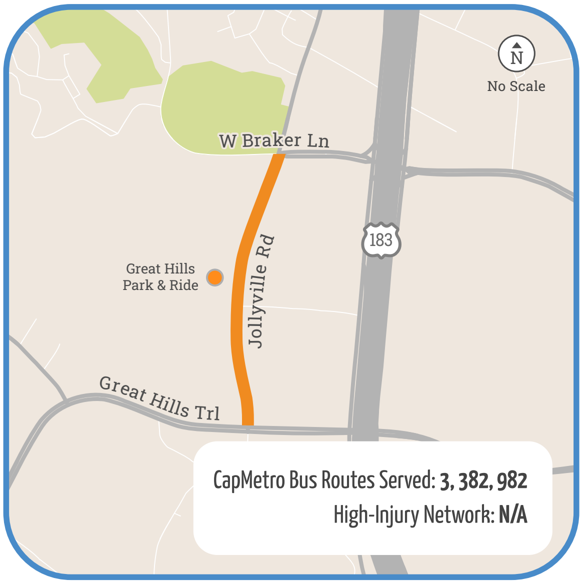
PROJECT SCORE

Speed/Reliability Needs: ✓✓

Access Needs: ✓✓✓

Equity Needs: ✓✓

PROJECT LOCATION



IMPLEMENTATION

- **Approximate Cost**: $0.7M for design and construction
- **Potential Funding Sources**: 2020 Austin Mobility Bond funds, CapMetro ILA funds, Street Impact Fee funds
- **Project Duration from Conceptual Design through Construction**: Medium (2-5 years)

IMPLEMENTATION & NEXT STEPS

FUNDING

There are two existing funding sources available for the implementation of projects recommended by this report:

1. 2020 Austin Mobility Bond funds: Up to $19 million in voter-approved general obligation bonds may be applied to Transit Enhancement projects that address reliability, speed, and safety of local bus service and improve transit access. Projects using bond funds should be completed by 2028.
2. CapMetro Transit ILA funds: Up to $1 million in funds are available each fiscal year through an interlocal agreement with the City of Austin. CapMetro concurrence is required before applying funds towards projects recommended by this report.

The full implementation of all projects recommended in this report is expected to total approximately $53 million in 2023 dollars. As a result, additional funding will be needed. It is acknowledged that longer-term and larger-scale capital improvement projects such as street reconstruction and fully-dedicated transit facilities will require additional funding. Potential funding sources include:

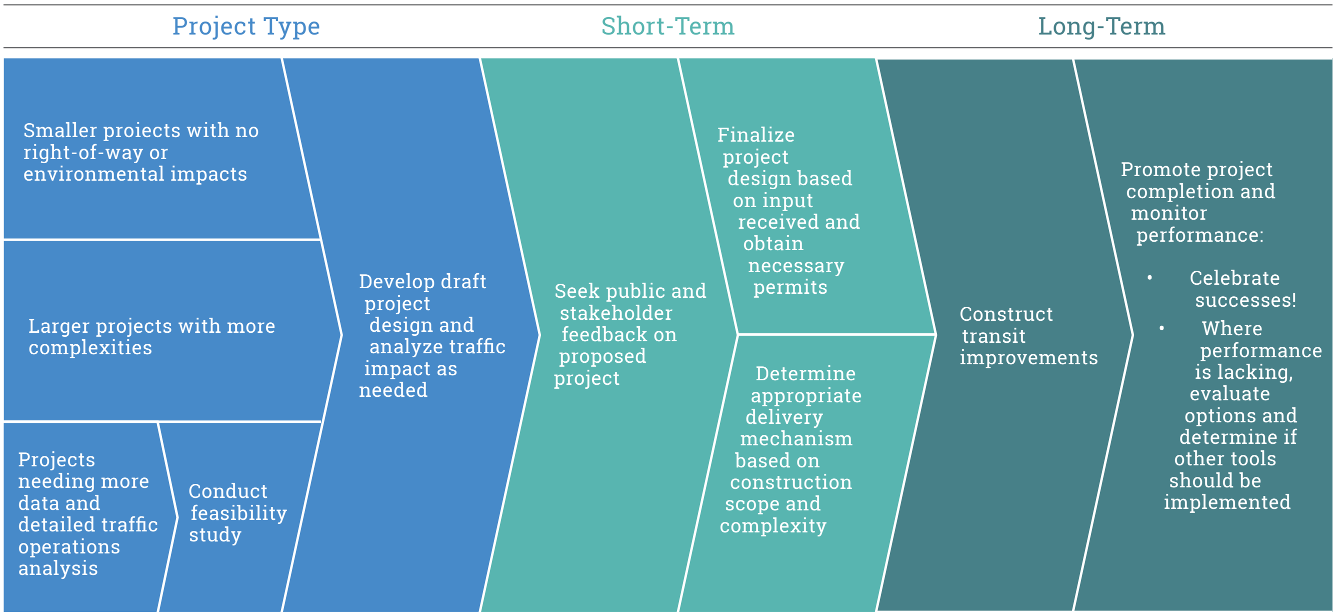
- Future City bond elections
- Development mitigation funds
- Capital Area Metropolitan Planning Organization (CAMPO) funding opportunities: Agencies within the CAMPO boundaries compete for funding based on evaluation criteria identified for each call for projects. Funding cycles vary.
- Texas Department of Transportation (TxDOT) Transportation Alternatives Set-Aside (TA) Program: TxDOT administers Federal Transit Administration (FTA) grants through statewide calls for projects, typically in two-year cycles.

- Federal Infrastructure Investment and Jobs Act (IIJA) funds: These funds are available through competitive grant applications for fiscal years 2022 through 2026. Applicable programs may include:
  - » Safe Streets for All (SS4A)
  - » Multimodal Project Discretionary Grant Opportunity (MPDG)
  - » Rebuilding American Infrastructure with Sustainability and Equity (RAISE)

PROJECT DEVELOPMENT

The projects in this report represent planning level recommendations to improve the speed and reliability of transit service in Austin, and make that service easier and safer to access. The next steps in moving these projects toward construction will vary by location and may include more detailed design, traffic analysis, and/or additional community engagement. While the level of design and analysis varies by project, public outreach will be conducted prior to the implementation of each project and project performance will be monitored to assess the effectiveness of each project following implementation.

Project Type and Next Steps



SCHEDULE

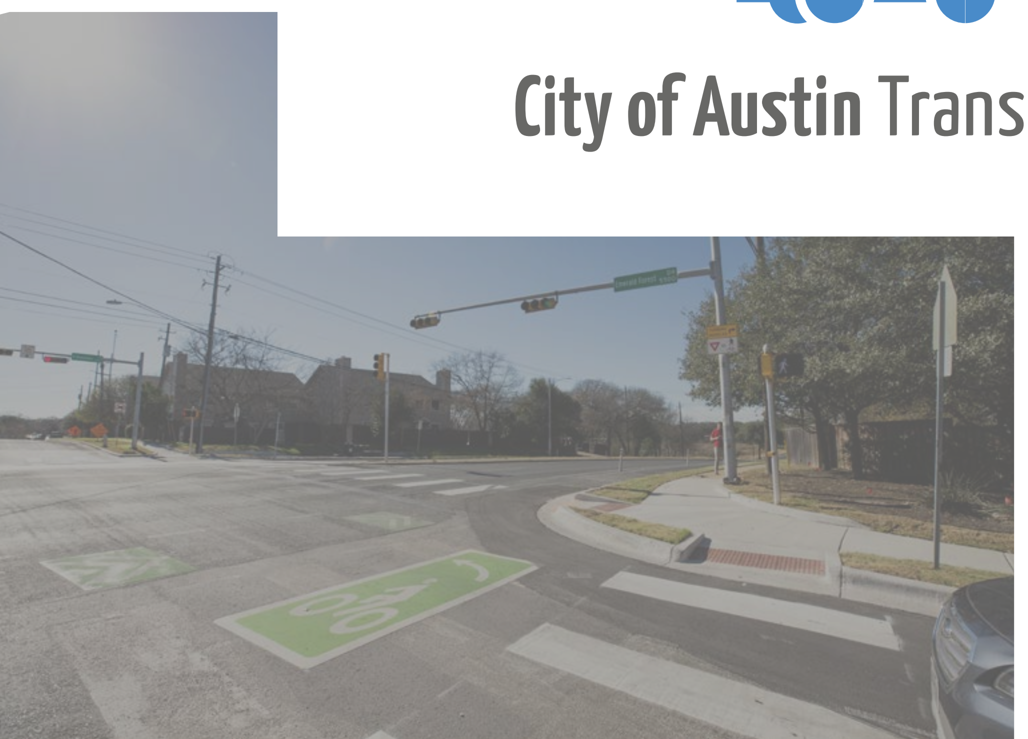
Each project included in this report has an approximate duration from conceptual design through construction, generally ranging from:

- 6 to 24 months for feasibility studies
- 3 to 24 months for smaller, less complex projects implemented through field engineering
- 3+ years for larger, more complex projects implemented through design-bid-build

Some projects may be integrated into other planned projects in the City's Capital Improvement Program. Implementation of other projects may need to be considered in light of Project Connect efforts, particularly where light rail transit alignments are still being evaluated and finalized, and those alignments overlap with recommended transit enhancement projects.

austin
MOBILITY BONDS

City of Austin Transit Enhancement Toolbox



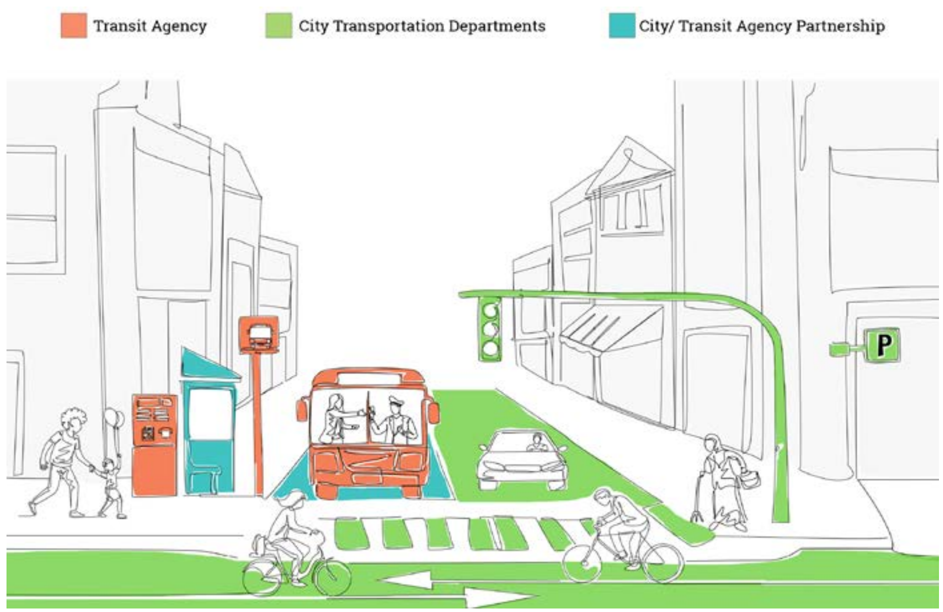
INTRODUCTION

Austin Transportation and Public Works' Transit Enhancement Program works to improve mobility and access to opportunity by enhancing areas of the built environment to support transit riders and transit operations. This Transit Enhancement Toolbox is a collection of potential capital and operational treatments that can be applied in Austin to improve transit speed, reliability and access, and create safer, more predictable interactions between transit and other travel modes.

The toolbox was developed for Transportation and Public Works (TPW) in partnership with CapMetro and Austin Transit Partnership staff and includes 32 tools across four categories ranging from low-cost, minor capital improvements to high-dollar, major infrastructure improvements. The toolbox is intended to serve as a resource for both agency staff and the community, and not only identifies the tools available to improve transit performance, safety and access in Austin, but informs stakeholders about the benefits, trade-offs, and considerations required to implement these tools across the city.

TOOLBOX APPLICATION & STAKEHOLDER COORDINATION

Implementation of the tools outlined in this toolbox requires coordination between agencies and stakeholders, including the City of Austin or the relevant roadway authority, CapMetro or the relevant transit provider, and potential other stakeholders, including area businesses, residents, and elected officials. This coordination is required to get the full benefit of these tools that involve both the roadways and transit service that operates on them. Not all tools will be applicable for all locations, and implementing particular tools may involve trade-offs in the public right-of-way. Before using the toolbox for a project, TPW's Transit Enhancement Program and CapMetro will work together to identify the issues and opportunities at a particular project location, and determine the appropriateness and impact of applying a particular tool at that location, before moving forward with project design.



Source: National Association of City Transportation Officials. Move! That! Bus!

TOOLBOX ORGANIZATION

TOOLS

STREETS AND INTERSECTIONS

STATIONS AND STOPS

ACCESS AND MULTIMODAL INTERACTIONS

TRAFFIC SIGNALS AND OPERATIONS

The 32 tools in the Transit Enhancement Toolbox are grouped into four categories, and each individual tool in that category is covered in a one-pager within the body of this document. More details about the organization of the toolbox, including the summary matrix that provides a snapshot of all 32 tools, can be found below.

SUMMARY MATRIX

A summary matrix of all 32 tools in the toolbox is included on pages 3 and 4. The summary matrix provides an overview of:

- The name of each tool
- The category to which that tool belongs
- The tool's effectiveness at addressing particular challenges
- The tool's cost

This matrix can be used to quickly identify which tools may be most appropriate to improve transit service at a particular location.

TOOL ONE-PAGERS

One-pagers provide an overview of each individual tool, including expected benefits, operational considerations, implementation criteria, related strategies, cost magnitude, and cost considerations.

TOOL CATEGORIES

For ease of navigation, tools are grouped into four categories:

- Streets and Intersections
- Stations and Stops
- Access and Multimodal Interactions
- Traffic Signals and Operations

Each category includes a table of contents, and individual tools within each category are organized in ascending order from least to most capital intensive. Tools may be applied individually or in combination with other tools; see the related strategies section within each tool one-pager for more information.

COST CONSIDERATIONS

The estimated cost ($-$$$$) of each tool includes expenses incurred from project development to construction. Details on the cost magnitudes can be found in the cost considerations section of each tool's one-pager. Actual costs may vary based on the site conditions at each project location.

- ● Low Benefit
- ●● Medium Benefit
- ●●● High Benefit

- $: Under $50,000
- $$: $50,000-$100,000
- $$$: $100,000-$250,000
- $$$$: Over $250,000

STREET AND INTERSECTION DESIGN

STRATEGY	CONGESTION		TRAFFIC OPERATIONS				TRANSIT OPERATIONS				SAFETY			COST
CHALLENGES	INTERSECTION	CORRIDOR	SIGNAL	RIGHT TURN	LEFT TURN	OTHER TRAFFIC RELATED	INEFFICIENT ROUTE DESIGN	INTERRUPTIONS LEAVING BUS STOP	BUS ZONE DWELL TIME	BUS STOP CAPACITY	PEDESTRIAN CONFLICTS	CYCLIST CONFLICTS	MOTORIST CONFLICTS	
Turn Restriction/Exemption	●		●	●●	●●	●	●	●			●	●	●	$-$$
Facilitating Turning Movements				●●	●●	●●					●			$-$$
Roadway Channelization and Turn Pockets	●		●	●●	●●		●				●	●	●	$-$$
Transit Priority Lane (Bus Lane)	●●	●●	●●●	●●		●		●●			●●	●●●	●	$$-$$$$
Queue Jump Lane (Short Bus Lane)	●●●	●●		●●	●●	●●	●●	●●			●	●		$-$$$
Peak-Only Bus Lane	●●	●●	●●					●●		●●		●●	●●	$-$$$
Curbside Bus Lane	●●●	●●●	●●●	●●●				●●		●●		●	●●	$$-$$$$
Offset Bus Lane	●●●	●●●	●●●	●●				●●					●	$$-$$$$
Contraflow Bus Lane	●●●	●●●		●●●	●●●	●●●		●●●				●	●●	$$-$$$$
Reversible / Bidirectional Bus Lane	●●●	●●				●●●		●●●			●●●		●●	$$-$$$$
Median Bus Lane	●	●●●				●●●		●●●		●●	●●●	●●●	●●●	$$-$$$$

STATIONS AND STOPS

STRATEGY	INTERSECTION	CORRIDOR	SIGNAL	RIGHT TURN	LEFT TURN	OTHER TRAFFIC RELATED	INEFFICIENT ROUTE DESIGN	INTERRUPTIONS LEAVING BUS STOP	BUS ZONE DWELL TIME	BUS STOP CAPACITY	PEDESTRIAN CONFLICTS	CYCLIST CONFLICTS	MOTORIST CONFLICTS	COST
Pull-Out Stop													●	$-$$
Level Boarding									●●●					$-$$
Bus Stop Lengthening							●	●	●	●●●				$-$$
Parking Removal or Alterations		●●						●●		●			●●	$-$$
Bus Stop Consolidation	●						●●●	●	●	●				$-$$
In-Lane Stop								●●●			●●	●●		$$-$$$
Far-Side Bus Stop			●●								●●●		●	$-$$$
Near-Side Stop											●●			$-$$$
Midblock Stop			●●								●●			$-$$$

- ● Low Benefit
- ●● Medium Benefit
- ●●● High Benefit

$: Under $50,000
$$: $50,000-$100,000
$$$: $100,000-$250,000
$$$$: Over $250,000

CHALLENGES	Intersection	Corridor	Signal	Right Turn	Left Turn	Other Traffic Related	Inefficient Route Design	Interruptions Leaving Bus Stop	Bus Zone Dwell Time	Bus Stop Capacity	Pedestrian Conflicts	Cyclist Conflicts	Motorist Conflicts	
STRATEGY	CONGESTION		TRAFFIC OPERATIONS				TRANSIT OPERATIONS				SAFETY			COST
ACCESS AND MULTIMODAL INTEGRATION														
Dedicated Bike Signal	●	●	●	●	●			●●●				●●●		$-$$
Shared Bus-Bike Lane								●●		●		●	●	$-$$
Shared Cycle Track Stop								●●●				●●		$$-$$$
Floating Stop								●●●				●●		$$-$$$
Access Improvements								●●			●●●	●●●		
Bicycle Improvements								●●				●●●		
TRAFFIC SIGNALS AND OPERATIONS														
Traffic Signal Timing Adjustments	●●	●	●●	●	●			●			●	●	●	$-$$
Traffic Signal Phase Modification	●●	●	●	●		●●		●			●	●	●	$-$$
Transit Signal Priority	●●		●●●	●●●	●●●	●●●		●						$-$$$
Bus Signal Phase and Signal Head	●●●		●●●	●●●	●●●			●●			●●●	●●	●●	$-$$$
Reverse Queue Jump	●●	●●			●●			●●					●●	$-$$$
Transit Agency Tools							●●●	●●●	●●●	●●●				

STREET AND INTERSECTION DESIGN

TURN RESTRICTION / EXEMPTION

COST: $ – $$

OVERVIEW:

Turn restriction or turn exemption allows buses to make a movement at an intersection that is prohibited for general purpose traffic.

BENEFITS:

- Allowing buses to make movements that are restricted for other vehicles can allow for more direct bus routing that can save transit travel time

OPERATIONAL CONSIDERATIONS:

- May support contraflow bus transit and/or bicycle lanes
- May be enhanced with dedicated signal phasing and/or transit signal priority
- Design needs to include signing and striping to discourage vehicles from making the restricted movement
- Design may require traffic diversion features (e.g., curbs, median islands) to physically prevent restricted movement.
- Turn restrictions/exemptions can be in effect all day or during certain hours. Exemptions can also be extended to bikes

IMPLEMENTATION CRITERIA:

- A traffic analysis may be needed to understand the impact of the proposed turn restriction/exemption on both transit and general purpose traffic
- If general purpose turns are restricted, identify alternate routing options
- Can be applied to either through lanes or turning lanes

RELATED STRATEGIES:

- Reverse queue jump
- Bus signal phase
- Transit signal priority

COST CONSIDERATIONS:

- Costs depend on location and range from new signage to pavement marking modifications, signal head modifications, and medians

FACILITATING TURNING MOVEMENTS

COST: $ – $$

OVERVIEW:

This treatment involves modifying intersection geometry or roadway markings to facilitate smoother and safer turn movements for buses. Treatments may include the implementation of "smart right" designs, corner radius modifications, mountable aprons, parking modifications, striping changes, and/or pulling back stop bars to making turning movements easier for buses and reduce transit delay.

BENEFITS:

- Improvements that facilitate bus turns can improve transit travel times, and can also improve safety if buses were encroaching into adjacent/oncoming travel lanes or riding over the curb in order to execute a turn

OPERATIONAL CONSIDERATIONS:

- Front-mounted bicycle racks should be considered when analyzing the turn movement to determine the appropriate design
- Signal timing for pedestrian crossing may need to be altered to account for changes to the pedestrian crossing distance
- Design phase should include an auto-turn analysis using the appropriate design vehicle, and a field test may be needed before finalizing recommendations

IMPLEMENTATION CRITERIA:

- The appropriate treatment option will be site specific and could include a minor restriping or parking modification, or a more substantial corner modification
- Mountable aprons should be designed to discourage pedestrian or bicycle refuge. Additionally, on-board bus rider comfort should be considered when developing mountable apron profiles

RELATED STRATEGIES:

- Parking removal/alteration
- Channelization and turn pockets

COST CONSIDERATIONS:

- Costs for pavement markings will be lower while curb and apron construction increases costs, especially if right-of-way acquisition is needed

"Smart right" turn on N Lamar Boulevard at W 29th Street, Austin, TX
Source: Google Street View

ROADWAY CHANNELIZATION AND TURN POCKETS

COST: $ – $$

OVERVIEW:

Roadway channelization is the design of traffic lanes in a way that provides definite paths for vehicles to follow through an intersection. Channelization to support bus operations could include adding left/right turn pockets at intersections with high turn volumes that conflict with bus operations and contribute to transit delay.

BENEFITS:

- Channelization improvements can improve transit travel speeds by clarifying lane operations and reducing delay associated with turning movements
- Adding right or left turn lanes provides roadway space for turning vehicles that would otherwise impede transit

OPERATIONAL CONSIDERATIONS:

- When implemented in coordination with a transit lane, turning vehicles must still cross the transit lane, which can cause delays depending on turn volumes
- May lengthen pedestrian crossing distance
- May require the removal/modification of bicycle lanes, median, parking spaces, or other facilities
- May benefit from the use of raised medians and other vertical elements to direct traffic flow and minimize conflicts

IMPLEMENTATION CRITERIA:

- Identify locations where turning movements cause delay to transit operations and determine if channelization would address the concern
- Implementation may be limited by the availability of roadway space and tradeoffs for other roadway users.

RELATED STRATEGIES:

- Parking removal/alteration
- Facilitating turn movements

COST CONSIDERATIONS:

- Capital costs include new signage and re-striping the roadway, and may include curb modifications
- Adding turn pockets within existing curb lines can sometimes be achieved by relocating bike lanes from in-street to behind-curb facilities, which may require constructing bike lanes or shared-use paths behind curb.

Right turn pocket on 7th Street at I-35 (Austin, TX) separates right turning vehicles from through moving buses

TRANSIT PRIORITY LANE (BUS LANE)

COST: $ – $$$

OVERVIEW:

"Transit priority lane" is the term of art used in Austin for a bus lane. It is a general, catch-all term to describe a roadway lane that is dedicated exclusively or primarily for the use of buses. A transit priority lane can operate full-time or during peak periods only, can be a few hundred feet or multiple miles long, and can be configured in a variety of ways (e.g., directly against the curb, offset from the curb, in the center of the roadway, etc.) depending on transit's needs and the context of the lane within the larger transportation network. Pages 10-16 of this toolbox provide more details regarding the specific types of transit priority lanes (bus lanes) that can be implemented to improve transit operations in Austin.

BENEFITS:

- A transit priority lane can improve bus travel times and service reliability. The magnitude of the improvement will depend on a variety of factors including the level of congestion that existed on the roadway prior to the implementation of the lane, enforcement of illegal parking and other activities in the lane, and whether or not general purpose vehicles are allowed to enter the lane to execute turns

OPERATIONAL CONSIDERATIONS:

- Operational considerations vary by bus lane type and are discussed in more detail on subsequent pages
- A lane width of 11 feet is generally desired for bus operations. Bus lane widths of less than 11 feet may be warranted depending on the context and following coordination between the City of Austin and the relevant transit provider
- Traffic analysis may be needed during the design phase to understand the expected transit speed and reliability benefits as well as the anticipated impacts to other roadway users

IMPLEMENTATION CRITERIA:

- Transit operating characteristics (i.e., bus frequency, bus turn movements, bus stop locations, etc.), the operations of other roadway users (i.e., traffic volumes, turn demand, availability of alternate routes, etc.), and the magnitude, location and source of bus delay should all be considered when determining whether (and what kind of) a bus lane should be implemented

RELATED STRATEGIES:

- Curb management
- Transit signal priority
- Intersection queue jump

COST CONSIDERATIONS:

- Costs can vary widely by bus lane type

Guadalupe Street in Austin, TX

QUEUE JUMP LANE (SHORT BUS LANE)

COST: $ – $$

OVERVIEW:

Queue jump lanes are relatively short bus lanes that combine dedicated transit facilities with either a leading/lagging bus phase or active signal priority to allow buses to bypass traffic queues and enter traffic flow in a priority position. Queue jump lanes can reduce delay considerably, resulting in transit travel time savings and improved service reliability.

BENEFITS:

- Can significantly improve bus operations by routing buses past traffic congestion approaching an intersection, but the magnitude of the benefit will depend on how much delay, and how consistently that delay, is experienced at a particular bottleneck

OPERATIONAL CONSIDERATIONS:

- Can be implemented in coordination with near-side or far-side bus stops, or in non-stop conditions
- Can be implemented in a shared transit/turn lane if turn volumes are low enough that they don't impede the ability of buses to bypass the queue
- Bus-only phase can be concurrent with pedestrian signal phase to promote safety

RELATED STRATEGIES:

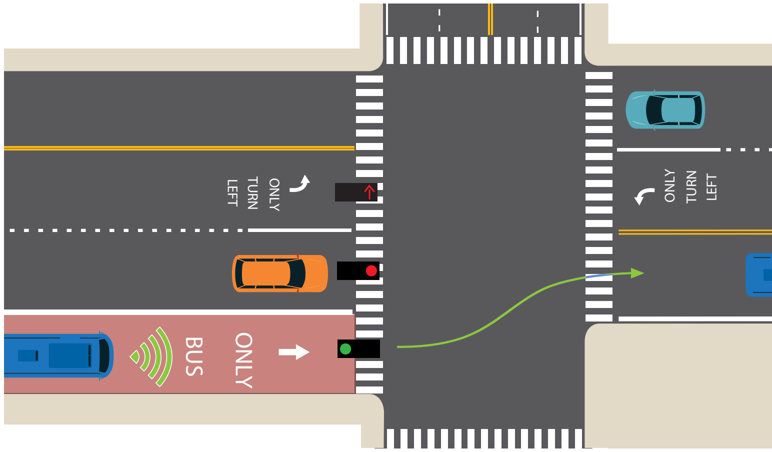
- Parking removal/alterations
- Transit signal priority
- Pre-signals
- Bus signal head

IMPLEMENTATION CRITERIA:

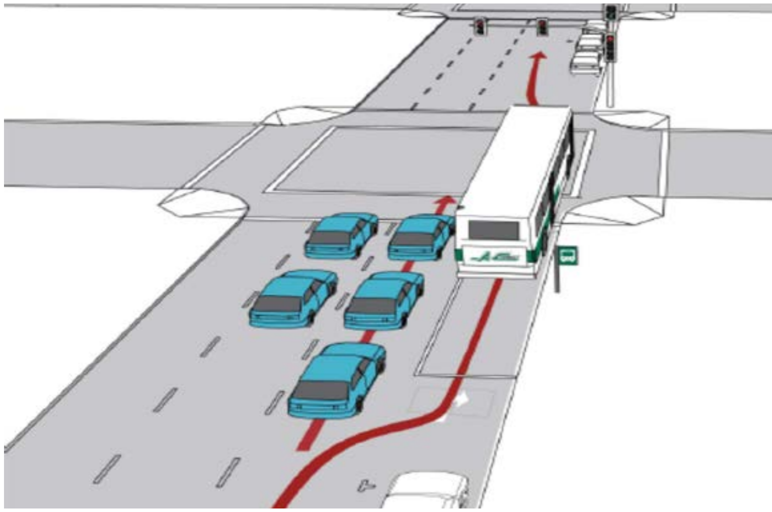
- Separate signal heads must be used to differentiate when transit can proceed from when general traffic can proceed
- Queue jump lane must be long enough that buses can consistently access the lane and reach the front of the queue at the beginning of the signal cycle

COST CONSIDERATIONS:

- Low to moderate cost when using existing right turn lane or removing parking
- Higher cost when curb modifications or ROW acquisition is required to accommodate the lane



Source: Maryland DOT Transit Priority Toolkit



Source: AC Transit

PEAK-ONLY BUS LANE

COST: $ – $$$

OVERVIEW:

A peak-only bus lane operates as a dedicated bus lane during peak travel periods and serves other curbside uses, such as parking or deliveries, at other times of day. This treatment allows transit to take precedence during peak hours when a bus lane is most beneficial to transit operations, while accommodating necessary goods movement and curb access at other times of day.

BENEFITS:

- Provides large boost to transit operations at critical times, substantially improving both service reliability and transit travel times
- Balances competing needs by allowing stationary uses such as parking, freight loading, and street vending during non-peak periods

OPERATIONAL CONSIDERATIONS:

- Generally appropriate on streets with high peak-period bus volumes and high peak-period traffic, plus curbside parking, loading or other flexible uses that can be relocated at certain times of day
- May require additional enforcement to preserve transit operations during peak hours, including towing of vehicles parked in the bus lane during bus-only hours
- May preclude the installation of curb extensions at intersections

IMPLEMENTATION CRITERIA:

- Signage must clearly indicate the lane restriction, the hours of operation, and the times that parking, delivery or vending is prohibited
- Pavement markings must indicate the lane is dedicated to transit

RELATED STRATEGIES:

- Curb management
- Transit signal priority
- Parking removal/alterations

COST CONSIDERATIONS:

- Capital costs include new signage and striping (less expensive), and may include curb modifications (more expensive)

Wilshire Blvd in Los Angeles, CA
Source: NACTO Transit Street Design Guide

CURBSIDE BUS LANE

COST: $$ – $$$

OVERVIEW:

A curbside bus lane is a travel lane adjacent to the curb that is dedicated exclusively or primarily for the use of buses. Curbside bus lanes can be designed with varying levels of separation from other modes, increasing transit performance and capacity as the level of separation increases.

BENEFITS:

- Can improve bus travel times and service reliability
- Helps raise the visibility of the high-quality transit service

OPERATIONAL CONSIDERATIONS:

- Lanes can be subject to encroachment by deliveries, illegal parking, passenger loading, or other curbside activities; enforcement is needed
- Can be designed to allow general purpose right turn access to driveways and intersections, but transit travel time benefits will degrade as right turn volumes increase beyond 150 vehicles per hour.

IMPLEMENTATION CRITERIA:

- Generally appropriate on streets with relatively high bus volumes where transit vehicles and riders are regularly subject to delay
- Pavement markings (red paint optional) and signage (e.g., “Right Turn Only Except Bus”) must indicate the lane is dedicated exclusively or primarily to transit
- Appropriate on streets with no curbside parking or where parking removal is acceptable

RELATED STRATEGIES:

- Parking removal/alterations
- Transit signal priority
- Bus only signal phase

COST CONSIDERATIONS:

- Capital costs include new signage and striping (less expensive), and may include pavement upgrades, curb modifications and/or signal adjustments (more expensive).

East Riverside Drive, Austin, TX

OFFSET BUS LANE

COST: $$ – $$$

OVERVIEW:

An offset bus lane is a travel lane that is dedicated primarily for the use of buses and is typically located to the left of a curbside travel lane. This type of bus lane is often used to preserve curb space for other uses, such as parking, deliveries, bicycle lanes, or right-turning traffic.

BENEFITS:

- Can improve bus travel times and service reliability while preserving curbside space for other uses like bike lanes, deliveries, parking, or turn lanes

OPERATIONAL CONSIDERATIONS:

- Special consideration must be given to bus stop access and design, and may require restricting curbside uses at bus stops so buses can pull to the curb, or bulbing out the curb so buses can stop in the bus lane
- Turning movements must be carefully managed to minimize conflicts with pedestrians, bicyclists, and other vehicles
- Buses in offset bus lanes may face increased conflicts with vehicles pulling in and out of the curbside lane, or with double-parked or improperly parked vehicles; proper design and enforcement is important for optimal function of offset lanes

IMPLEMENTATION CRITERIA:

- Pavement markings (red paint optional) and signage (e.g., “Right Turn Only Except Bus”) must indicate the lane is dedicated primarily for transit
- Generally appropriate on high-activity corridors that have both relatively high bus volumes where transit vehicles and riders are regularly subject to delay, and relatively high demand for curbside uses that cannot be removed

RELATED STRATEGIES:

- Transit signal priority
- Turn restrictions
- In-lane stop
- Floating stop

COST CONSIDERATIONS:

- Offset bus lanes may require higher capital and maintenance costs than curbside bus lanes due to potential need for bus stop reconstruction, overhead signs and more painting/striping to delineate uses

Source: Google Street View
Lavaca St at 10th Street, Austin, TX

CONTRAFLOW BUS LANE

COST: $$ – $$$

OVERVIEW:

A contraflow bus lane is a travel lane for buses that operates in the opposing direction of normal traffic flow on a one-way street. Contraflow bus lanes are typically used to create strategic, efficient connections for buses along a route, but may also be applied to longer roadway segments to take advantage of available capacity in the opposite direction of travel.

BENEFITS:

- Contraflow bus lanes can enable buses to follow a more direct route than would otherwise be possible on a one-way street grid, and can allow buses to avoid traffic congestion in the general traffic lanes

OPERATIONAL CONSIDERATIONS:

- Contraflow bus lane designs require careful consideration of signage and striping so pedestrians, cyclists, and drivers are aware of the potential presence of a bus approaching from an otherwise unexpected direction; dynamic signs at traffic signals may be warranted when extra attention is needed
- Adding additional traffic signal phases to accommodate the contraflow movement may impact the efficiency of the signal system

IMPLEMENTATION CRITERIA:

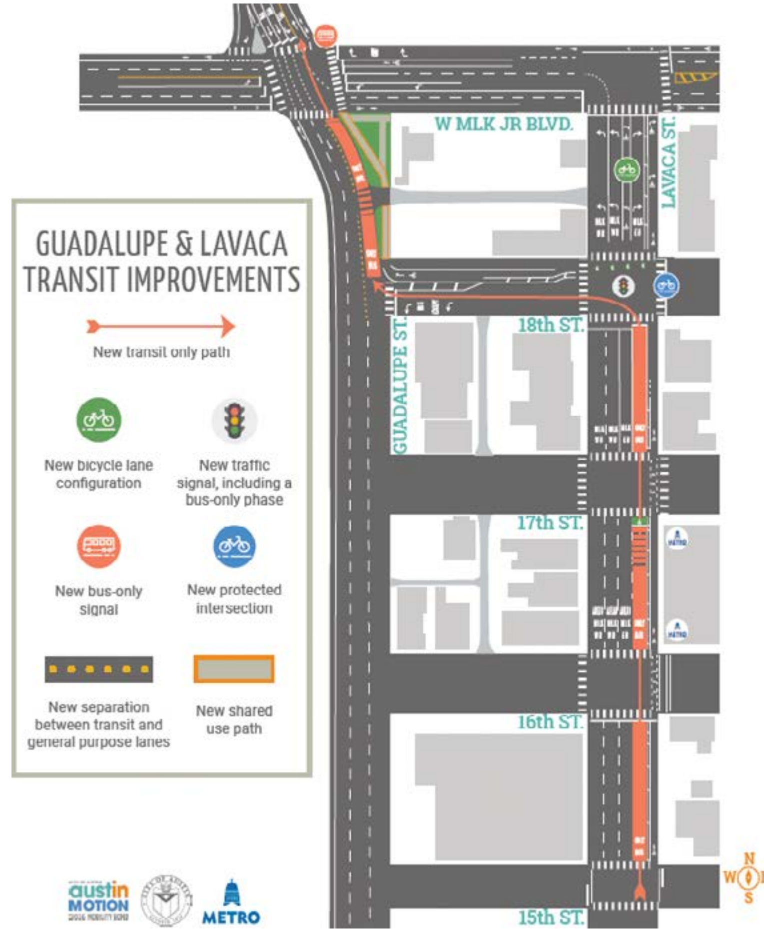
- Traffic signal infrastructure and signal phasing must be updated to reflect two-way traffic operations
- Pavement markings (red paint recommended) and signage (e.g., "One Way, Do Not Enter Except Buses") must indicate the lane is dedicated to transit
- A double-yellow centerline marking with optional vertical elements (e.g., delinators) should be applied to separate contraflow bus traffic from opposing traffic

RELATED STRATEGIES:

- Transit signal priority
- Turn restrictions
- Bus signal heads

COST CONSIDERATIONS:

- Contraflow bus lanes may require higher capital and maintenance costs than curbside bus lanes due to the need for additional signal infrastructure and robust signage and striping



Source: Guadalupe Contraflow Fact Sheet, City of Austin

REVERSIBLE / BIDIRECTIONAL BUS LANE

COST: $$ – $$$

OVERVIEW:

A reversible or bidirectional bus lane is a single travel lane dedicated exclusively to buses that allows transit to travel in either direction through a constrained section of roadway.

BENEFITS:

- Reversible or bidirectional bus lanes can improve bus travel times and service reliability by dedicating a single lane to transit in locations where site constraints prevent the use of separate lanes for each direction of bus travel

OPERATIONAL CONSIDERATIONS:

- A bidirectional, single-lane operation that continuously alternates based on the direction of the approaching bus will accommodate fewer buses per hour than other bus lane types and should only be considered for short segments of roadway, or be implemented where buses operate at low volumes.

- A reversible, single-lane operation that accommodates one direction of bus travel based on the time of day (e.g., northbound in the morning peak, southbound in the evening peak) is most effectively used when there is a significant and distinct difference in traffic volumes by direction and time of day

- Reversible/bidirectional bus lanes are typically more expensive to construct than other types of bus lanes due to the signal system required to control bus access

IMPLEMENTATION CRITERIA:

- Signal system must have block control capabilities that “check-in” and “check-out” buses from the lane to ensure that only buses traveling in the same direction occupy the lane at the same time

RELATED STRATEGIES:

- Transit signal priority
- Turn restrictions
- Bus signal heads

COST CONSIDERATIONS:

- Reversible/bidirectional bus lanes are typically more expensive than other bus lanes due to the signal system required to control bus access1[1]

Emerald Express (EmX) Bus Rapid Transit, Eugene, OR

1 King County Metro Speed Reliability Toolbox

MEDIAN BUS LANE

COST: $$ – $$$

OVERVIEW:

A median bus lane is a travel lane for buses that's located in the center of a multi-lane roadway. This treatment removes conflicts with parking, deliveries, bicycles, right turning vehicles, and other typical curb-side activities.

BENEFITS:

- Median bus lanes can significantly improve bus travel times and service reliability by removing most potential sources of bus delay other than traffic signal-related delays

OPERATIONAL CONSIDERATIONS:

- Should be painted red to distinguish median bus lanes from adjacent general purpose travel lanes; physical separation through the use of barriers (e.g., rumble strips, curbs, etc.) can be considered to reduce encroachment from other vehicles
- Transit performance can be impacted by the signal phasing, especially when vehicle left turn lanes are to the right of the median bus lane and cannot run at the same time due to conflicting paths

RELATED STRATEGIES:

- Transit signal priority
- Turn restrictions

IMPLEMENTATION CRITERIA:

- Typically implemented on major transit corridors with high frequency, heavy delay, and high ridership
- Requires installation of median boarding island bus stops that are fully accessible and connected to a safe, controlled crossing of the roadway
- Installation should be coordinated with land use changes that maximize economic growth potential; setback guidelines and other land use regulations should be tailored to create a more inviting pedestrian environment
- Minimum median bus lane width is 11'

COST CONSIDERATIONS:

- Median bus lanes may require higher capital and maintenance costs than curbside bus lanes due to need for overhead signs, potential roadway reconstruction, and stops in the roadway median

Source: NACTO

Source: NACTO

austin MOBILITY BONDS

STATIONS AND STOPS

PULL-OUT BUS STOP

COST: $ – $$

OVERVIEW:

Pull-out bus stops require buses to pull out of the flow of traffic to pick up and drop off passengers from the curb, prioritizing through-moving traffic flow at stop locations

BENEFITS:

- Allows transit to board and deboard passengers in locations where in-lane stops would be problematic, such as high-volume single lane roadways, timepoints or other stop locations with long dwell times
- Can assist operations of rapid or limited stop routes along a roadway shared with local stop transit service

OPERATIONAL CONSIDERATIONS:

- Contingent on available space to accommodate buses pulling fully out of the travel lane and accessing the curb without obstruction before pulling back out
- Buses may have significant difficulty re-entering the traffic stream; a queue jump signal can be considered to facilitate bus merging
- Buses take longer to serve pull-out stops compared to in-lane stops since transit must exit the travel lane completely to access the curb, then merge back into traffic after boarding/deboarding passengers
- Requires careful design consideration along roadways with adjacent bike lanes to ensure potential bus-bike conflicts are minimized

IMPLEMENTATION CRITERIA:

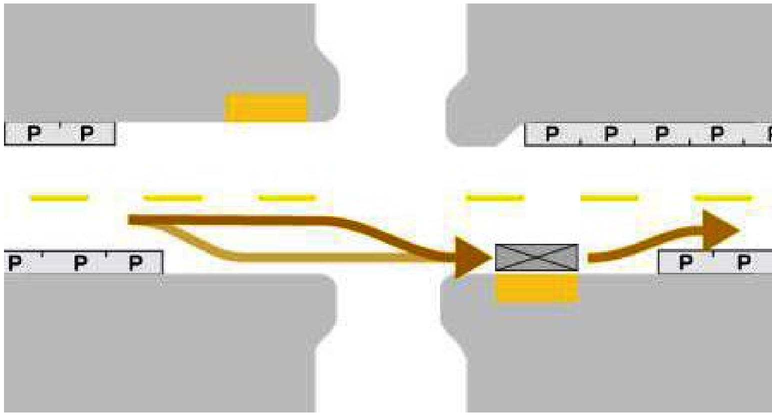
- Removal of parking or other curbside impediments may be required to accommodate bus pull in and pull out maneuvers
- Most effective when used with far side stops and in conjunction with signalization
- May be used as queue jump when designed as near side or far side stop

RELATED STRATEGIES:

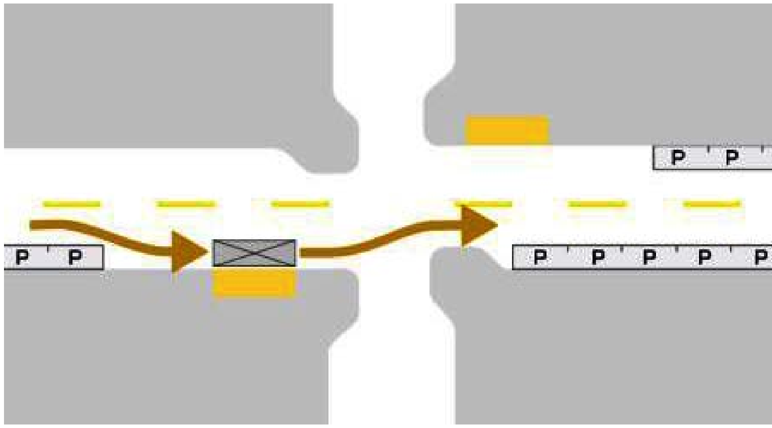
- Level boarding
- Parking removal or alteration
- Bus stop lengthening
- Queue jump

COST CONSIDERATIONS:

- Pull-out stops may be lower cost when implemented on roadways with on-street parking that can be removed for the bus stop, and higher cost when implemented on roadways that require reconstructing the curb line or acquiring right-of-way to accommodate the pull-out



Far-side Pull-out. Source: NACTO



Near-side Pull-out.
Source: NACTO

OVERVIEW:

Level or near-level boarding at bus stops and stations provides a curb height that minimizes the vertical gap between the curb and the door of the bus, making it easier and faster to board the bus at the bus stop. Near-level boarding places the curb height at 8-11 inches rather than the typical 6-inch curb, while level boarding matches the height of the curb to the floor height of the bus (typically 12-14 inches).

BENEFITS:

- Accommodate seniors and customers with mobility devices or strollers
- Reduce bus dwell time with faster boarding and alighting
- Emphasize bus stop location as separate from pedestrian area

OPERATIONAL CONSIDERATIONS:

- Often requires complete reconstruction of bus boarding area
- Implementation and retrofits can be challenging to integrate with existing sidewalk levels and can result in the need for ramps and railings
- Curb heights can be set to specific fleet specifications and may range from 8-14 inches. Lower curb heights in that range may only provide near-level boarding, but still improve passenger boarding/alighting

IMPLEMENTATION CRITERIA:

- Consider installing at locations that have high numbers of mobility-impaired riders
- Ensure that level boarding stops are compatible with adjacent land uses
- Level boarding stops are commonly implemented with high-capacity transit lines, such as Bus Rapid Transit where there is high ridership and significant stop/station infrastructure
- Level boarding stops must be compatible with bus fleet

RELATED STRATEGIES:

- Curbside bus lanes
- In-lane stop

COST CONSIDERATIONS:

- Cost of this treatment can vary widely depending on if the boarding platform needs to be rebuilt or retrofitted

Source: BaltimoreLink Transit Priority Toolkit

BUS STOP LENGTHENING

COST: $ – $$

OVERVIEW:

Bus stop lengthening allows a stop to serve more (or longer) buses simultaneously.

BENEFITS:

- Increasing the bus stop length to serve more or longer buses can improve travel time reliability; lengthening stops can also provide additional space for bus stop amenities, and can often be accomplished with little to no adverse impact on general traffic flow

OPERATIONAL CONSIDERATIONS:

- Available space and right-of-way may limit opportunities to implement stop lengthening
- Bus stop lengthening may result in a loss of on-street parking or other curb-side activity
- Design platforms to accommodate boarding and alighting from all doors, and consider additional elements to improve passenger comfort
- Agency policy may require that buses stopping in an upstream position still pull up and stop at the front position for accessibility

IMPLEMENTATION CRITERIA:

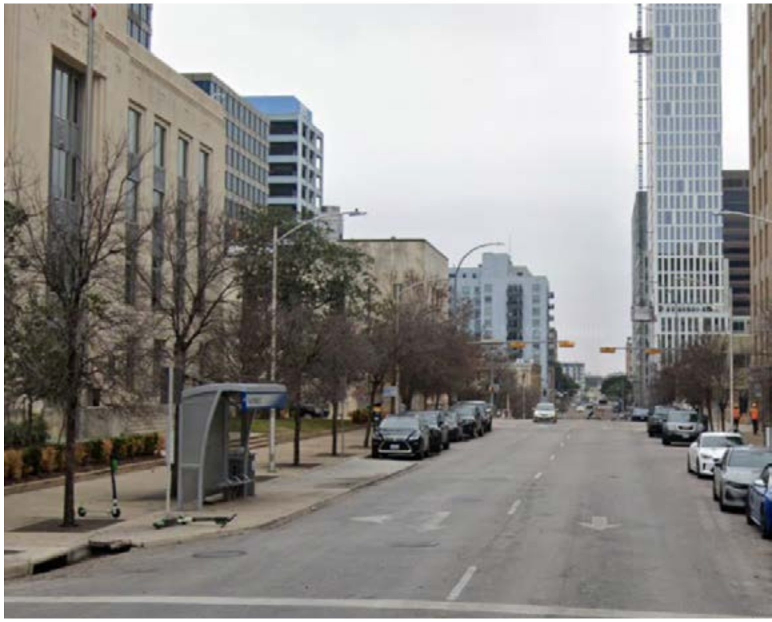
- Bus stops may need to be lengthened where there are frequent headways and/or multiple bus lines, where the existing stop space is insufficient for the passenger demand, and/or where there is high ridership
- Lengthening must accommodate proper drainage and compliant ADA access

RELATED STRATEGIES:

- Curbside bus lanes
- In-lane stop
- Far side stop

COST CONSIDERATIONS:

- Cost varies based on stop configuration and infrastructure in addition to any parking removal



Lavaca Street and 8th Street, Austin
Source: Google Street View

PARKING REMOVAL OR ALTERATIONS

COST: $

OVERVIEW:

Parking can be altered or removed in targeted areas to provide additional roadway space for buses. This can include providing additional space to increase lane widths, to install a bus lane, or to expand a bus stop.[1] This tool is a part of curb management, a series of strategies to more efficiently allocate curb space to meet desired needs such as bus stops, loading zones, passenger curbside activity, parking spaces, and more.

BENEFITS:

- Parking removal can facilitate bus turns, improve travel lane widths for transit, or reduce parking encroachment into lanes where transit is operating. This can improve bus travel times, plus reduce sideswipes and other parking-related crashes near the improvement

OPERATIONAL CONSIDERATIONS:

- Parking restrictions can be in effect 24/7 or during peak periods only
- Note that travel lane widths need to be evaluated if parking is being removed for a bus lane, as parking lanes are often 7-8 feet wide and not adequate on their own for bus operations[1]
- Community support for parking removal can be challenging where the public perceives parking to be critical to business or neighborhood access. Extending outreach to impacted constituents prior to removal is important

IMPLEMENTATION CRITERIA:

- Appropriate for streets with curbside loading or parking that can be removed or relocated

RELATED STRATEGIES:

- Peak only bus lane
- Transit priority lane
- Facilitating turn movements

COST CONSIDERATIONS:

- Some costs associated with removal or re-striping of parking. Some new signage may be necessary
- If paid parking is removed, there may be some loss of parking meter revenue unless replacement spots can be secured

1 King County Metro Speed Reliability Toolbox

BUS STOP CONSOLIDATION

COST: $ – $$

OVERVIEW:

Bus stop consolidation, also known as bus stop balancing or bus stop optimization, speeds up bus travel times by relocating or eliminating bus stops in order to increase the distance buses can travel between stops while still maintaining transit access for the area where buses are operating.[1]

BENEFITS:

- Buses spend approximately 20% of their time at bus stops; reducing the overall number of stops can dramatically speed up trips for transit riders.[2]
- Allows better allocation of limited resources to improve accessibility and amenities at the remaining stops

OPERATIONAL CONSIDERATIONS:

- Spacing trade-offs are critical and should be evaluated based on available demographic, socioeconomic, ridership, boarding pattern and bus frequency data
- Creating super-stops at transfer points of connecting routes can include updated rider amenities to improve customer experience[2]

IMPLEMENTATION CRITERIA:

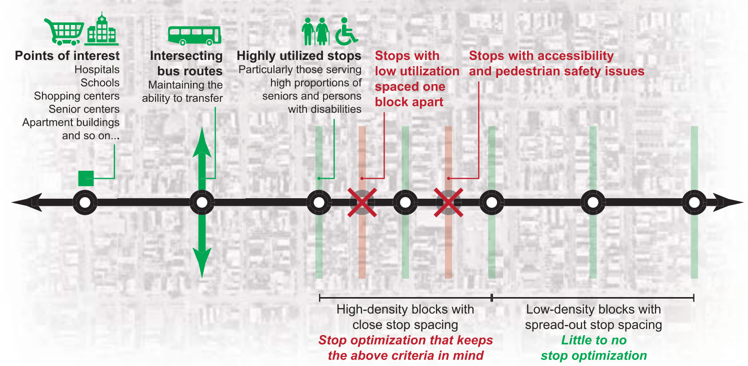
- Consider this treatment where stop spacing is on the lower end of the agency's stop spacing requirements (see table below)
- Consider this on low-performing corridors in terms of ridership and bus travel times

RELATED STRATEGIES:

- Far side stop
- Level boarding
- Route design/alignment

COST CONSIDERATIONS:

- Lower costs include removing bus stop poles and shelter from old site
- Higher costs can include installing new stops, improving ADA access, or new roadway paving



Source: Maryland DOT

CapMetro Recommended Minimum Distance Between Stops	
Area Type:	**Ideal Stop Spacing Range (Min-Max):**
Regular local stops in Downtown or on arterial streets	800-1,600 feet
Suburban and other low-density areas	1,200-2,500 feet

Source: CapMetro Service Standards & Guidelines

1 TCRP Report 183: Transit Capacity and Quality of Service Manual
2 TransitCenter, Bus Stop Balancing: A Companion Guide for Agency Staff

OVERVIEW:

An in-lane stop is a modification of the curb and sidewalk to extend the bus loading/waiting area out to the edge of travel lane, allowing the bus to dwell without having to merge back into traffic, thereby reducing delay.

BENEFITS:

- In-lane stops enable side-running transit vehicles to stop without making large lateral shifts; in-lane stops improve speed and reliability, decreasing the amount of time lost when merging in and out of traffic
- In-lane stops can become a focal point for improved public space along the street, creating space for waiting passengers, furnishings, bike parking, and other pedestrian amenities and community facilities without encroaching on the pedestrian through zone

OPERATIONAL CONSIDERATIONS:

- When placed at intersections, in-lane stops also act as curb extensions to shorten pedestrian crossings
- Can reduce bus and pavement wear and tear, reducing maintenance costs
- In-lane stops often require drainage modifications

IMPLEMENTATION CRITERIA:

- Preferred stop design by City unless safety issue warrants a pull-out stop
- Implement where a bus experiences delay merging into traffic from a pull-out stop
- Consider installing at bus stops where extra sidewalk space or boarding area is needed for high volumes of passengers waiting or for ADA purposes

RELATED STRATEGIES:

- Level boarding
- Floating bus stop

COST CONSIDERATIONS:

- Drainage changes, utility relocations, and relocating a bikeway are the increased cost components of this treatment

Guadalupe St, Austin.
Source: Google Street View

FAR-SIDE BUS STOP

COST: $ – $$$

OVERVIEW:

Far-side bus stops are located downstream of an intersection, allowing the bus to travel through the intersection before stopping to load and unload passengers. Far-side bus stops reduce bus delay and support the use of a broad array of active transit signal priority treatments.

BENEFITS:

- Allows buses to travel through an intersection before stopping, thereby reducing signal delay
- Encourages passengers to cross behind the bus, which increases visibility and improves pedestrian safety

OPERATIONAL CONSIDERATIONS:

- Contingent on available right-of-way on the far side of the intersection
- Most effective when paired with transit signal priority
- Need to consider the proximity to transfer stop locations, transfer ridership demand, and whether a far-side stop results in passengers having to make additional street crossings
- Far-side pull-out stops can benefit from a reverse queue jump to reduce post-dwell merging delay

IMPLEMENTATION CRITERIA:

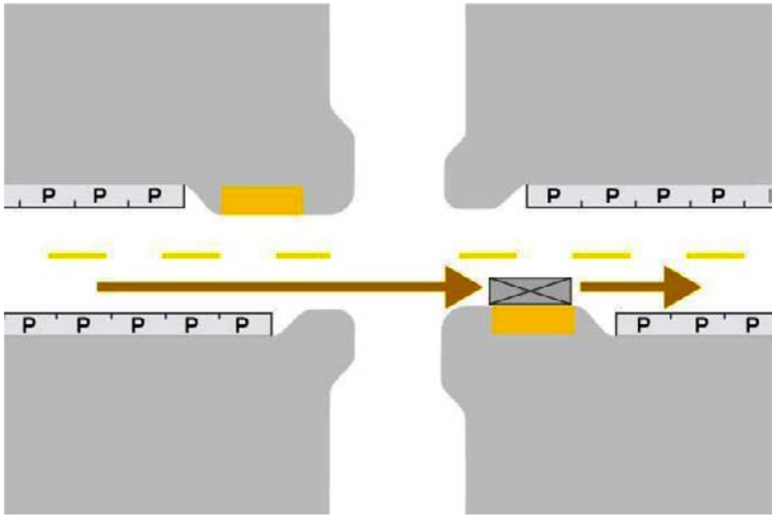
- Preferred stop location by the City unless other criteria warrant near-side stop
- Appropriate at intersections with long traffic signal cycles where a near-side stop may incur significant signal delay
- Consider implementation with bus bulbs to reduce bus merging delay
- Consider adjacent land use and location of trip generators
- Consider proximity to transfer stop locations

RELATED STRATEGIES:

- Curbside bus lanes
- In-lane stop
- Transit signal priority
- Reverse queue jump

COST CONSIDERATIONS:

- Cost varies based on stop configuration and infrastructure



Source: NACTO

NEAR-SIDE BUS STOP

COST: $ – $$$

OVERVIEW:

Near-side stops are located at the approach to an intersection and can facilitate in-lane stops in mixed-traffic lanes, ensuring queued vehicles behind transit vehicles do not block the intersection.

BENEFITS:

- Allows passengers to board and alight closer to intersection crosswalks
- Provides opportunity for queue jump at signalized intersection
- Keeps the far side of the intersection clear to receive turns, especially on single-lane roadways

OPERATIONAL CONSIDERATIONS:

- May impact ability of an intersection to process traffic and cause noticeable drops in intersection capacity
- Near-side stops can be used to facilitate transfer between two intersecting routes

IMPLEMENTATION CRITERIA:

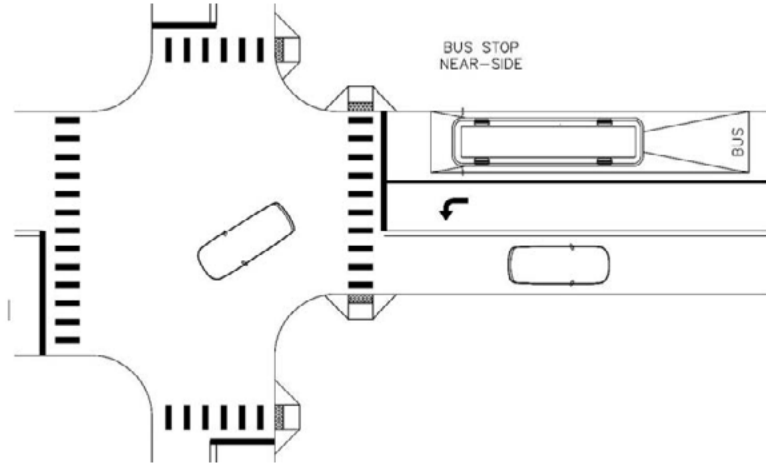
- Near-side stops should be set back at least 10 ft from the edge of the intersection crosswalk, or at the end of the turn radius, whichever is further from the intersection. Stops located just before the crosswalk can block the visibility of pedestrians
- Place near-side stops close enough to the intersection that right-turning vehicles cannot merge in front of the bus

RELATED STRATEGIES:

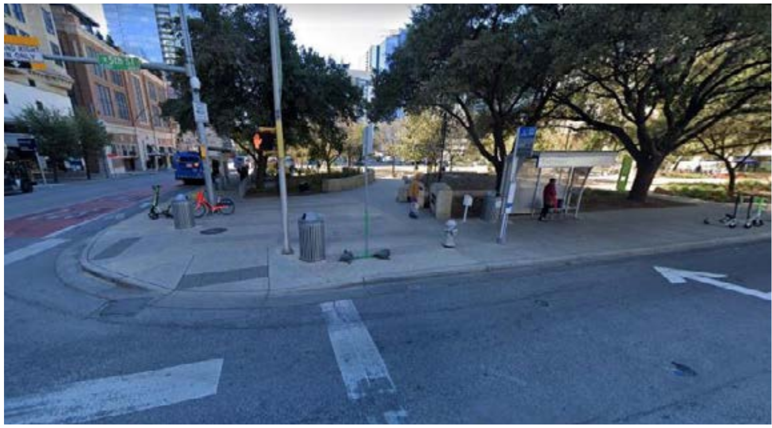
- Queue jump
- In-lane stop
- Level boarding

COST CONSIDERATIONS:

- Cost varies based on stop configuration and infrastructure



Source: City of Austin



Source: Google Street View

MIDBLOCK BUS STOP

COST: $ – $$$

OVERVIEW:

Midblock stops occur when the bus stops in between intersections, usually in a well-defined area. Midblock stops should be placed where a midblock pedestrian crossing can be installed in tandem with the transit stop.

BENEFITS:

- Provides transit access to popular destinations on corridors with long distances between signalized intersections

OPERATIONAL CONSIDERATIONS:

- May need to locate bikeway behind stop
- May allow space for multiple route stops or layover space
- May be useful where adding stops at complex or highly constrained intersections would created safety issues for buses or riders

IMPLEMENTATION CRITERIA:

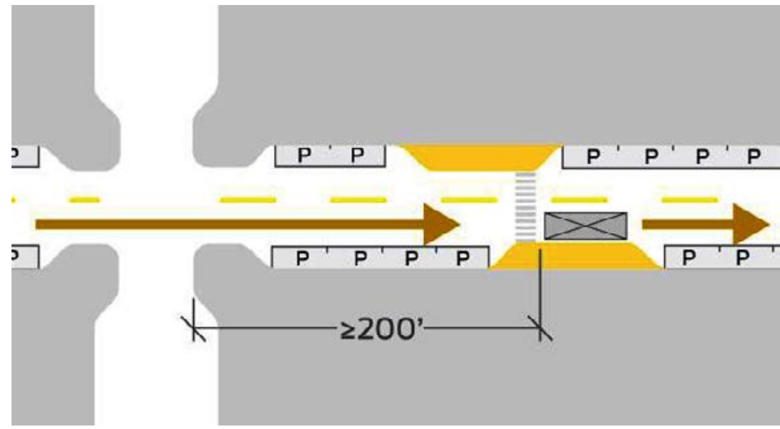
- Use at locations with large destinations midblock
- Consider implementation with bus bulbs for in-lane stops
- Pedestrian crossings should be installed with the transit stop design to facilitate crossings behind the stop, when appropriate

RELATED STRATEGIES:

- In-lane stop
- Floating stop
- Parking removal or alteration

COST CONSIDERATIONS:

- Midblock stop may require more curb area
- Costs will vary based on stop infrastructure and configuration and may include the cost of adding a midblock pedestrian crossing to support the bus stop



Source: NACTO

Source: Google Street View

ACCESS AND MULTIMODAL INTEGRATION

DEDICATED BIKE SIGNAL

COST: $ – $$

OVERVIEW:

A dedicated bike signal near busy bus stops or intersections where transit vehicles operate can help identify and organize transit, bicyclist, and pedestrian movements.

BENEFITS:

- While the primary purpose is to improve bicycle safety, dedicated bike signals can minimize transit delay by providing reliable and specifically-timed separation of transit and bicycle movements where a bus may otherwise need to yield to many cyclists

OPERATIONAL CONSIDERATIONS:

- The traffic signal cabinet and controller software needs to be able to accommodate the additional phase(s) and input(s)
- Bicycle phases that require additional or exclusive time within the signal cycle length may increase transit delay
- The design should consider any bicycle queue storage needs
- Signing and striping needs to provide clear wayfinding for cyclists and communicate awareness of the bicycle facility to drivers

IMPLEMENTATION CRITERIA:

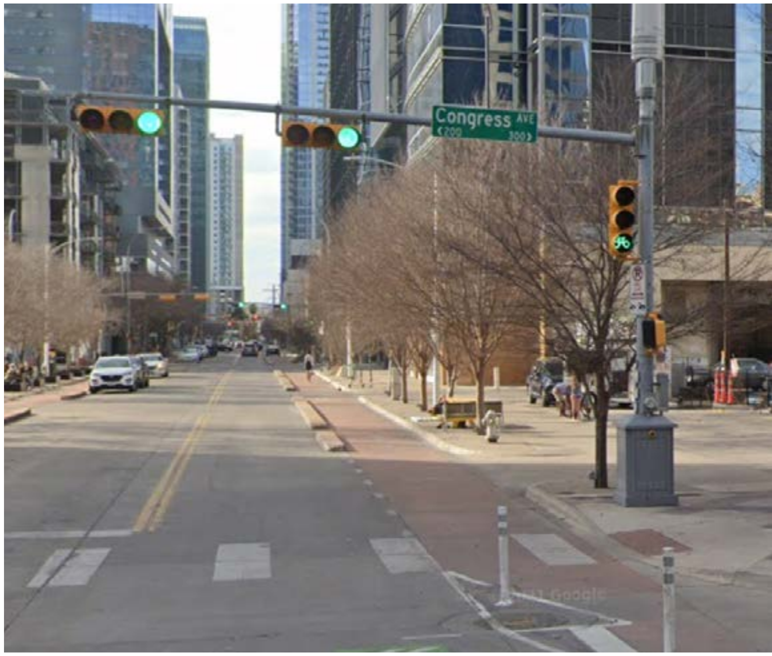
- Consider locations where buses experience frequent delay as a result of yielding to cyclists
- Existing dedicated bike phases where conflicting right turns are held to create a protected bike interval pose challenges when converting that right turn lane into a bus lane or queue jump lane as the protected bike movement will delay the bus; this situation can be mitigated by using transit signal priority to call a lagging protected bike phase

RELATED STRATEGIES:

- Separated bike and bus facilities
- Turn restrictions
- Signal timing modifications

COST CONSIDERATIONS:

- Costs include new signal heads, signal timing updates, and could include new bike-specific signing and striping



Source: Google Street View

SHARED BUS-BIKE LANE

COST: $ – $$

OVERVIEW:

A shared bus-bike lane is a roadway lane that is dedicated exclusively or primarily for the shared use of buses and bicycles. A shared bus-bike lane is not a high-comfort bike facility and the preferred option for incorporating bicycle lanes into transit infrastructure is a separate bikeway, but a shared bus-bike lane may be an option on streets where dedicated bus and separate bike facilities cannot be provided.

BENEFITS:

- Shared bus-bike lanes can provide increased space and visibility for cyclists while improving transit service reliability on corridors with consistent delay and lower bus volumes
- Shared bus-bike lanes can accommodate both modes at low speeds and moderate bus headways, where buses are discouraged from passing, and bicyclists pass buses only at stops

OPERATIONAL CONSIDERATIONS:

- Not recommended for areas where buses are traveling at speeds greater than 20 mph, or could be expected through design to operate at greater than 20 mph
- Preferred configuration separates bikes from buses at stops
- Bus-bike lanes are not high-comfort bicycle facilities, and are not a substitute for dedicated bikeways

IMPLEMENTATION CRITERIA:

- Applications should generally be limited to bus lanes with operating speeds of 20 mph or less and transit headways of four minutes or longer (max. 15 buses per hour)
- Recommended where dedicated or reasonable parallel bicycle facilities are not feasible

RELATED STRATEGIES:

- Far side stop
- Dedicated bicycle signal
- Traffic signal timing adjustments

COST CONSIDERATIONS:

- Ranges from basic striping and signing to resurfacing pavement, red paint markings, installing overhead signage, or changing roadway cross-section

West 5th Street at Pressler St, Austin, TX
Source: City of Austin

SHARED CYCLE TRACK STOP

COST: $$ – $$$

OVERVIEW:

At shared cycle track stops, a bike lane rises and runs along the boarding area, rather than wrapping behind the back of the bus stop. Bicyclists can ride through the boarding area when no transit vehicles are present but must yield the space to passengers when a bus stops for boarding and alighting.

BENEFITS:

- Avoids potential bike-bus conflict from sharing the travelway, increases bicyclist comfort and safety
- Improves bicyclist visibility and increases predictability of bicyclist positioning on the travelway
- Provides space for transit passengers and amenities while maintaining a clear pedestrian path on the sidewalk

OPERATIONAL CONSIDERATIONS:

- Measures must be taken to ensure bicyclists yield to boarding and alighting transit passengers; compliance is critical to providing safe and comfortable conditions
- Pedestrians must have sufficient space to wait behind the cycle track so they are not trapped between the cycle track and the vehicle lane while waiting
- Bike facilities may be buffered or protected

IMPLEMENTATION CRITERIA:

- Shared cycle track stops require comprehensive multi-sense information to guide blind or visually impaired riders. Appropriate use of detectable warning surfaces is required to meet accessibility standards.
- Used where limited right-of-way or other constraints preclude floating stops with bikes behind the bus stop
- Generally occurs in curbside conditions

RELATED STRATEGIES:

- Dedicated bicycle signal
- Turn restrictions

COST CONSIDERATIONS:

- Costs include restriping and resigning existing curbside station at a minimum and also may include station construction costs

Example of Shared Cycle Track Stop
Source: TriMet

FLOATING STOP

COST: $$ – $$$

OVERVIEW:

Floating bus stops, also known as boarding islands or multimodal bus stops, reduce conflicts between buses, bikes and transit riders by the wrapping the bike lane behind the bus stop. This separation improves safety for bicyclists and pedestrians, and clarifies interactions among all modes.

BENEFITS:

- Routing bikes behind a bus stop improves safety by minimizing conflicts between buses, passengers, and bicycles within the same space; this type of stop layout typically keeps the bus in-lane, reducing delay and friction associated with merging into and out of traffic and enabling faster and more reliable transit operations

OPERATIONAL CONSIDERATIONS:

- A platform is constructed along the right side of the roadway, typically within a current parking area, travel lane, or bike lane, where the bike facility is then routed behind the stop/station area
- Need pavement markings and signage directing bicyclists behind the boarding area and crosswalks directing pedestrians from platform to sidewalk
- When possible, include raised crosswalk to channelize pedestrians and alert bicycle riders to yield to pedestrians

IMPLEMENTATION CRITERIA:

- Streets with heavily-used transit routes and protected bikeways where adequate right-of-way permits the “island” or “floating” configuration
- This treatment is most appropriate for roadways with a high level of interaction among bicycles, pedestrians, and transit
- This treatment requires more right-of-way than similar treatments such as shared cycle track stops. Available right-of-way should be considered when assessing this tool.

RELATED STRATEGIES:

- In-lane stop
- Far side stop
- Shared cycle track stop

COST CONSIDERATIONS:

- Pedestrian fencing, bollards, and object markers may be required
- Costs can be significantly reduced when incorporated into a larger corridor project

Stassney Lane Project at South 1st Street, Austin, TX
Source: City of Austin

ACCESS IMPROVEMENTS

OVERVIEW:

This page describes several access improvements that have been grouped onto one page as a part of Access and Multimodal integration. They don't need a full-page explanation but should be considered when implementing other tools in this Toolbox.

LEADING PEDESTRIAN INVERVAL (LPI):

This tool involves adding a phase where the pedestrian walk indication is displayed 5-15 seconds before the associated vehicle movement receives a green indication on the signal head. This allows pedestrians to get a head start crossing the intersection, minimizing turning vehicle conflicts by increasing visibility of pedestrians.

MEDIAN REFUGE ISLAND:

A concrete refuge island constructed in the median between vehicle lanes gives pedestrians and bicyclists refuge part-way through crossing the roadway. This increases crossing opportunities and make crossing at wide roadway locations safer.

PEDESTRIAN CROSSING TREATMENTS:

These include the following in order of level of effort and level of traffic control required:

- **Raised Crossing:** The crosswalk is physically raised to increase visibility and awareness of pedestrians to drivers. It also has the added benefit of slowing vehicles approaching the crossing.
- **Rectangular Rapid Flashing Beacon (RRFB):** This is a form of advanced warning, and is triggered when pedestrian pushes a button on the beacon before crossing. Flashing lights signal to drivers that a pedestrian is actively crossing at that location.
- **Pedestrian Hybrid Beacon (PHB):** unlike the flashing lights of the RRFB, a pedestrian hybrid beacon will show a red indication after an initial flashing indication to stop vehicles before a pedestrian begins crossing. Vehicles must stay stopped until the beacon flashes and exits the solid red indication.
- **Traffic Signal:** When previous active and enhanced crossing indicators do not suffice, a traffic signal may be installed to support safe pedestrian crossings if it passes signal warrants.

Median Refuge Island, Source: NACTO

Pedestrian Hybrid Beacon
Source: Google Streetview

OVERVIEW:

This page describes several bicycle improvements that have been grouped onto one page as a part of Access and Multimodal integration. They don't need a full-page explanation but should be considered when implementing other tools in this Toolbox.

BICYCLE PARKING:

This tool involves providing secure bicycle parking at park and rides and other high-activity transit stops to encourage and facilitate bicycling access to transit.

BIKE SHARE PROGRAM:

This tool involves implementing or expanding a City or agency-wide bike share program to facilitate the use of bicycles for first and last mile trips, especially those that connect to transit. Bike share programs allow people to use bicycles on one leg of their trip, not requiring round trips. They also remove bicycle parking concerns for the individual user. There are many types of bike share programs that can be implemented ranging from docked to dockless options.

SEPARATE BUS AND BIKE FACILITIES:

Separated bus and bike facilities generally involve a combination of the following options:

- **Right Side Bike Lanes:** Typically separated bike lanes are on the right-side of the travel way, increasing bicyclist comfort and safety and reducing potential bike-bus conflict in the roadway
- **Left Side Bike Lanes:** This tool involves conventional bike lanes placed on the left-side of one-way streets or two-way median divided streets. The advantage of left side bike lanes is they have fewer bus conflicts along the curb as most bus stops and operations are on the right side of the street.
- **Protected Bike Lane:** This is a bike lane protected by physical barriers such as delineators, curbs, or parking
- **Buffered Bike Lane:** This is a bike lane separated from an adjacent travel lane by a buffer of space, ranging from 2-6 feet, often delineated by striping. Physical barriers are not required for a buffered bike lane but may be used where space is available to provide additional protection for bicyclists.

Buffered bike lane
Source: NACTO

Left side bike lane
ource: NACTO

austin MOBILITY BONDS

TRAFFIC SIGNALS AND OPERATIONS

TRAFFIC SIGNAL TIMING ADJUSTMENTS

COST: $ – $$

OVERVIEW:

Traffic signal timing adjustments can be optimized to reduce overall delay for motor vehicles on the intersection approaches used by transit. Since the signal timing is the same whether or not a bus is present, the improvements are considered to be passive.

BENEFITS:

- Can reduce bus stopping and travel time through the corridor by up to 12 percent[1]
- Adjusting signal timing specifically for bus progression will help reduce delay experienced by buses at an intersection[2]

OPERATIONAL CONSIDERATIONS:

- The amount of signal time reallocated to approaches served by buses is constrained by the amount of time required in terms of traffic volumes, lane configuration, and pedestrian volumes to serve vehicles on other approaches[2]
- Changing signal timing for one intersection on a coordinated corridor may require changing timing of the whole corridor except if double or half cycling is employed on the candidate intersection
- Signal timing changes that benefit buses (such as shorter cycle lengths or more green time for the approaches used by buses) may also improve operations for other roadway users

IMPLEMENTATION CRITERIA:

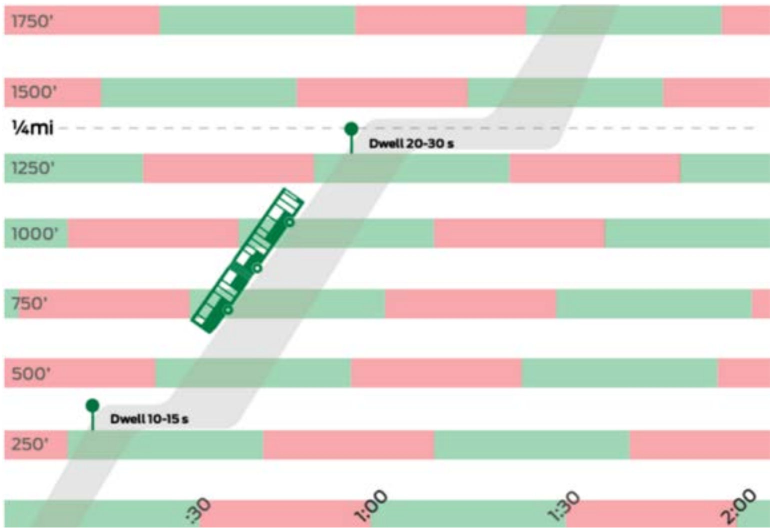
- Can be implemented on corridors with pre-timed signals or coordinated signals
- Most beneficial on coordinated corridors or corridors without isolated traffic signals
- Most beneficial on corridors that experience poor progression or have congestion but are not fully saturated

RELATED STRATEGIES:

- Transit signal priority
- Phase modification
- Bus only signal

COST CONSIDERATIONS:

- Potential for no capital costs if existing equipment is supported, otherwise controller and/or detection upgrades may be necessary
- Timing adjustments would require some staff time



Source: NACTO Transit Street Design Guide

1 Translink Transit Priority Toolkit
2 TCRP Report 183: Transit Capacity and Quality of Service Manual

TRAFFIC SIGNAL PHASE MODIFICATION

COST: $ – $$

OVERVIEW:

Traffic signal phase modification consists of modifying signal phasing for improved safety and transit operations. An example modification may include conversion from permissive left turn phasing to protected-only phasing for increased safety of left turn operations. Conversely, a protected-only left turn phase can be modified to a permitted/protected operation when conditions allow to serve left turn demand during the permissive phase and reduce the amount of protected green time needed, thereby increasing the through movement green time to benefit mainline transit operations. Other phase modifications may include adding right-turn overlap phasing or a left turn reservice phase to provide a left turning bus the opportunity to be served before or after the through phase.

BENEFITS:

- Reduces bus delay and improves travel time reliability by accommodating varying bus arrival times at a traffic signal
- Additional green time for buses will also benefit the motorists sharing the intersection approach

OPERATIONAL CONSIDERATIONS:

- Right-turn overlaps benefit right turning buses, but can also be used to flush right turning traffic from a queue jump lane when used in conjunction with transit signal priority and a transit signalhead
- Need sufficient cycle length at the intersection for phase reservice to effectively function
- Controller upgrades may be needed to provide phase modifications[1]
- Phase reservice can be conditional, i.e., if a bus or two to three cars occupy the left lane, then the left turn signal activates

IMPLEMENTATION CRITERIA:

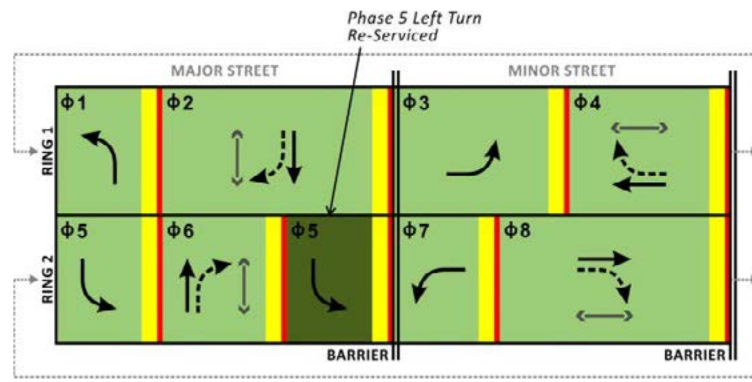
- In a transit context, this strategy has the greatest potential at signalized intersections where buses turn left
- Can be used in combination with transit signal priority to change the phase rotation to faster serve the bus (i.e., dynamic lead/lag left turn phasing)

RELATED STRATEGIES:

- Transit signal priority
- Bus only signal
- Facilitating turn movements
- Queue jump lane

COST CONSIDERATIONS:

- No capitol costs if locations includes required equipment; however changes to wiring, detection, signage, signalheads, controller or firmware may be necessary
- Any new equipment added to a mast arm may warrant installation of a new mast arm to accommodate additional loading



Source: Phase Reservice, TCRP Report 183

Source: NACTO Transit Street Design Guide

1 TCRP Report 183: Transit Capacity and Quality of Service Manual

TRANSIT SIGNAL PRIORITY

COST: $ – $$$

OVERVIEW:

Transit Signal Priority (TSP) is a tool that aids in giving a bus some level of priority moving through intersections so that the bus experiences reduced delay. It is implemented by modifying or altering traffic signal timing or phase allocation using communication technology between a traffic signal and an approaching bus. This strategy may include:

- EXTENDING GREEN TIME OR PROVIDING EARLY GREEN TIME
- CALLING BUS-ONLY PHASES (E.G., QUEUE JUMP)
- DYNAMIC PHASE ROTATION (E.G., DYNAMIC LEAD/LAG LEFT TURN)

BENEFITS:

- Can reduce transit delay by approximately 10-50 percent at a target intersection
- Improves travel time reliability
- Improves overall transit corridor operations and improves reliability of the transit system

OPERATIONAL CONSIDERATIONS:

- Effective at intersections with long queues or high delays
- Limited effectiveness when mainline and cross-street traffic are near or over capacity
- Needs high degree of coordination between agencies responsible for signal and transit operations

IMPLEMENTATION CRITERIA:

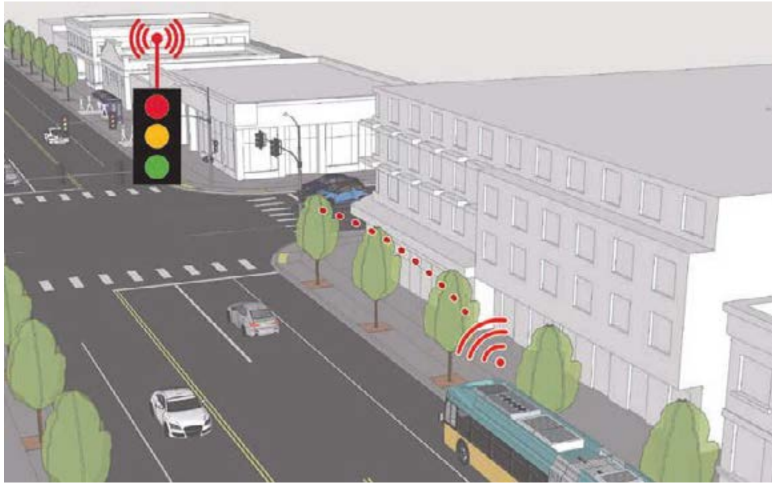
- Works best for signals with longer cycle lengths and for signal spacing greater than a half-mile
- Effective at locations with far-side stop or no stop, allowing buses to clear intersections without waiting; near-side stops have reduced effectiveness

RELATED STRATEGIES:

- Other signal timing strategies
- Queue jump lane
- Far side stop

COST CONSIDERATIONS:

- Upgrading signal controller, detection system, communication, and signal timings are key cost variables



Source: King County Metro Speed Reliability Toolbox

BUS SIGNAL PHASE AND SIGNAL HEAD

COST: $ – $$$

OVERVIEW:

A bus signal phase is a traffic signal phase included in the traffic signal cycle to serve bus movements that cannot be served, or are not desired to be served, concurrently with other traffic. Bus-only signal phases allow buses to make nonstandard movements at an intersection like making a left turn from a right-side bus lane or movements to and from a median bus lane.[1] Bus-only signal phases are often implemented with separate bus signal heads.

BENEFITS:

- Supports the feasible implementation of other transit-supportive roadway strategies, such as queue jump lanes and bus lanes
- Can help reduce transit travel time and improve service reliability when used to solve issues associated with turning movements[1]

OPERATIONAL CONSIDERATIONS:

- The signal controller needs to have an unused phase available to serve the bus-only phase
- Geometric design considerations like bus turning radii will need to be checked, to ensure sufficient space for a bus to make a turn or merge
- Signing and striping need to clearly communicate operations for motorists
- Separate bus signal head may be added to clearly distinguish the bus-only phase

IMPLEMENTATION CRITERIA:

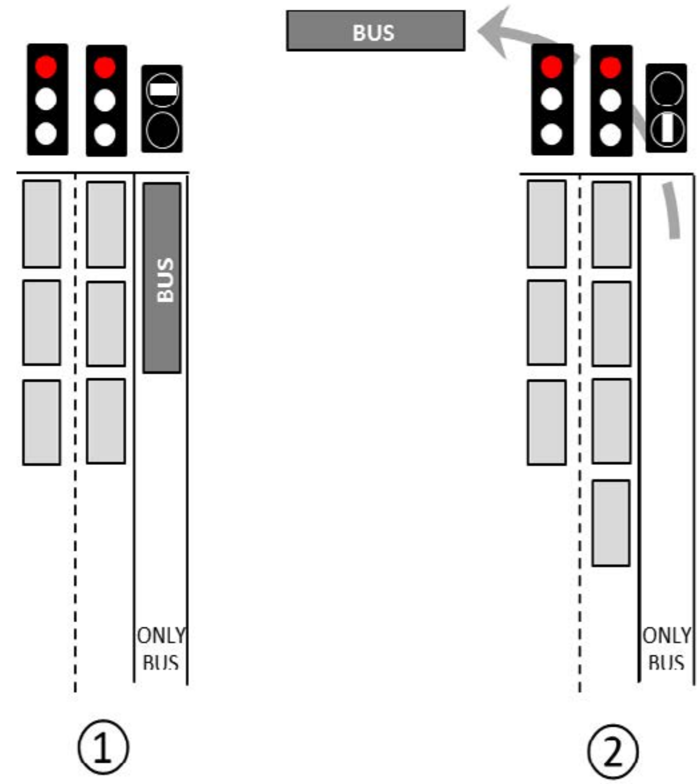
- Can be used whenever a transit vehicle needs to be served through a traffic signal from a dedicated lane. Common examples may include:
  - » Queue jump
  - » Left turn from right lane
  - » Right turn from median/left lane
  - » Entry or exit from a transit lane (median or side)

RELATED STRATEGIES:

- Phase modification
- Intersection queue jump lane
- Facilitating turn movements

COST CONSIDERATIONS:

- Cost depends on whether detection infrastructure, new signal head, or new controller needs to be installed



Example of bus-only signal phase
Source: TCRP Report 183

1 TCRP Report 183: Transit Capacity and Quality of Service Manual

REVERSE QUEUE JUMP

COST: $ – $$$

OVERVIEW:

This tool includes communication between nearby traffic signals and the bus to create gaps in traffic to expedite a difficult transit movement. For example, a bus stopped at a far-side pull-out bus stop would trigger a call for a red phase at a downstream intersection to create a gap in traffic that the bus can use to merge back into traffic.[1]

BENEFITS:

- Reduces transit delays at intersections and merge areas where a lack of gaps in traffic otherwise make the bus movement difficult

OPERATIONAL CONSIDERATIONS:

- Signal must respond quickly to a bus request to be useful
- It may be necessary to configure pedestrian overlap phases so that pedestrian clearance does not need to be provided prior to the reverse queue jump phase
- A yellow trap condition may need to be mitigated if there are permissive left-turns at the intersection[1]

IMPLEMENTATION CRITERIA:

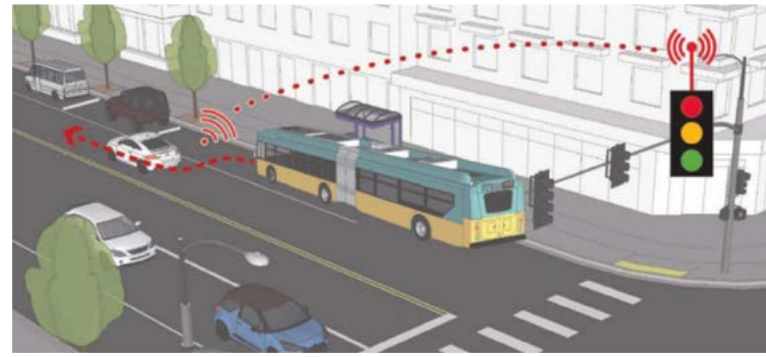
- Appropriate where other signal phasing or timing modifications are not sufficient
- Requires adjacent traffic signal where a phase change can benefit a downstream bus

RELATED STRATEGIES:

- Turn restriction
- Transit signal priority
- Far side stop

COST CONSIDERATIONS:

- Includes controller updates, detection, communication between bus and signal
- May need a planning study to determine appropriateness of strategy



Source: King County Metro Speed Reliability Toolbox

1 King County Metro Speed Reliability Toolbox

OVERVIEW:

This page describes several transit enhancements that are outside of the City's jurisdiction but should also be considered as possible treatments to improve transit travel time and reliability.

YIELD-TO-BUS:

Some states (Oregon, Florida, New York and Washington) have passed laws requiring motorists to yield to buses when signaling to re-enter the travel lane from a bus stop.[1] In other states, private vehicles can be encouraged to yield to buses merging into traffic from a bus stop by using a bus-mounted yield sign or illuminated yield-to-bus light.

ALL-DOOR BOARDING:

All-door boarding is an operational treatment that allows patrons to board and alight from a transit vehicle from any open door to minimize passenger queues and dwell time associated delay at transit stops. This concept requires fare reading equipment at all doors of the fleet, thus requiring an initial capital expense.

ROUTE DESIGN/ALIGNMENT:

Route design is a patron-centric treatment of adjusting or changing the alignment of a existing transit route to provide faster service and improve trip reliability to accommodate changing ridership, traffic patterns, and land use.[1]

OFF-BOARD FARE PAYMENT:

This tool involves patrons paying their fares outside buses, thereby reducing bus dwell times. Payment options include off-board vending machines and websites or apps that provide patrons with proof-of-payment.This tool is especially helpful on high-ridership routes where on-board payments would increase transit delay.

Yield-to-Bus electronic sign
Source: TCRP

All-door Boarding,
Source: StreetsBlog LA

1 TCRP Report 183: Transit Capacity and Quality of Service Manual

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AUSTIN TRANSIT ENHANCEMENT INFRASTRUCTURE REPORT

Public Outreach Summary – Round 1

INTRODUCTION

In November 2020, City of Austin voters approved $460 million for transportation infrastructure improvements, including $19 million for transit projects that improve the speed and reliability of local bus service while making that service safer and easier to access. Transportation and Public Works (TPW), together with CapMetro staff, is currently developing the Transit Enhancement Infrastructure Report. This report will identify roadways within the city that have high needs for transit infrastructure investment and develop planning-level project recommendations for identified locations.

Public outreach is a critical component of any transit enhancement project. The community members who rely on and interact with public transit and its infrastructure can provide meaningful insight on the types of improvements, both operational and access related, and their prioritization. The first round of public outreach to support the development of the Transit Enhancement Infrastructure Report conducted from September 19, 2022 to October 7, 2022. It included in-person outreach events at 10 high-ridership transit hubs across the city as well as online outreach. Surveys were deployed in both English and Spanish and comments were geolocated on interactive maps.

The first round of public outreach focused on understanding the community's priorities for transit infrastructure improvements. The community was asked to rate the importance of investments in making transit fast and reliable by adding infrastructure like bus lanes and signals for transit, investments in making transit easier to access by improving infrastructure like sidewalks and roadway crossings, and addressing equity by focusing transit investments in historically underserved communities. Additionally, demographic data was collected to ensure that that the public that was engaged reflected the demographics of Austin and CapMetro riders. Results are described in detail on the following pages.

IN-PERSON OUTREACH

Round 1 of public outreach, which occurred from September 19, 2022 to October 7, 2022, was conducted through a series of in-person outreach events designed to gather feedback from CapMetro ridership. In-person engagement included a set of map exhibits to introduce the study area so that the respondents could quickly provide feedback. The in-person outreach events were held at ten high-ridership transit hubs across the city of Austin:

1. Tech Ridge Park & Ride
2. North Lamar Transit Center
3. Manor at Susquehanna
4. Norwood Transit Center
5. Westgate Transit Center
6. The Drag (University of Texas (UT) West Mall)
7. Riverside at Pleasant Valley
8. Republic Square
9. Southpark Meadows
10. William Cannon at Bluff Springs

Survey Questions

The Austin Transit Enhancement (ATE) survey had a total of three primary questions and five optional demographic data questions. The primary questions were based on a 5-point rating scale from "Not at all important" to "Extremely important" with the question text as follows below:

1. I believe the City should prioritize investments in making transit fast and reliable for the most riders.
2. I believe the City should prioritize investments in improvements like new sidewalks and roadway crossings that make it safer and easier to get to and from bus stops.
3. I believe the City should prioritize investments in historically underserved areas.

The demographic questions gathered information on the following topics: age, gender, cultural identity, disability identification, and income level. All questions were optional and not all respondents answered every question.

Comparisons were drawn to the 2015 CapMetro Origin and Destination Study and the 2020 American Community Survey (ACS) Five-Year Estimates for the City of Austin. These comparisons examined the demographics of survey respondents versus previous transit survey data and the general Austin population. The 2015 CapMetro Study gathered data for different segments of the ridership based on their transit option of choice. For the purposes of this survey comparison, the Fixed/Express category, which represents the majority of CapMetro's bus ridership, was used. The ranges for each of the three data sets were different, so the ranges were altered to fit the other data sets where necessary.

1) IN-PERSON SURVEY RESULTS

In total, 599 in-person surveys were initiated and 423 (71%) were fully completed. A strong majority of respondents rated each of the three primary questions as “Very important” or above, with 88% for the first question, 82% for the second, and 79% for the third. In-person surveys were filled out in both English and Spanish, with English being the majority at 490 (82%) and Spanish at 109 (18%).

Q1: Fast and Reliable Transit	Q2: Sidewalks and Roadway Crossings	Q3: Historically Underserved Areas
88%	82%	79%

Age and Gender Survey Results

GENDER	2015 CAP. METRO	2020 ACS	ATE SURVEY
FEMALE	39%	49%	44%
MALE	60%	51%	55%
OTHER	N/A	N/A	1%
AGE	**2015 CAP. METRO**	**2020 ACS**	**ATE SURVEY**
UNDER 18	6%	17%	2%
19-25	25%	7%	15%
26-39	31%	38%	38%
40-64	35%	22%	35%
65+	3%	9%	11%

The percentage of male and female respondents for the ATE survey was split in-between the two other surveys. There was a good representation of both males and females, at 55% and 44% respectively. 1% of respondents listed a gender as other, which was not captured in the other two surveys.

The age ranges were captured differently for each survey, so the ATE and ACS survey data were converted to the 2015 CapMetro measurements. Overall, the ATE data shows a middle-aged to older ridership, with the under 18 and 19-25 age ranges being lower at 2% and 15%, respectively, while the 65+ category was higher at 11%. The highest age range of respondents to the ATE survey was 26-39 at 38%, while 40-64 was the same as the CapMetro data at 35%.

LTURAL ENTITY	2015 CAPMETRO	2020 ACS	ATE SURVEY
AN	4%	7%	4%
ACK AND/OR RICAN ERICAN	23%	8%	18%
PANIC AND/OR TINO/LATINA/ TINX	34%	33%	39%
TIVE/ IGENOUS	1%	1%	1%
ITE	35%	69%	27%
HER	2%	1%	3%
O OR MORE	N/A	7%	8%

ATE survey reached a wide and diverse population. Hispanic and/or no/Latina/Latinx was the highest cultural identity at 39% of survey respondents, a 5%, 6% higher response rate than the CapMetro and 2020 ACS, respectively. White was the nd at 27%, lower than both the CapMetro and 2020 ACS surveys. Black and/or African erican, was third in response rate with 18% of respondents. This was lower than the Metro survey with 23% but much higher than the 2020 ACS with 8%. Asian esentation was the same compared to the CapMetro survey but was 3% lower than the 0 ACS. Other and Two or More were similar between surveys. Overall, the in-person lts resembled the established CapMetro ridership well.

sults

ey used much lower increments of measurement for income and the highest ed at $60,000+ instead of $150,000+. The CapMetro and 2020 ACS data were TE data format to allow for comparisons between surveys.

INCOME	2015 CAPMETRO	2020 ACS	ATE SURVEY
$0 - $24,999	43%	14%	55%
$25,000 - $49,999	15%	18%	19%
$50,000 - $74,999	8%	17%	11%
$75,000 - $99,999	N/A	13%	6%
$100,000 - $149,999	N/A	18%	4%
$150,000+	N/A	20%	4%

Although this question was the most frequently skipped in the survey, the results showed that the ATE survey reached many people from lower income brackets; the top income range was the $0-$24,999 category at 55%. The $25-49,000 range was also somewhat higher at 19% of respondents compared to 15% and 18% from the CapMetro and 2020 ACS surveys, respectively. The CapMetro survey listed its' final category as $60,000+ at 8%. Going by the same format, the ATE survey would show 25% had an income over $60,000 while the 2020 ACS would show 68%.

Disability Survey Results

The final demographic category was respondent's identified disabilities. The CapMetro survey did not gather data on disability, so only the 2020 ACS Five-Year estimates were used for comparison. Both surveys allowed respondents to select multiple disabilities.

DISABILITY	2020 ACS	ATE SURVEY
COGNITIVE OR INTELLECTUAL	4%	8%
HEARING	2%	5%
VISION	2%	7%
MOBILITY	4%	13%
NONE	91%	74%

Respondents to the ATE survey expressed higher rates of disability compared to the overall population of Austin. 8% of respondents reported a cognitive or intellectual disability, compared to 4% for the 2020 ACS survey. Five percent had a hearing disability, 7% had a vision disability, and 13% reported having a mobility related disability. Seventy-four percent of respondents did not have a disability, 17% lower than Austin in general.

ONLINE SURVEY RESULTS

The online surveys were advertised and distributed via Facebook ads and the City of Austin Transportation Department's social media. In total, 117 online surveys were filled out, with 109 (92%) completing the entire survey. A strong majority of respondents rated each of the three primary questions as "Very important" or above, with 92% for the first question, 76% for the second, and 87% for the third. A Spanish-language version of the survey was offered, but all online respondents used the English-language version.

Fast and Reliable Transit	Sidewalks and Roadway Crossings	Historically Underserved Areas
92%	76%	87%

Age and Gender Survey Results

GENDER	2015 CAPMETRO	2020 ACS	ATE SURVEY
FEMALE	39%	49%	39%
MALE	60%	51%	55%
OTHER	N/A	N/A	5%
AGE	**2015 CAPMETRO**	**2020 ACS**	**ATE SURVEY**
UNDER 18	6%	17%	3%
19-25	25%	7%	18%
26-39	31%	38%	52%
40-64	35%	22%	21%
65+	3%	9%	6%

The ATE online survey leaned more heavily towards males, at 55%, which was 16 percentage points greater than female representation at 39%. The proportion of male and female representation closely matched the 2015 CapMetro survey. Although data was not captured for this category in the other two surveys, 5% listed a gender as other, which was significantly higher than the in-person data. This higher percentage could be due to people feeling more comfortable stating their gender in a completely anonymous format rather than the personal experience offered by the in-person outreach events.

Overall, respondents to the ATE online survey skewed heavily towards the 26-39 category at 52%, which is 21% greater than the CapMetro survey and 14% higher than the 2020 ACS. The under 18 and 19-25 age representation was lower than both the CapMetro survey and the 2020 ACS. The 40-64 age range was lower than both surveys at 21%, and the proportion in the 65+ category was between the result of the CapMetro survey and the 2020 ACS.

Cultural Identity Survey Results

For the ATE survey, respondents were allowed to select multiple cultural identities; those that did were placed into the Two or More category. Additionally, the 2020 ACS data was captured differently than the ATE and CapMetro survey with those selecting Hispanic and/or Latino/Latina/Latinx also selecting another cultural identity without being in the Two or More category.

CULTURAL IDENTITY	2015 CAPMETRO	2020 ACS	ATE SURVEY
ASIAN	4%	7%	13%
BLACK AND/OR AFRICAN AMERICAN	23%	8%	4%
HISPANIC AND/OR LATINO/LATINA/ LATINX	34%	33%	14%
NATIVE/ INDIGENOUS	1%	1%	0%
WHITE	35%	69%	62%
OTHER	2%	1%	2%
TWO OR MORE	N/A	7%	6%

The ATE online survey reached a far less diverse group of people with a very heavy bias towards White, the highest category at 62%, though it was still lower than the 2020 ACS by 7%. Those reporting Asian were significantly higher in the online survey than the in-person, at 13%. Those identifying as Hispanic and/or Latino/Latina/Latinx was drastically lower at 14% of respondents. Those reporting Black and/or African American were also much lower than CapMetro and the 2020 ACS at 4% compared to 23% and 8%, respectively. Native/Indigenous was 0% while Other and Two or More was similar to the 2020 ACS.

Income Survey Results

The CapMetro survey used much lower increments of measurement for income and stopped at a lower overall income level: $60,000+ instead of $150,000+ when compared to the other two surveys. Both survey's data was converted to the ATE data format because the ATE survey only captured data in the below categories. The 2015 CapMetro study also did not have a full representation of the income data, with their results only reaching 66% in total.

INCOME	2015 CAPMETRO	2020 ACS	ATE SURVEY
$0 - $24,999	43%	14%	16%
$25,000 - $49,999	15%	18%	20%
$50,000 - $74,999	8%	17%	14%
$75,000 - $99,999	N/A	13%	20%
$100,000 - $149,999	N/A	18%	21%
$150,000+	N/A	20%	19%

Overall, the income ranges had a more even distribution that the in-person results. The $0-24,999 category was significantly lower than the in-person results at 16% but was similar to the 2020 ACS data. The $25,000-49,000 range was a little higher than both other surveys, at 20%. The CapMetro survey listed its' final category as $60,000+ at 8%. Going by the same listing, the ATE survey would show 64%, and the 2020 ACS at 68%, had an income over $60,000. This was the question most frequently skipped in the survey.

Disability Survey Results

The final demographic category was respondent's identified disabilities. The CapMetro survey did not gather data on disability, so only the 2020 ACS Five-Year estimates were used for comparison. Both surveys allowed respondents to select multiple disabilities.

DISABILITY	2020 ACS	ATE SURVEY
COGNITIVE OR INTELLECTUAL	4%	5%
HEARING	2%	3%
VISION	2%	5%
MOBILITY	4%	7%
NONE	91%	89%

Overall, ATE survey respondents expressed a similar level of disability to the general Austin population. 5% of respondents reported a cognitive or intellectual disability, compared to 4%. 3% had a hearing disability, 5% had a vision disability, and 7% reported having a mobility related disability. 89% of respondents did not have a disability, only 2% lower than Austin in general.

2) COMBINED SURVEY RESULTS

In total, 716 online and in-person surveys were filled out, with 185 (25%) not responding to at least one question. For the combined results, once again a strong majority of respondents rated each of the three primary questions as "Very important" or above, with 88% for the first question, 80% for the second, and 80% for the third. Surveys were filled out in both English and Spanish, with English being the majority at 607 (85%) and Spanish at 109 (15%).

Fast and Reliable Transit	Sidewalks and Roadway Crossings	Historically Underserved Areas
88%	80%	80%

Overall, the two methods of survey outreach delivered very different results. The in-person outreach events received feedback from demographics that more closely resembled the results found in the 2015 CapMetro Origin and Destination Study while the online advertisement brought commentary from a sampling that was similar to the 2020 American Community Survey Five-Year estimates. Though the in-person outreach events required a more logistically intensive process, the results gathered a more accurate representation of the Austin Transit ridership.

Below are the combined in-person and online survey results comparisons.

Age and Gender Survey Results

GENDER	2015 CAPMETRO	2020 ACS	ATE SURVEY
FEMALE	39%	49%	43%
MALE	60%	51%	55%
OTHER	N/A	N/A	2%
AGE	**2015 CAPMETRO**	**2020 ACS**	**ATE SURVEY**
UNDER 18	6%	17%	2%
19-25	25%	7%	16%
26-39	31%	38%	40%
40-64	35%	22%	32%
65+	3%	9%	10%

The percentage of male and female respondents for the ATE survey was split in-between the two other surveys. There was a good representation of both males and females, at 55% and 43% respectively. 2% of respondents listed a gender as other, which was not captured in the other two surveys.

Overall, the ATE data shows a more middle-aged ridership, with the under 18 and 19-25 age ranges being drastically lower at 2% and 16%, respectively, while the 65+ category was higher at 10%. The highest age range was 26-39 at 40%, higher than both other surveys. The 32% for the 40-64 age range was lower than the CapMetro data but higher than the 2020 ACS.

Cultural Identity Survey Results

For the ATE survey, respondents were allowed to select multiple cultural identities. Those that did, were placed into the Two or More category. Additionally, the 2020 ACS data was captured differently than the ATE and CapMetro survey with those selecting Hispanic and/or Latino/Latina/ Latinx also selecting another cultural identity without being in the Two or More category.

CULTURAL IDENTITY	2015 CAPMETRO	2020 ACS	ATE SURVEY
ASIAN	4%	7%	5%
BLACK AND/OR AFRICAN AMERICAN	23%	8%	16%
HISPANIC AND/OR LATINO/LATINA/ LATINX	34%	33%	34%
NATIVE/ INDIGENOUS	1%	1%	1%
WHITE	35%	69%	34%
OTHER	2%	1%	3%
TWO OR MORE	N/A	7%	7%

The ATE survey, once again, reached a wide and diverse population with Hispanic and/or Latino/Latina/Latinx tied for the top cultural identity at 34%, 5%, and 6% higher than the CapMetro and 2020 ACS, respectively. White was tied with Hispanic at 34%, similar to the CapMetro survey, but much lower the 2020 ACS. The higher percentage of those identifying as White was influenced by the online survey responses. Black and/or African American was lower than the CapMetro at 16% compared to 23%, but much higher than the 2020 ACS with 8%. Asian was a little higher compared to the CapMetro survey but a little lower than the 2020 ACS. Other and Two or More were similar to the 2020 ACS. Overall, the in-person results resembled the established CapMetro ridership well.

Income Survey Results

The CapMetro survey used much lower increments of measurement for income and stopped at a lower overall income level: $60,000+ instead of $150,000+. The CapMetro and 2020 ACS data was converted to the ATE data format because the ATE survey only captured data in the following categories, which would otherwise make the final comparisons less than satisfactory. The 2015 CapMetro study also did not have a full representation for the ridership's income data, with the highest income category set at $60,000+.

INCOME	2015 CAPMETRO	2020 ACS	ATE SURVEY
$0 - $24,999	43%	14%	47%
$25,000 - $49,999	15%	18%	20%
$50,000 - $74,999	8%	17%	12%
$75,000 - $99,999	N/A	13%	7%
$100,000 - $149,999	N/A	18%	8%
$150,000+	N/A	20%	7%

Overall, the ATE survey reached many people from lower income brackets; the top income range was the $0-$24,999 category at 47%, similar to that of the CapMetro survey. The $25,000-49,000 range was also higher at 20% compared to 15% in the CapMetro survey and 18% in the 2020 ACS. The CapMetro survey listed its' final category as $60,000+ at 8%. Going by the same format, the ATE survey would show 34% had an income over $60,000 while the 2020 ACS would show 68%. This was the question most frequently skipped in the survey.

Disability Survey Results

The final demographic category was respondent's identified disabilities. The CapMetro survey did not gather data on disability, so only the 2020 ACS Five-Year estimates were used for comparison. Both surveys allowed respondents to select multiple disabilities.

DISABILITY	2020 ACS	ATE SURVEY
COGNITIVE OR INTELLECTUAL	4%	7%
HEARING	2%	5%
VISION	2%	7%
MOBILITY	4%	12%
NONE	91%	77%

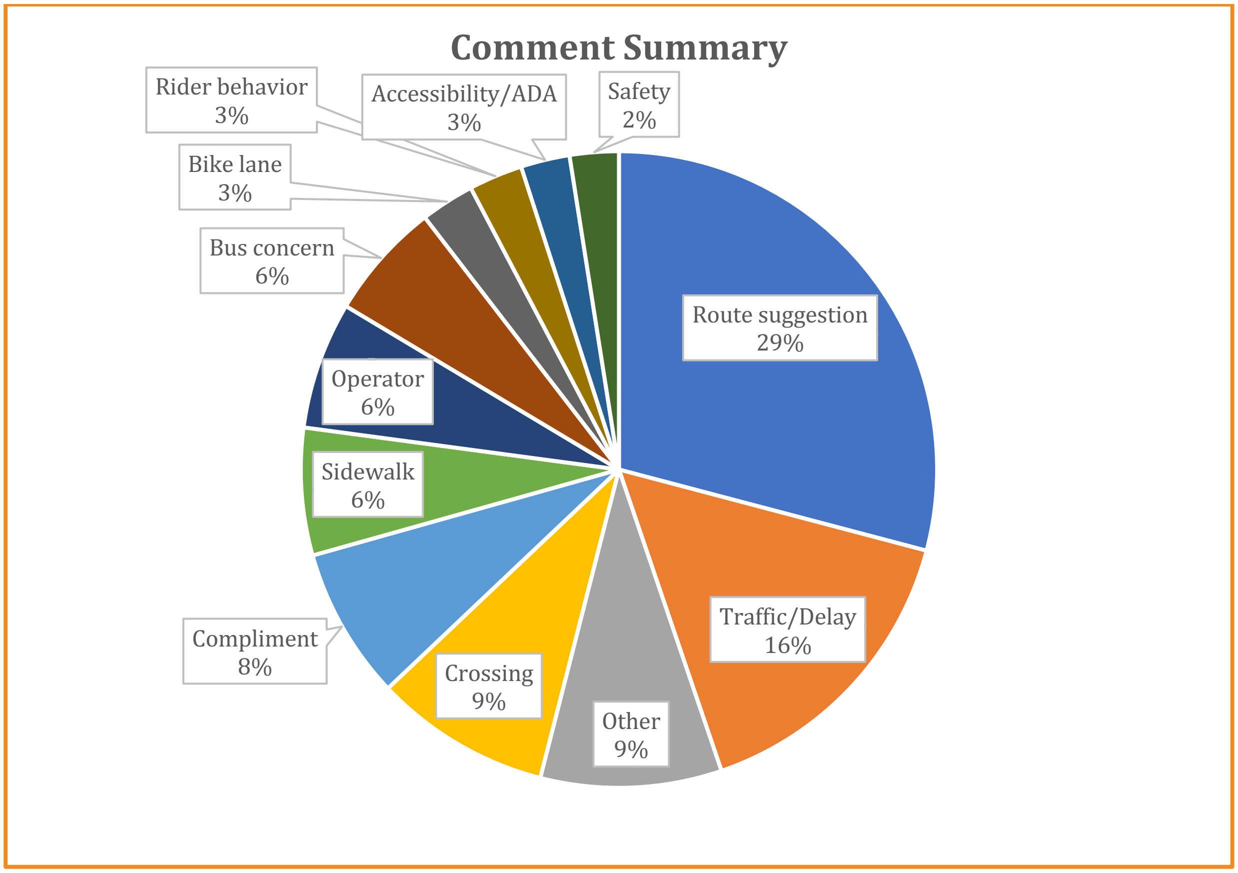
Overall, respondents to the ATE survey again expressed higher rates of disability compared to the overall population of Austin with 7% of respondents reporting a cognitive or intellectual disability, compared to 4% for the 2020 ACS survey. 5% had a hearing disability, 7% had a vision disability, and 12% reported having a mobility related disability. 77% of respondents did identify as having a disability, 14% lower than Austin in general.

3) COMMENT SUMMARY

424 total comments were received, covering a wide variety of topics ranging from route suggestions and traffic or delays to operator and rider behavior. As expected, not all comments were relevant to the project, including operator and rider behavior comments. 57% of comments received were not relevant to the scope of the Transit Enhancement project but were passed on to CapMetro.

Comments could discuss multiple topics and were marked as such, with the most popular topics being Route Suggestions, Traffic or Delay, and Crossings. Other was comprised of topics that individually made up only 1% or less of the total comment topics. These ranged from comments about pricing and pavement to coordination and the transit app.

Though a majority of comments came from the Austin transit riders, some bus operators also provided feedback about issues they noticed along the routes. These were generally included in the Route Suggestion category as most pertained to how the route itself is laid out, but a few operator comments discussed problems with Sidewalks and Crossings as well as Accessibility and Americans with Disabilities Act (ADA) compliance at some bus stops.

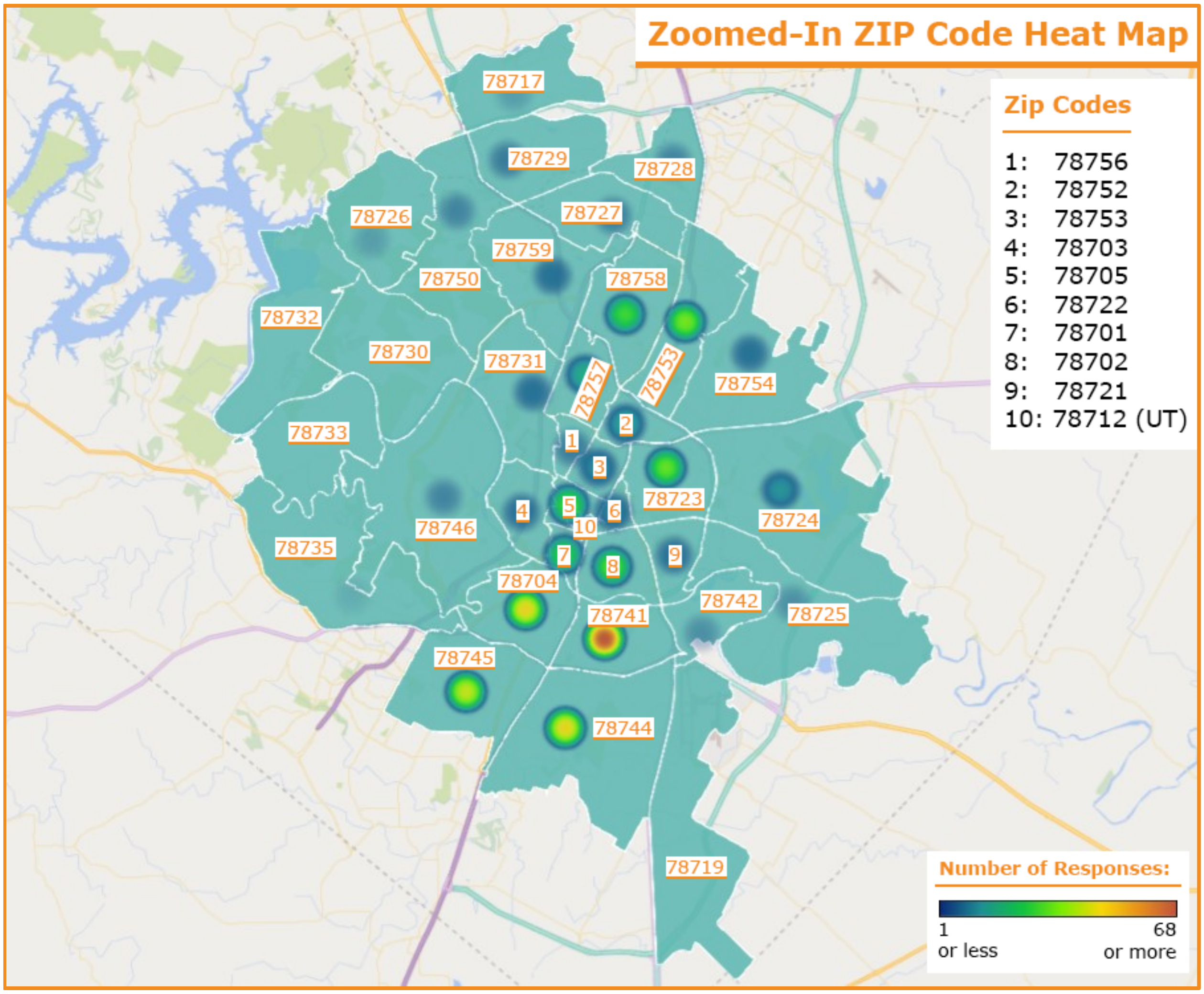

Comment Summary
Rider behavior 3%
Accessibility/ADA 3%
Safety 2%
Bike lane 3%
Bus concern 6%
Route suggestion 29%
Operator 6%
Sidewalk 6%
Traffic/Delay 16%
Compliment 8%
Crossing 9%
Other 9%

4) HEAT AND PIN MAPS

To determine whether a robust representation of CapMetro's ridership was achieved, a question was included asking for the respondent's ZIP code. From those ZIP codes, several maps were created to illustrate the survey's reach. For the purposes of these maps, outliers from other states and countries were excluded.

Zoomed-In ZIP Code Heat Map

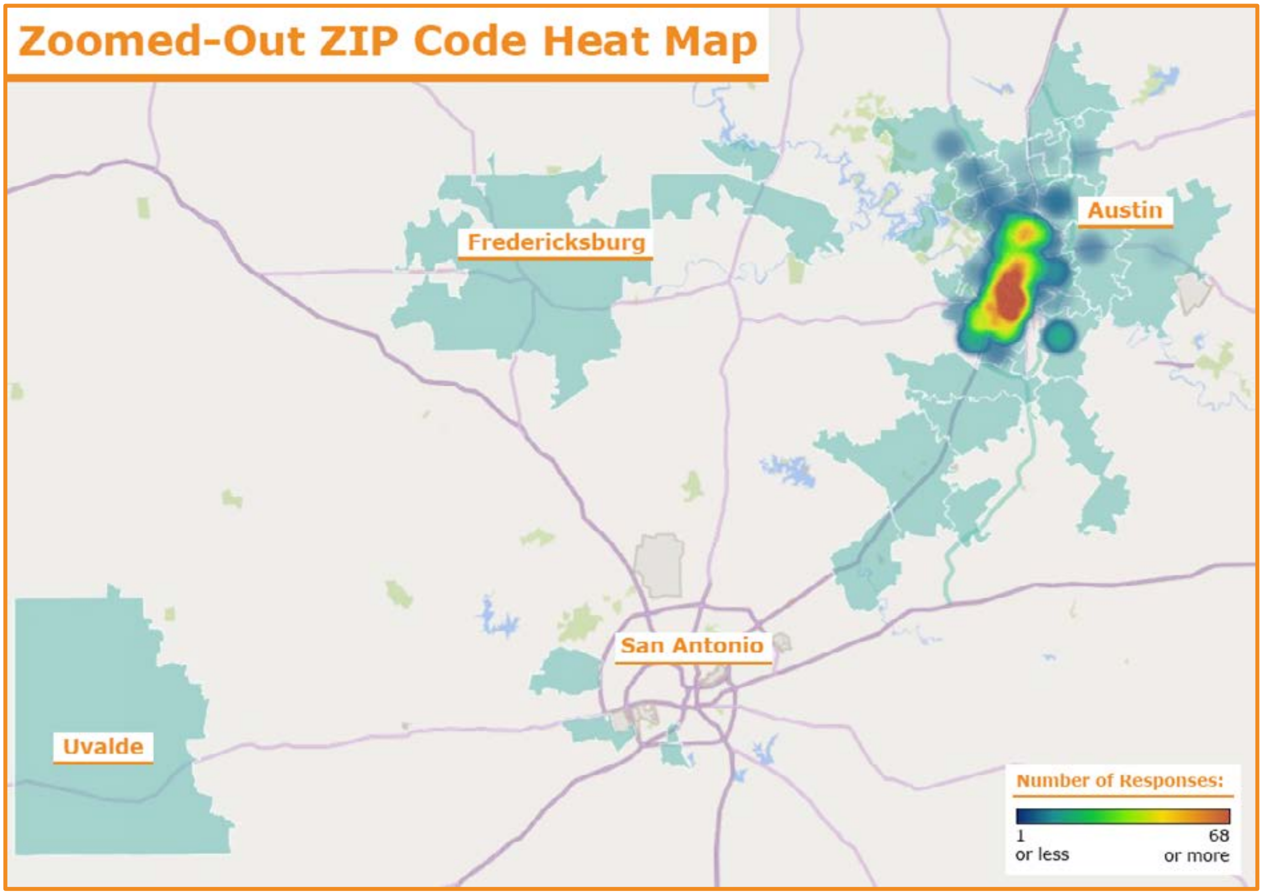
Two ZIP code heat maps were created to highlight the level of respondents inside and outside the city of Austin, respectively. This map is focuses on where the majority of respondents were living in the city. Most surveys were from people who lived south, central, and north of downtown Austin. Fewer surveys were submitted by respondents living on the west side of the city.



Zoomed-Out ZIP Code Heat Map

This-map shows most of the ZIP codes submitted by respondents. Again, outliers from different states and countries were excluded. Most comments were submitted from the Austin area and surrounding cities, but a few came from other locations, including Fredericksburg, San Antonio, and Uvalde.

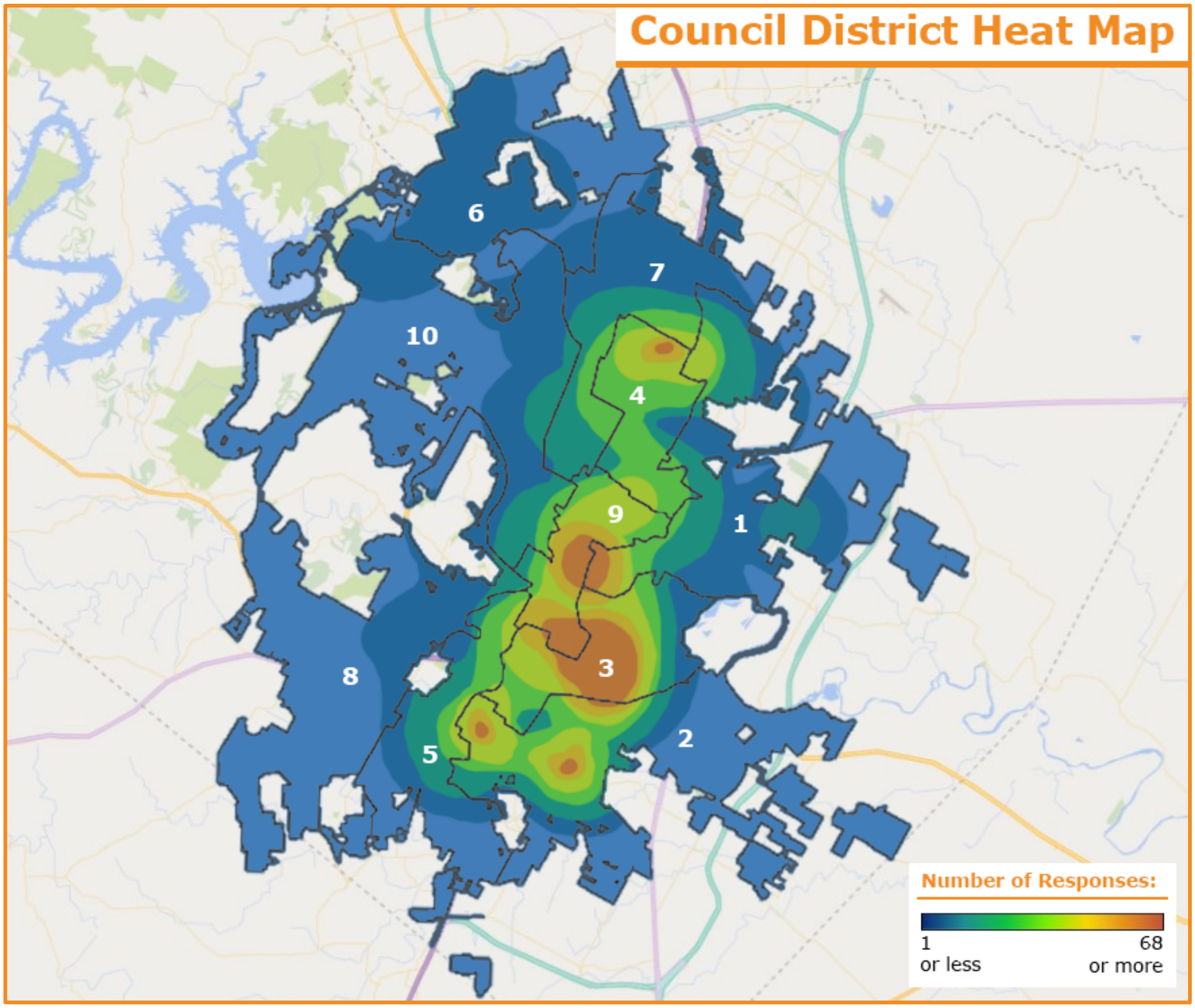
At least one respondent explained that they commuted by train from San Antonio to Austin, then used the CapMetro Transit system for transportation within Austin.



Council District Heat Map

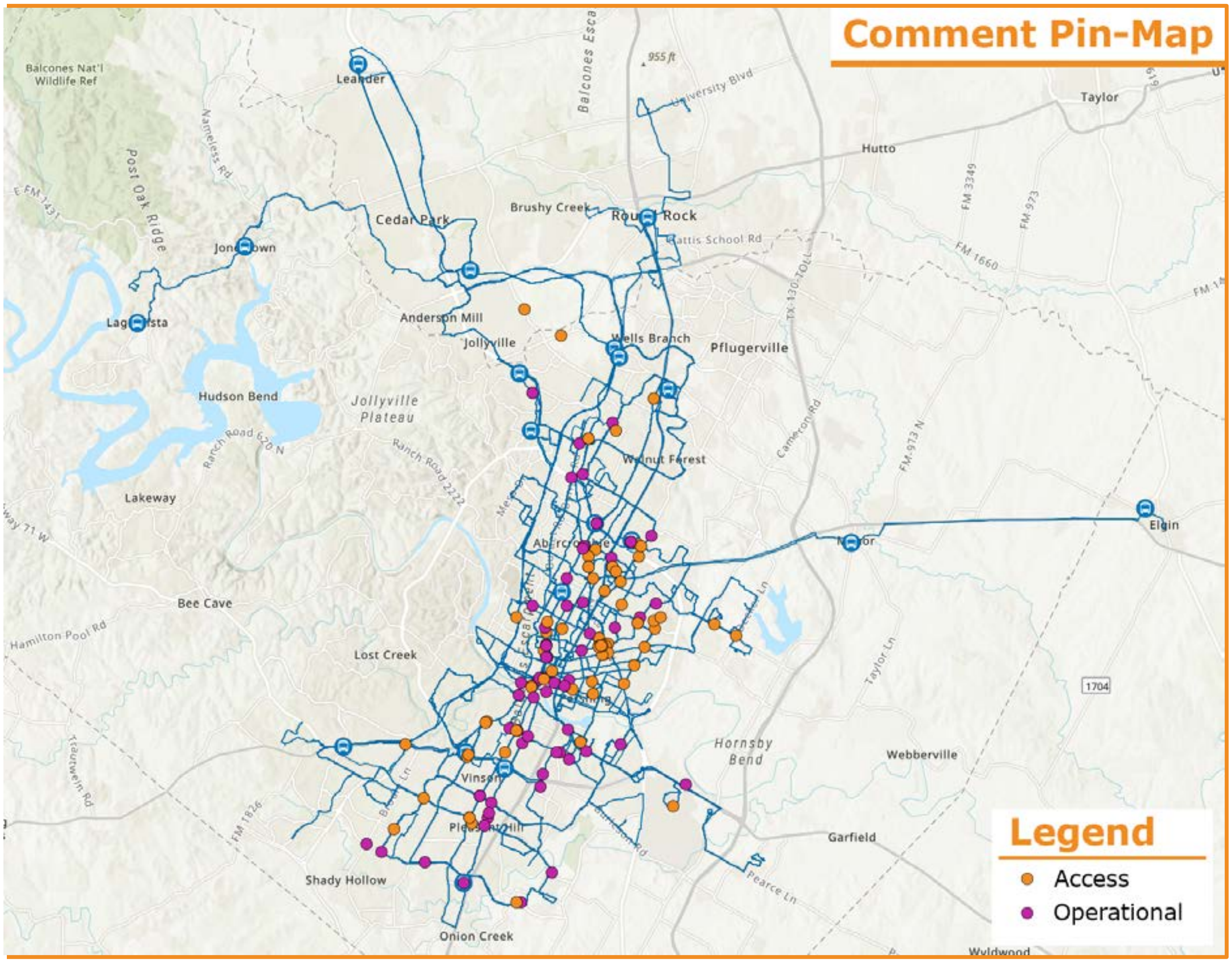
A third map was created to show how comments fit into the Austin City Council Districts. Since the districts do not line up exactly with ZIP codes, this map is an approximation of the submitted comments.

The districts with the most responses were 3 and 9. Once again, comments were generally within south, central, and north Austin, though there were some to the northwest and east.



Comment Pin-Map

A comment pin-map was also created to provide respondents the ability to point out specific issues or provide area-specific suggestions along the current transit lines. The pin-map tool received 79 comments mapped at specific points around the transit system. Fifty-two of the survey comments that were considered relevant to transit operations, infrastructure, and access were added to the pin-map, for a total of 131 mapped comments.



6) CONCLUSION

Overall, demographics of those surveyed were similar to the 2015 CapMetro Origin and Destination Study and 2020 American Community Survey, with a few key differences:

- Black and/or African American cultural identity was lower than the CapMetro 2015 survey data.
- Respondents' reported zip codes tended to be grouped in south, central, and north Austin, while outer Austin had significantly less.
- The younger age groups, those under 18 and 19-25, were significantly less represented.
- The level of reported disability was higher than the 2020 ACS Five-Year Estimates.

The in-person outreach events received feedback from demographics that more closely resembled the results found in the 2015 CapMetro Origin and Destination Study while the online advertisement brought commentary from a sampling that was similar to the 2020 American Community Survey Five-Year estimates. Though the in-person outreach events required a more logistically intensive process, the results gathered a more accurate representation of the Austin Transit ridership.

Most respondents supported all three of the primary questions, with improving the speed and reliability of the transit services being the most popular option.

Round 1 of public outreach elicited feedback from a wide and diverse sample of the Austin transit ridership. The above noted differences between the in-person outreach and online outreach may be explained by each survey's methodology. These differences will be taken into consideration when planning the next round of public outreach for the Austin Transit Enhancement program. The results of the outreach will inform the weighting of potential transit enhancement project locations in order to determine a list of top locations for investment.

AUSTIN TRANSIT ENHANCEMENT INFRASTRUCTURE REPORT

Public Outreach Summary – Round 2

INTRODUCTION

In November 2020, City of Austin voters approved $460 million for transportation infrastructure improvements, including $19 million for transit projects that improve the speed and reliability of local bus service while making that service safer and easier to access. Transportation and Public Works (TPW), together with CapMetro staff, is currently developing the Transit Enhancement Infrastructure Report. This report will identify roadways within the city that have high needs for transit infrastructure investment and develop planning-level project recommendations for identified locations.

Public outreach is a critical component of any transit enhancement project. The community members who rely on and interact with public transit and its infrastructure can provide meaningful insight on the types of improvements, both operational and access related, and their prioritization. The second round of public outreach was conducted from March 20, 2023 to April 7, 2023. It included in-person outreach events at 10 high-ridership transit hubs across the city as well as online outreach. Surveys were deployed in both English and Spanish and comments were geolocated on interactive maps.

The second round of public outreach focused on the trade-offs inherent to improving transit operations and access. The first trade-off question related to willingness to walk further to a bus stop to allow for faster bus service and the second trade-off question related to prioritizing transit improvements when working with a limited budget. Additionally, demographic data was collected to ensure that that the public that was engaged reflected the demographics of Austin and CapMetro riders. Results are described in detail on the following pages.

IN-PERSON OUTREACH

Round 2 of public outreach, which occurred from March 30, 2023 to April 7, 2023, was conducted through a series of in-person outreach events designed to gather feedback from CapMetro's ridership. In-person outreach included a set of map exhibits and a brief community survey. These events were held at ten high-ridership transit hubs across the city of Austin:

1. Tech Ridge Park & Ride
2. North Lamar Transit Center
3. Eastside Bus Plaza
4. Norwood Transit Center
5. Westgate Transit Center
6. The Drag (UT West Mall)
7. Southpark Meadows
8. William Cannon at Bluff Springs
9. Riverside at Pleasant Valley
10. Republic Square

Survey Questions

The Austin Transit Enhancement (ATE) survey had two primary questions and five demographic data questions. The primary questions asked respondents to choose between two options as shown below:

1. Closing bus stops with low ridership can make the walk longer for some riders but can make everyone's travel time faster. Would you rather:
   (a) Have a faster bus rider but a longer walk to the bus stop, or
   (b) Have a slower bus ride but a shorter walk to the bus stop.

2. When working with limited funding, the City has to prioritize projects. Assuming the overall budget is the same, would you rather see us make:
   (a) Bigger improvements in fewer locations, or
   (b) Smaller improvements in more locations.

The demographic questions gathered information on the following topics: zip code, age, gender identity, cultural identity, disability identification and income level. All questions were optional and not all respondents answered every question.

Comparisons were drawn to the 2015 CapMetro Origin and Destination Study and the 2020 American Community Survey Five-Year Estimates for the City of Austin. The comparisons examined the demographics of survey respondents as compared to previous transit survey data and the general Austin population. The 2015 CapMetro Study gathered data for different segments of the ridership based on their transit option of choice. For the purposes of this survey comparison, the Fixed/Express category, which represents the majority of CapMetro's bus ridership, was used. The ranges for each of the three data sets were different, so the ranges were altered to fit the other data sets where necessary.

IN-PERSON SURVEY RESULTS

In total, 402 in-person surveys were initiated, and 298 (74%) were completed. A majority of respondents indicated they would rather have a slower bus ride but a shorter walk to the bus stop, and a majority of respondents indicated they would also like to see smaller improvements in more locations. In-person surveys were filled out in both English and Spanish, with English being the majority at 326 (81%) and Spanish at 76 (19%).

Q1: Walk time / Ride time	Q2: Funding allocation
40% prefer longer walk / faster ride 60% prefer shorter walk / slower ride	37% prefer bigger improvements / fewer locations 63% prefer smaller improvements / more locations

Age and Gender Survey Results

GENDER	2015 CAPMETRO	2020 ACS	ATE SURVEY
FEMALE	39%	49%	32%
MALE	60%	51%	67%
OTHER	N/A	N/A	1%
AGE	**2015 CAPMETRO**	**2020 ACS**	**ATE SURVEY**
UNDER 18	6%	17%	1%
19-25	25%	7%	12%
26-39	31%	38%	38%
40-64	35%	22%	42%
65+	3%	9%	7%

Representation of females was lower, and males higher, than CapMetro's ridership and the city overall. 1% of respondents listed a gender as other, which was not captured in the other two surveys.

The age ranges were captured differently for each survey, so we converted the ATE and ACS survey data to the 2015 CapMetro measurements. Overall, the ATE data shows a middle-aged to older ridership, with the under 18 and 19-25 age ranges being quite a bit lower at 1% and 12%, respectively. The highest age range was 40-64 at 42%, while 26-39 was the same as the City data at 38%.

Cultural Identity Survey Results

For the ATE survey, respondents were allowed to select multiple cultural identities. Those that did were placed into the "Two or More" category. Additionally, the 2020 ACS data was captured differently than the ATE and CapMetro survey with those selecting Hispanic and/or Latino/Latina/Latinx also selecting another cultural identity without being in the Two or More category.

CULTURAL IDENTITY	2015 CAPMETRO	2020 ACS	ATE SURVEY
ASIAN	4%	7%	3%
BLACK AND/OR AFRICAN AMERICAN	23%	8%	30%
HISPANIC AND/OR LATINO/LATINA/ LATINX	34%	33%	34%
NATIVE/ INDIGENOUS	1%	1%	1%
WHITE	35%	69%	25%
OTHER	2%	1%	1%
TWO OR MORE	N/A	7%	6%

The ATE survey reached a wide and diverse population. Hispanic and/or Latino/Latina/Latinx was the highest cultural identity at 34% of survey respondents, matching CapMetro data and nearly matching 2020 ACS data. Black or African American was the second highest at 30%, higher than CapMetro and much higher than the 2020 ACS. White, in third at 25%, was lower than CapMetro and much lower than the 2020 ACS at 69%. Asian (3%) was slightly lower when compared to the CapMetro survey and more significantly lower when compared to 2020 ACS data. The choices "Other" and "Two or More" were similar to the other data points. Overall, the in-person results resembled the established CapMetro ridership well.

Income Survey Results

The CapMetro survey used much lower increments of measurement for income and the highest income level stopped at $60,000+ instead of $150,000+. The CapMetro and 2020 ACS data were converted to the ATE data to allow for comparisons between surveys.

INCOME	2015 CAPMETRO	2020 ACS	ATE SURVEY
$0 - $24,999	43%	14%	61%
$25,000 - $49,999	15%	18%	22%
$50,000 - $74,999	8%	17%	9%
$75,000 - $99,999	N/A	13%	5%
$100,000 - $149,999	N/A	18%	2%
$150,000+	N/A	20%	1%

The ATE survey reached many people from lower income brackets; the top income range was the $0-$24,999 category at 61%. The $25,000-49,000 range was also somewhat higher at 22% when compared to the other data sets. This was the question most frequently skipped in the survey.

Disability Survey Results

The final demographic category was respondent's identified disabilities. The CapMetro survey did not gather data on disability, so only the 2020 ACS Five-Year estimates were used for comparison. Both surveys allowed respondents to select multiple disabilities.

DISABILITY	2020 ACS	ATE SURVEY
COGNITIVE OR INTELLECTUAL	4%	9%
HEARING	2%	6%
VISION	2%	7%
MOBILITY	4%	16%
NONE	91%	62%

Respondents to the ATE survey expressed significantly higher rates of disability compared to the overall population of Austin. Sixty-two percent of respondents reported that they did not have a disability. Ninety-one percent of City residents reported that they did not have a disability according to the 2020 ACS survey.

ONLINE SURVEY RESULTS

The online surveys were advertised and distributed via Facebook ads and the City of Austin Transportation Department's social media. In total, 370 online surveys were filled out. A slight majority of respondents indicated they would rather have a slower bus ride but a shorter walk to the bus stop, and a larger majority of respondents indicated they would like to see smaller transit infrastructure improvements in more locations. A Spanish-language version of the survey was offered, but all online respondents used the English-language version.

Q1: Walk time / Ride time	Q2: Funding allocation
47% prefer longer walk / faster ride	40% prefer bigger improvements / fewer locations
53% prefer shorter walk / slower ride	60% prefer smaller improvements / more locations

Age and Gender Survey Results

GENDER	2015 CAPMETRO	2020 ACS	ATE SURVEY
FEMALE	39%	49%	49%
MALE	60%	51%	48%
OTHER	N/A	N/A	3%
AGE	**2015 CAPMETRO**	**2020 ACS**	**ATE SURVEY**
UNDER 18	6%	17%	0%
19-25	25%	7%	6%
26-39	31%	38%	60%
40-64	35%	22%	28%
65+	3%	9%	5%

The ATE online survey received a balanced response between males and females. Female response exceeded the CapMetro study while the male response rate came in significantly lower. Though data was not captured for this category in the other two surveys, 3% listed a gender as other, which was higher than the in-person data.

Overall, the ATE online survey skewed heavily towards the 26-39 category, at 60%, significantly higher than CapMetro and 2020 ACS data. The under 18 category had no responses and the 19-25 age category was underrepresented when compared to CapMetro ridership. The 40-64 age range and the 65+ category fell between the other two surveys.

Cultural Identity Survey Results

For the ATE survey, respondents were allowed to select multiple cultural identities; those that did were placed into the 'Two or More' category. Additionally, the 2020 ACS data was captured differently than the ATE and CapMetro survey with those selecting Hispanic and/or Latino/Latina/Latinx also selecting another cultural identity without being in the Two or More category.

CULTURAL IDENTITY	2015 CAPMETRO	2020 ACS	ATE SURVEY
ASIAN	4%	7%	11%
BLACK AND/OR AFRICAN AMERICAN	23%	8%	13%
HISPANIC AND/OR LATINO/LATINA/ LATINX	34%	33%	20%
NATIVE/ INDIGENOUS	1%	1%	3%
WHITE	35%	69%	60%
OTHER	2%	1%	2%
TWO OR MORE	N/A	7%	N/A

The ATE online survey generally reached a less diverse group of people in comparison with in-person engagement. The largest group represented was White at 60%, though representation was still lower than the 2020 ACS by 9%. Those reporting an Asian cultural identity were significantly more represented in the online survey than the in-person, at 11%. Those identifying as Hispanic and/or Latino/Latina/Latinx were underrepresented when compared to the other surveys as well as in-person participation. Black and/or African American participation fell between the two other surveys. Native/Indigenous participation online was higher than CapMetro ridership and the City overall, as well as in-person participation.

Income Survey Results

The CapMetro survey used much lower increments of measurement for income and stopped at a lower overall income level: $60,000+ instead of $150,000+ when compared to the other two surveys. Both survey's data was converted to the ATE data format because the ATE survey only captured data in the below categories.

INCOME	2015 CAPMETRO	2020 ACS	ATE SURVEY
$0 - $24,999	43%	14%	12%
$25,000 - $49,999	15%	18%	15%
$50,000 - $74,999	8%	17%	21%
$75,000 - $99,999	N/A	13%	13%
$100,000 - $149,999	N/A	18%	17%
$150,000+	N/A	20%	21%

Overall, the income ranges had a more even distribution that the in-person results. The $0-24,999 category was significantly lower than the in-person results at 12%, but was similar to the 2020 ACS data. The $25-49,000 range matched CapMetro's data. This was the question most skipped in the survey.

Disability Survey Results

The final demographic category was respondent's identified disabilities. The CapMetro survey did not gather data on disability, so only the 2020 ACS Five-Year estimates were used for comparison. Both surveys allowed respondents to select multiple disabilities.

DISABILITY	2020 ACS	ATE SURVEY
COGNITIVE OR INTELLECTUAL	4%	6%
HEARING	2%	6%
VISION	2%	9%
MOBILITY	4%	9%
NONE	91%	75%

Overall, ATE online survey respondents expressed a higher level of disability to the general Austin population. Seventy-five percent of respondents reported that they did not have a disability. Ninety-one percent of City residents reported that they did not have a disability according to the 2020 ACS survey.

COMBINED SURVEY RESULTS

In total, 772 online and in-person surveys were initiated. A small majority of respondents would rather have a slower bus ride but a shorter walk to the bus stop. A larger majority of respondents would like to see smaller improvements in more locations.

Q1: Walk time / Ride time	Q2: Funding allocation
43% prefer longer walk / faster ride 57% prefer shorter walk / slower ride	38% prefer bigger improvements / fewer locations 62% prefer smaller improvements / more locations

Overall, the two methods of survey outreach delivered very different results in terms of demographic participation. The in-person in-person outreach events received feedback from community members that more closely resemble ridership identified in the 2015 CapMetro Origin and Destination Study while the online option brought commentary from a sampling that was similar to the 2020 ACS Five-Year estimates. Though the in-person outreach events required a more logistically intensive process, the results gathered a more accurate representation of transit ridership in Austin.

Below are the combined in-person and online survey results comparisons.

Age and Gender Survey Results

GENDER	2015 CAPMETRO	2020 ACS	ATE SURVEY
FEMALE	39%	49%	40%
MALE	60%	51%	58%
OTHER	N/A	N/A	2%
AGE	**2015 CAPMETRO**	**2020 ACS**	**ATE SURVEY**
UNDER 18	6%	17%	1%
19-25	25%	7%	9%
26-39	31%	38%	49%
40-64	35%	22%	35%
65+	3%	9%	6%

When combined, females were represented generally evenly when compared with CapMetro ridership data, and males were slightly underrepresented.

Overall, the ATE data shows a more middle-aged ridership, with the 26-39 group being overrepresented when compared to CapMetro and the under 18 and 19-25 age ranges being significantly lower than CapMetro's ridership.

Cultural Identity Survey Results

For the ATE survey, respondents were allowed to select multiple cultural identities. Those that did, were placed into the Two or More category. Additionally, the 2020 ACS data was captured differently than the ATE and CapMetro survey with those selecting Hispanic and/or Latino/Latina/ Latinx also selecting another cultural identity without being in the Two or More category.

CULTURAL IDENTITY	2015 CAPMETRO	2020 ACS	ATE SURVEY
ASIAN	4%	7%	7%
BLACK AND/OR AFRICAN AMERICAN	23%	8%	22%
HISPANIC AND/OR LATINO/LATINA/ LATINX	34%	33%	27%
NATIVE/ INDIGENOUS	1%	1%	2%
WHITE	35%	69%	43%
OTHER	2%	1%	1%
TWO OR MORE	N/A	7%	3%

When examining the combined in-person and online data, it is clear that the ATE survey reached a diverse population that generally reflects CapMetro's ridership data.

Income Survey Results

The CapMetro survey used much lower increments of measurement for income and stopped at a lower overall income level: $60,000+ instead of $150,000+. The CapMetro and 2020 ACS data was converted to the ATE data format because the ATE survey only captured data in the following categories, which would otherwise make the final comparisons less than satisfactory.

INCOME	2015 CAPMETRO	2020 ACS	ATE SURVEY
$0 - $24,999	43%	14%	35%
$25,000 - $49,999	15%	18%	18%
$50,000 - $74,999	8%	17%	15%
$75,000 - $99,999	N/A	13%	9%
$100,000 - $149,999	N/A	18%	10%
$150,000+	N/A	20%	12%

The ATE survey's combined results show a desirable income distribution, favoring lower income brackets when compared to ACS data.

Disability Survey Results

The final demographic category was respondent's identified disabilities. The CapMetro survey did not gather data on disability, so only the 2020 ACS Five-Year estimates were used for comparison. Both surveys allowed respondents to select multiple disabilities.

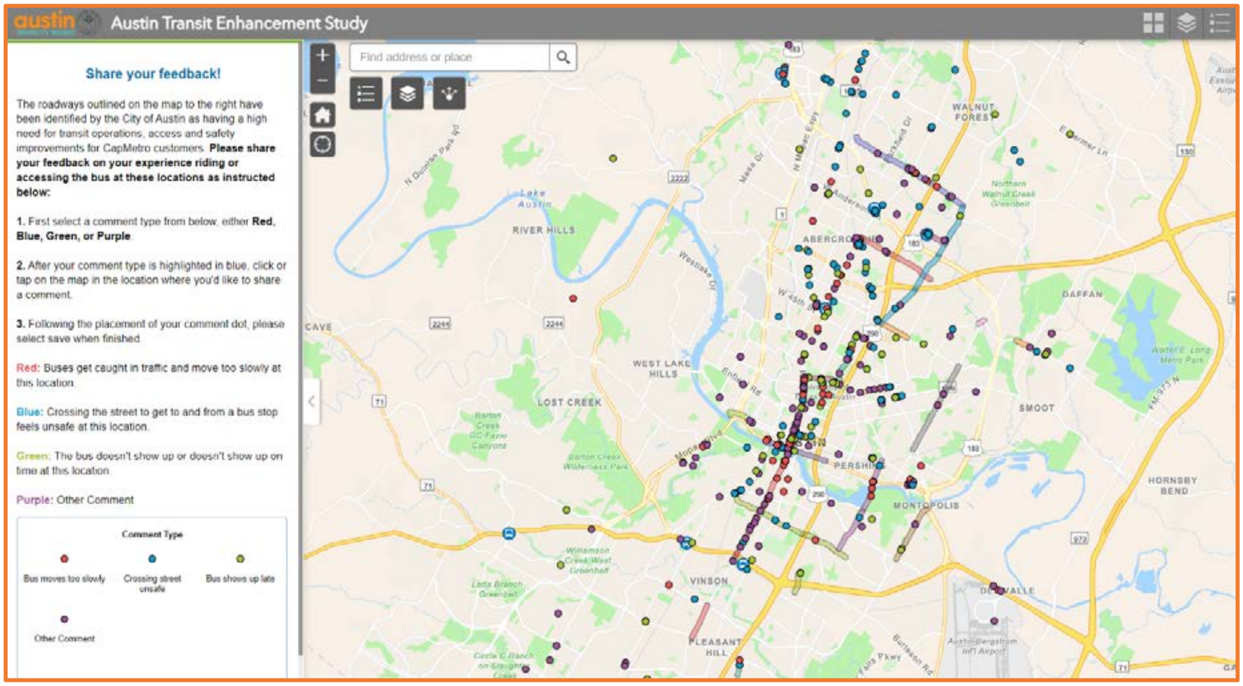
DISABILITY	2020 ACS	ATE SURVEY
COGNITIVE OR INTELLECTUAL	4%	8%
HEARING	2%	6%
VISION	2%	8%
MOBILITY	4%	13%
NONE	91%	71%

Overall, respondents to the ATE survey expressed higher rates of disability compared to the overall population of Austin.

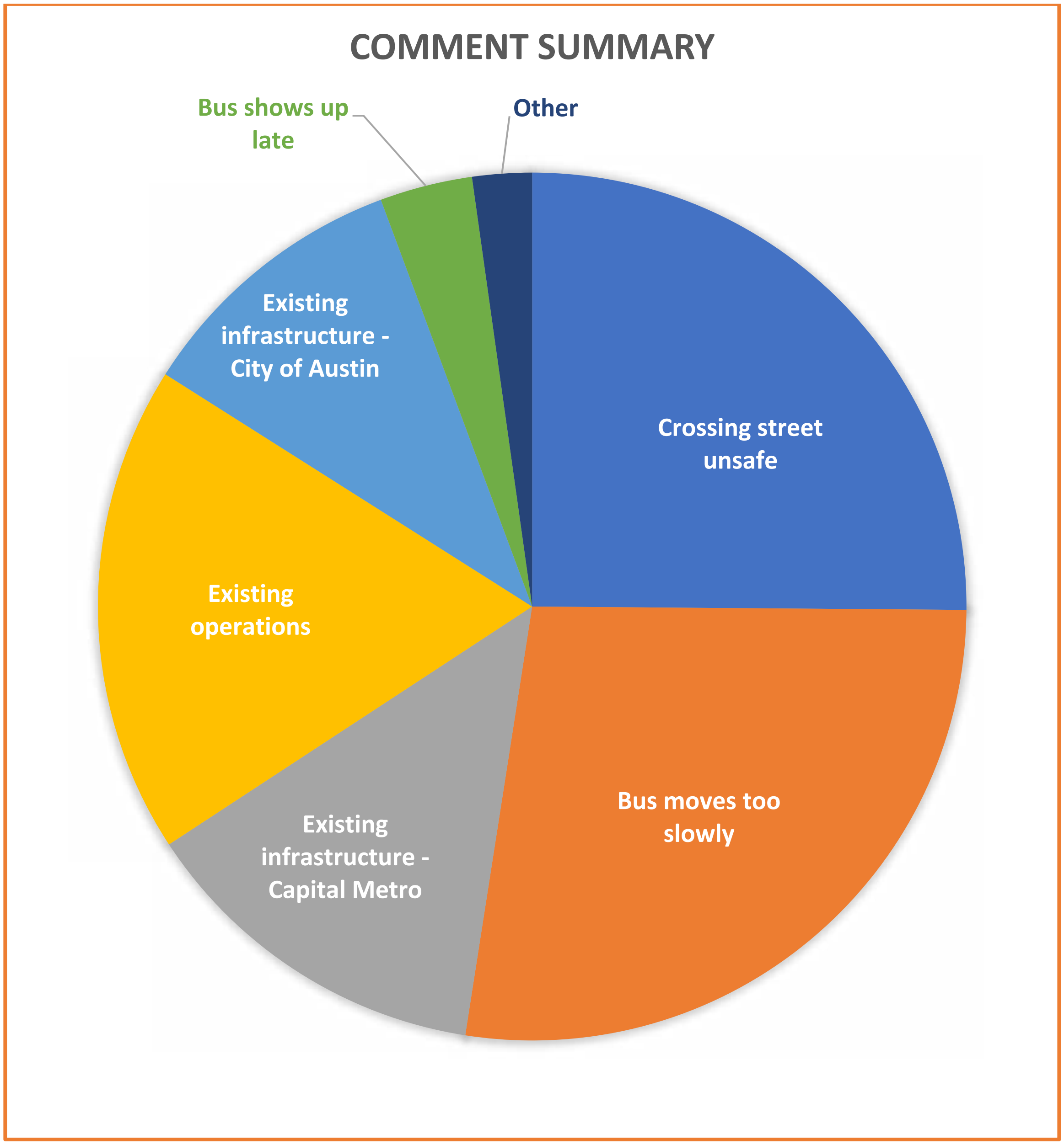
COMMENT SUMMARY

406 comments were submitted via the ArcGIS pin-drop map available on the online engagement page for this outreach. Nearly all comments fit into one of the pin categories provided, including:

- **Red:** Buses get caught in traffic and move too slowly at this location.
- **Blue:** Crossing the street to get to and from a bus stop feels unsafe at this location.
- **Green:** The bus doesn't show up or doesn't show up on time at this location.
- **Purple:** Other Comment



Additional comments were received that did not fit into one of the categories provided and may not necessarily be in the scope of the Austin Transit Enhancements Project. These comments have been routed to CapMetro for further review.

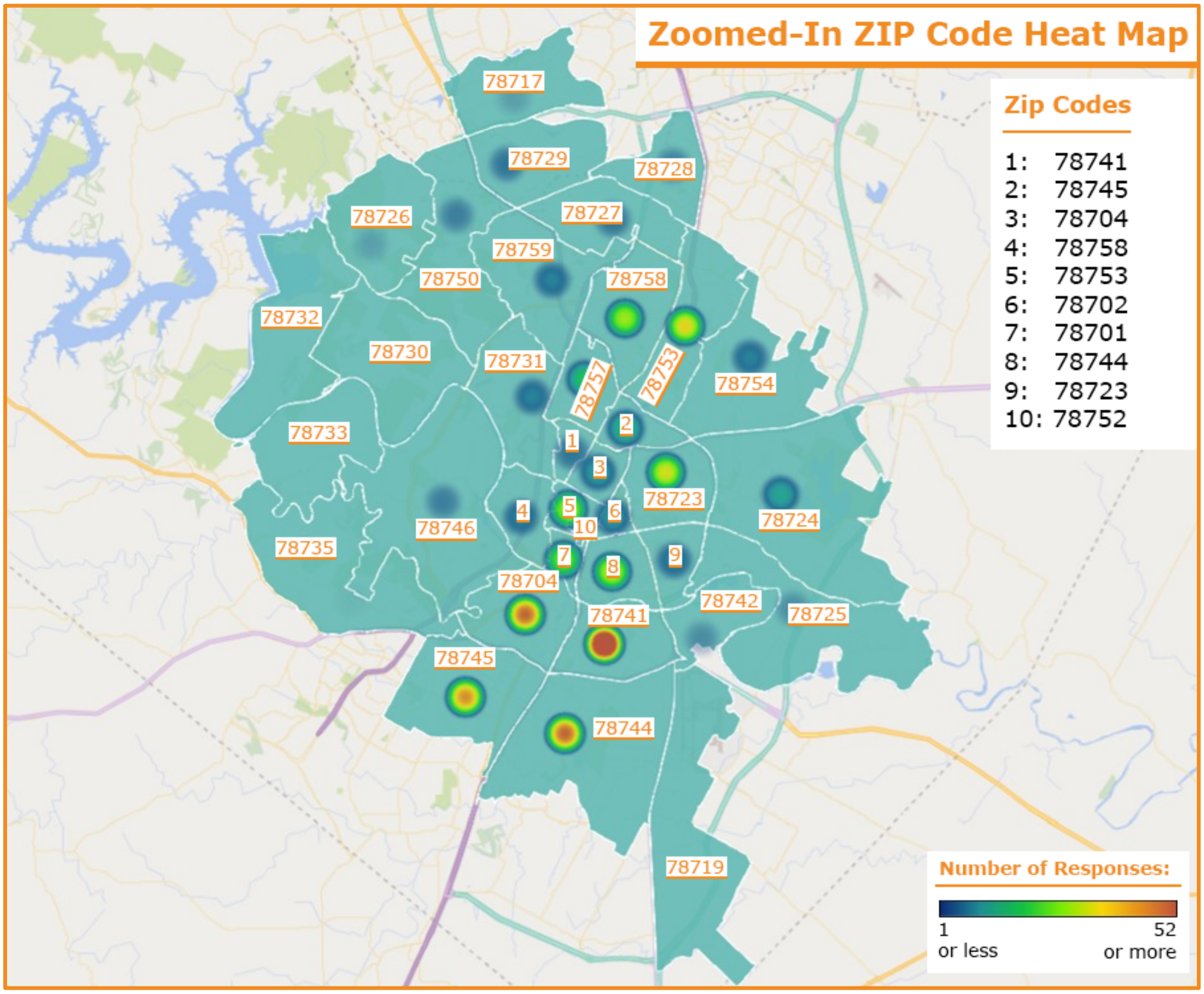


Comment Category	Comment Details	Number of Comments
Bus moves to slowly	Comments regarding long waits at intersections; need for signal priority; idle time due to congestion; need for dedicated lanes.	111
Crossing street unsafe	Comments regarding the need for increased safety at intersections; comments indicating areas where ability to cross safely is needed; suggestions for pedestrian signal improvements; locations where wide crossing or speed of traffic impacts crossing safety; suggestions to eliminate of slip lanes at	102

	specific locations; locations where unpredictable vehicle movements make crossing feel unsafe.	
Existing operations	Comments regarding recommended changes to routing, frequency, or dwell times; need for additional vehicles due to crowds; general inconsistency in operation of route.	74
Existing infrastructure - CapMetro	Comments regarding missing or broken equipment; suggested changes to stop layout or location; suggested signage improvements; need for station amenities or parking.	54
Existing infrastructure - City of Austin	Comments regarding missing or broken equipment (lighting, signage, signals, etc.); concerns with traffic speeds; suggested improvements to sidewalks or bike lanes; comments regarding roadway geometry, potholes, or dips that cause operational challenges for buses; comments related to construction that causes long-term impacts to bus lanes; suggested changes to signal timing.	42
Bus shows up late	Comments regarding construction detour signing; comments related to specific buses arriving late; comments that multiple vehicles arrive at the same time; comments related to a generally unreliable route due to delays.	14
Other	Comments related to community safety; comments related to the survey.	9

PARTICIPATION HEAT MAP

To determine whether a robust representation of the ridership was achieved, a question asking for the respondent's ZIP code was included. From those ZIP codes, several maps were created to illustrate the survey's reach. For the purposes of these maps, outliers from other states and countries were excluded.



CONCLUSION

Key takeaways from the survey include:

- A slight majority of survey respondents favor a longer bus ride / shorter walk combination, regardless of participation type.
- A larger majority of survey respondents favor smaller improvements in more locations.
- Overall, demographics of participants make sense in the context of the 2015 CapMetro Origin and Destination Study and 2020 American Community Survey.
- We heard from fewer women in-person but more women online.
- There was a low share of feedback from community members 25 and under.
- When in-person, a large majority of respondents were non-white and low income while online survey respondents skewed whiter and wealthier.
- Across participation types, people with disabilities were sample at similar proportions compared to Austin as a whole.

The in-person outreach events received feedback from community members that more closely resemble ridership identified in the 2015 CapMetro Origin and Destination Study while the online option brought commentary from a sampling that was similar to the 2020 American Community Survey Five-Year estimates. Though the in-person outreach events required a more logistically intensive process, the results gathered a more accurate representation of transit ridership in Austin.

Round 2 of public outreach elicited feedback from a wide and diverse sample of the transit community in Austin. The results of the outreach will inform the development of proposed transit enhancement projects recommended in TPW's Transit Enhancement Infrastructure Report.