POP-UP PROTECTED BIKE LANES

SANTA FE, NM, FALL 2021

Santa Fe MPO

AARP®

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INTRODUCTION

During the COVID-19 pandemic, multi-use trails in Santa Fe exploded in popularity. At the same time, local bike shops followed national trends with record sales and high demand for bicycles. However, where many cities found an opportunity in COVID to expand and improve bicycle networks, the Santa Fe bicycle network remained largely unchanged. Additionally, between 2010 and 2019 in Santa Fe, people walking or biking were only involved in 2% of all crashes, however 27% of fatal crashes involved a person walking or biking. Introducing protected bicycle infrastructure, a proven bicycle safety countermeasure, has been shown to improve safety for vulnerable road users, such as people walking and biking in Santa Fe.

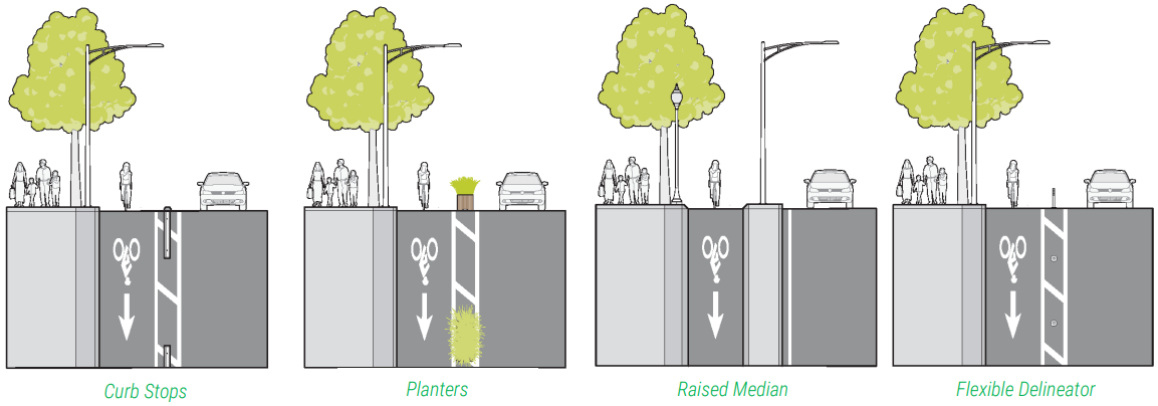
With this in mind, and research supporting the perceived and real safety benefits of protected bicycle infrastructure, the Santa Fe Metropolitan Planning Organization applied to and was awarded the AARP Community Challenge Grant to fund a pop-up protected bike lane toolkit.

Goals:

- Demonstrate protected bike lanes in Santa Fe with low cost and low commitment
- Start the conversation: what is the demand for or interest in protected bike lanes in Santa Fe?
- Work towards the Santa Fe Bicycle Master Plan goal of 1 mile of protected bike lanes by 2024

What are protected bike lanes?

Protected bicycle lanes come in different forms, however, all entail a physical barrier or separation between vehicle traffic and bicycle traffic. The barrier could be a bollard, curb, planter, parked cars, or specialized protected bike lane barriers such as the decorative DezignLine steel curb with plastic ribbons. Many protected bike lanes are installed at the same grade as the vehicle lane, though some are raised. They can also employ different colored paint, typically green, or colored asphalt.



Protected Bike Lane Types from the Santa Fe Metropolitan Bicycle Design Toolkit


Parking and Buffer Protected Bike Lane


Green Protected Bike Lane


DezignLine[1] Protected Bike Lane


Grade-separated and Landscaped Protected Bike Lane

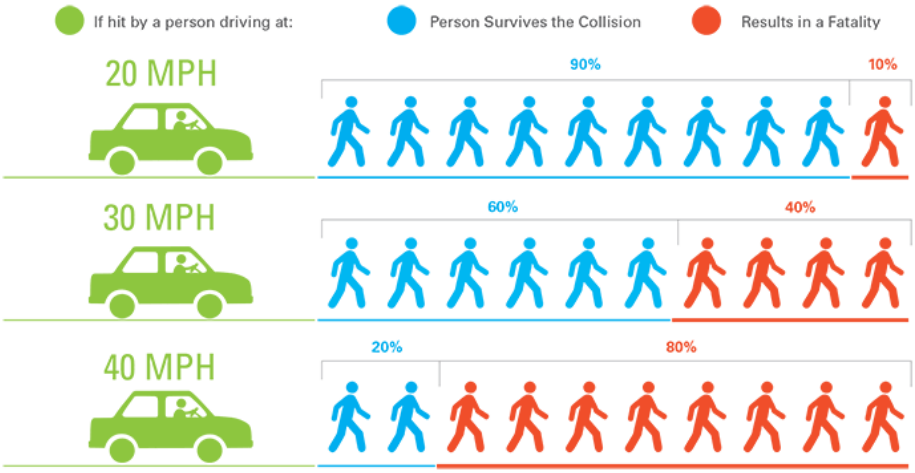
Why protected bike lanes?

As protected bike lanes have become more common across North America, the amount of research and understanding of their impacts on the surrounding communities has proliferated. Increasingly, studies are demonstrating a wide range of benefits to communities when protected bicycle lanes are installed.

1. They're safer for everyone on the road, not just people biking

In a key research article published in 2019, 13 years of data from 12 major U.S. cities were analyzed to determine how a number of factors, including protected bike lanes, affected road safety.[2] The authors analyzed all traffic fatalities alone and combined with severe injuries. They looked for significant associations within three different groups of variables: travel behavior, such as bike commute mode share; the built environment; and demographics. Their models indicated that more protected bike lanes and intersection density decreased fatalities alone and when combined with severe injuries. Their models show that when the feet of protected bike lanes per square mile quadrupled from 25 to 100, fatal and severe crashes decreased by 53%. The other variables shown to significantly affect traffic fatalities and injuries were percent of bike commuters (decreased safety), percent of population identifying as white (increased safety), percent of population between 15 and 24 (decreased safety), and percent of population 65 or older (increased safety). These results demonstrate that protected bike lanes are one of the few factors within a city's control that can reduce traffic fatalities and severe injuries for all road users.

One of the primary mechanisms protected bike lanes are thought to increase safety for all road users is through a traffic calming effect, which reduces vehicles speeds. Collisions at slower vehicle speeds are less likely to result in pedestrian and vehicle passenger fatalities.[3]



2. Studies have shown they boost economic growth

Many studies have linked protected bike lanes with economic growth, but the most comprehensive review is a 2013 report by People for Bikes and Alliance for Biking & Walking: "Protected Bike Lanes Mean Business".[4] The report outlines four major ways that protected bike lanes boost economic growth:

- Boosting land values through accessibility. As redevelopment creates density, protected bike lanes allow more people to access the new assets without increasing congestion.
- Helping companies recruit talented workers. Being able to skip traffic congestion and use safe bicycle facilities to get to work is a perk that attracts young talent to good jobs and allows employers to save money on parking expenses.
- Making healthier, more productive employees. Protected bike lanes get more people biking, which means more physical activity and lower health care costs for employers. Physical activity can also increase employee productivity.
- Increasing sales. Retailers can serve more people with less parking if people bike there, and people biking by are easy to attract and more likely to return again and again.

3. They increase the number of people biking, leading to healthier, more sustainable cities

In cities across the United States and the world, the number of people biking has increased after the installation of protected bike lanes.[5] One study in particular examined the number of people biking before and after protected bike lanes were installed in five cities in the US. In each of the eight locations, ridership increased in a range of 21% to 171%. In follow-up surveys, a portion of riders on each route responded that they would have used a different mode of transportation if the protected bike lane had not been installed. In addition, women reported a greater frequency of biking after the protected bike lanes were installed.[6]

Shifting transportation away from personal vehicles by providing better and safer bicycle routes has a number of benefits. For individuals, riding bicycles improves physical and mental wellbeing.[7, 8] Regionally, replacing vehicle trips with bicycles reduces air pollution and greenhouse gas emissions, thereby improving air quality for residents and reducing contributions to climate change.

In Santa Fe and nationwide, transportation is the greatest contributor to greenhouse gas emissions.[9] The Sustainable Santa Fe Plan outlines a goal of carbon neutrality by 2040 and transportation mode shift away from personal vehicles is a key strategy to achieve this.[10]

Finally, reducing reliance on personal vehicles reduces the need for parking, which can free up valuable land for other uses such as housing and businesses, which will in turn create more density and walkable, bikeable neighborhoods.

4. They're cheaper than a multi-use trail, but similar in safety

In Santa Fe, multi-use trails are popular among people biking for their safety and aesthetic features. However, constructing these trails can range into multi-million dollar projects. On the other hand, protected bike lanes can utilize existing pavement and right-of-way to achieve similar safety results for people biking, with the added benefit of improving safety for all road users.

Infrastructure costs can vary widely, however, one analysis of bicycle infrastructure costs estimated $21.97 per linear foot to install a protected bike lane (if no new pavement or curb is required), and another analysis found an average of $91.13 per foot to install a paved multi-use trail, or over four times the cost of a protected bike lane.[11, 12]

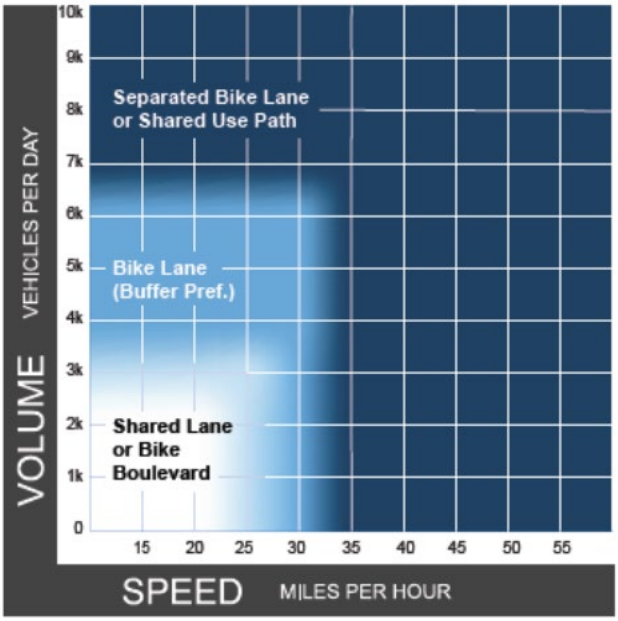
A protected bike lane can be 4X less than the cost of a multi-use trail

5. They support an all ages and abilities bicycle network

The 2019 Santa Fe Metropolitan Bicycle Master Plan identifies a goal of creating an all ages and abilities bike network where the very old and very young can safely travel by bicycle. In addition, extensive research has identified that large portions of the population fall into the "interested but concerned" category of bicycle riders and do not feel comfortable riding in a bike lane at the edge of a busy street. Protected or separated bike lanes provide a more comfortable experience by mitigating the negative impact of traffic volumes and traffic speeds on bicyclist safety and comfort. An all ages and abilities bicycle network is composed of protected bike lanes, quiet streets, and urban trails, making travel by bicycle more accessible and comfortable for everyone.[13]

SEPARATED (PROTECTED) BIKEWAY

MPH	≤25	30-35	≥40
2012	0 mi	0 mi	0 mi
2018	0 mi	0 mi	0 mi
TARGET 2024	-	1 mi	-



Preferred bikeway types for urban and suburban contexts.
2019 Bicycle Master Plan Appendix 1, Santa Fe Bicycle Design Toolkit.[14]

PROTOCOL

Demonstration Types

Two different street types are candidates for protected bike lane demonstrations in Santa Fe. The first is a street with four lanes, two in each direction, no bike lane, and traffic volumes typically below 20,000 average annual daily volume.[15] This street type is generally considered a good candidate for a road diet, or lane reduction, and therefore should tolerate a temporary lane reduction during a protected bike

lane demonstration. To do this demonstration, the outermost lanes will be converted to a bicycle lane and barriers will be placed towards the edge of the lane to prevent cars from entering and provide the lane protection.

The other possible street eligible for a protected bike lane demonstration already has bike lanes, or un-striped but wide shoulders. With this street type, the temporary barriers can simply be placed on or near the bike lane line, or 5 feet from the curb to create a bike lane. Vehicle travel lane and bike lane widths should be checked to ensure the vehicle travel lane is a minimum of 10 feet with the barrier placed and the bike lane is a minimum of 5 feet.

For either type, temporary paint may be added to supplement the demonstration such as to paint a buffer space, bike lane line, or to demonstrate a solid painted bike lane.

Materials

The Santa Fe MPO used the majority of the funding from the AARP Community Challenge Grant to purchase 350 moveable delineator posts with 10lb bases. With 10 foot spacing, these can be used for a one-way distance of 0.66 mile, or one mile with 15 foot spacing.

Another portion of the funding was to print bilingual signage to be used before and during the demonstrations. The sign types are:

- “coming soon” to be hung up to one week before the demonstration
- “follow the signs” guide people to the demonstration on the day over
- “up ahead” warns turning cars
- “bike lane ends” used at the end of the demonstration limits
- A-frame signs are placed on or near the demonstration and describe the project

Additional materials for data collection are described in a following section.

Planning a Protected Bike Lane Demonstration

The location and timing of the protected bike lane demonstration can be determined by a number of factors such as coordination with local bicycle events, the safe routes to school program, or roads previously identified in planning documents as candidates for road diets or protected bike lanes. Set up and take down of the demonstrations requires special traffic control certifications, so the Santa Fe MPO partners with the City of Santa Fe Streets Division to manage the demonstrations. Therefore, coordination on date and location with the City of Santa Fe Streets Division is essential. This partnership also includes permitting so that a City of Santa Fe Special Events permit is not required.

Partnerships are essential to the success of a protected bike lane demonstration project. Obvious partnerships include local organizers of bicycle events, schools, and the safe routes to school program. Additionally, working with partners to help spread the word or to lead bike rides through the infrastructure can help boost awareness of the demonstration.

Public outreach before the demonstration is another critical component. In addition to signs placed on-site in advance of the demonstration, the MPO uses a number of strategies to advertise the demonstration. These can include: emailing the MPO email list, sending post cards to addresses adjacent to the demonstration, hanging posters at bike shops or other prominent locations, creating ¼ page flyers for distribution near the demonstration or at bike or coffee shops, and utilizing social media events and posts and requesting partners share posts to their pages.

Data Collection

Data collection is essential to understanding the impacts of the protected bike lane and feasibility of a permanent installation. Quantitative data collection can include vehicles speeds with and without the protected bike lanes, bicycle counts within the bike lane, and survey data from those that experienced the demonstration. Additionally, written and verbal testimonials serve to share qualitative experiences with the protected bike lane.

Vehicle Speeds

The protocol used to collect speed data is as follows:

1. MPO staff determines an appropriate 2-hour window during the protected bike lane demonstration to record vehicle speeds. The timing could be arranged based on a period of interest, such as school pick-up, but at least should have a buffer period after set up and before takedown.
2. MPO staff schedules a control date before or after the demonstration to record speeds during the same time window and on the same day of week. Ideally the week before or after.
3. During the data collection window, MPO staff record speeds with a Bushnell Velocity Speed Gun and a custom datasheet where speeds are recorded in intervals of 5.
4. Data collection should occur at the same location with and without the protected bike lane and can focus on just one side of the road, or include 1 hour on each side of the road.

Bicycle Counts

The NMDOT Multimodal Planning and Programs Bureau maintains pneumatic tube bicycle count equipment and Miovision camera equipment available for agencies to use. Either of these equipment types can be set up strategically along the protected bike lane demonstration to record the number of users. The pneumatic tubes shouldn't be set up until after the protected bike lane is created, and needs to be taken down before the protected bike lane is removed, however, the data is easy to access and download. The Miovision cameras can be set up in advance and programmed to record at specific times, however, analysis requires funding to outsource counting or staff time to manually generate counts. The Miovision cameras are not limited to bicycle counts; they can be used for pedestrian and vehicle counts as well.

Surveys

Informal and formal surveys can be used. Formal surveys can be printed and handed out, or accessed via QR codes from the pop-up protected bike lanes website. Informal surveys can be written on a flip chart with tallies for people's responses. Verbal testimonies or reactions can also be recorded with permission.

CASE STUDY RESULTS

Paseo de Peralta – October 9th-10th, 2021

The first pop-up protected bike lane demonstration was timed to take advantage of a popular bike event, the Santa Fe Century on Sunday, October 10th. The MPO closed the eastbound outer lane on Paseo de Peralta from Cerrillos Road to Old Santa Fe Trail from 8am, Saturday the 9th, to 5pm, Sunday the 10th. On Saturday, the MPO utilized the popular Railyard Farmer's Market and Santa Fe Century packet pickup to direct people to experience the demonstration. On Sunday, the Santa Fe Century departed from the Railyard and traveled east on Paseo de Peralta. Additionally, a community partner led a community cruise on Saturday through the protected bike lane.

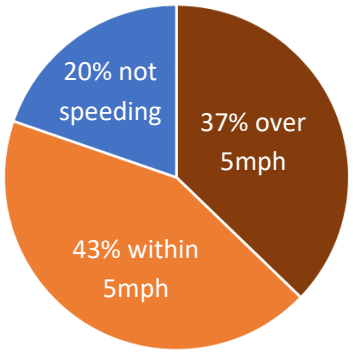
Flyers, social media posts and a facebook event, posters, an ad in the Santa Fe Reporter, and postcards to residents along Paseo de Peralta were all used to promote the demonstration in advance.

The delineator materials had not yet been acquired, so the MPO contracted with Southwest Safety to set up the traffic safety plan and traffic equipment for the protected bike lane.

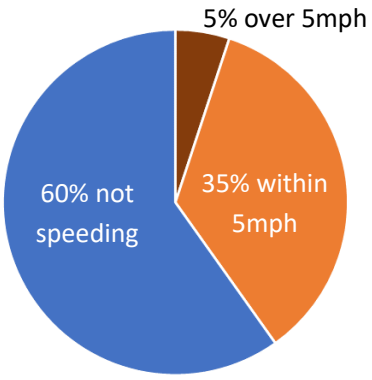
Data

Pneumatic tube bicycle counters and Miovision cameras were set up to record the number of users during the demonstration. Between Saturday at 10:20am and Sunday at 3:40pm, 647 people were recorded biking the protected bike lane; 172 on Saturday and 475 on Sunday. At the time of writing the Miovision video recordings have yet to be analyzed.

Vehicle speeds were recorded of eastbound traffic between 12:00pm and 2:00pm on Saturday and Sunday the 9th, 10th, 16th, and 17th. The data collected indicate steep decreases in speeding vehicles during the protected bike lane demonstration, especially vehicles speeding above 5 mph over the 25mph speed limit.



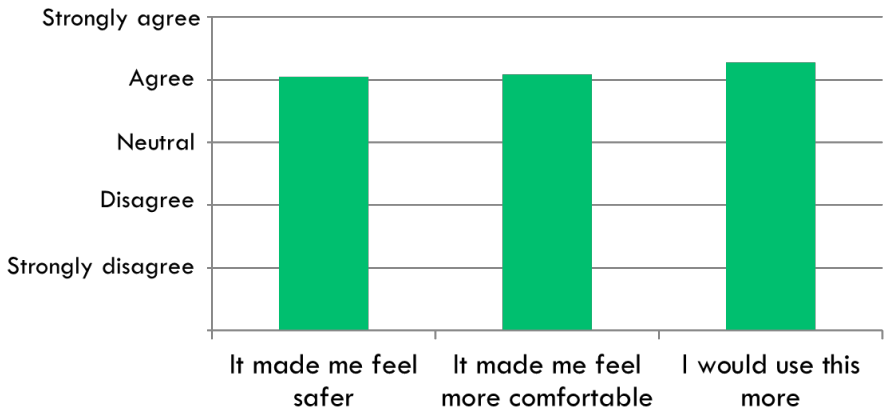
1,451 vehicle speeds recorded without a protected bike lane, Oct. 16-17



1,148 vehicle speeds recorded during the protected bike lane, Oct. 9-10

The MPO partnered with the City of Santa Fe Bicycling and Pedestrian Advisory Committee to conduct a survey during the weekend of the pop-up protected bike lane. Twenty-two survey respondents had

experienced the pop-up protected bike lane and were asked to compare their experience in it to that of an unprotected bike lane. The weighted averages of the responses indicate that users felt safer, more comfortable, and more likely to use a protected bike lane compared to an unprotected one.



Finally, several participants agreed to record their experiences on video, viewable on Instagram.[16]

"I absolutely liked it, I thought it made a nice safe barrier for the riders today"

"It was very helpful.. [] I felt safe"

"..great to not have to worry about the cars coming too close to you"

"..great to ride down city streets and not have to worry about cars going by."

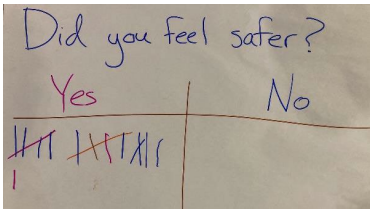
Paseo del Sol – November 30th, 2021

For the second pop-up protected bike lane demonstration, the MPO partnered with the Santa Fe Safe Routes to School Program and Nina Otero Community School. Each Tuesday, Nina Otero has a Bike Train Tuesday bike to school event that meets at SWAN Park and bikes as a group to Nina Otero. A large part of the route follows the Tierra Contenta Trail, but there is a half-mile section for the final stretch on Paseo del Sol to Nina Otero. Nina Otero also has a semi-regular after school bike club that uses a variety of routes, including back up Paseo del Sol to the Tierra Contenta Trail. For this demonstration, the City of Santa Fe Streets Division set up delineators to protect the existing bike lane on Paseo del Sol from the trail crossing to the entrance to Nina Otero.

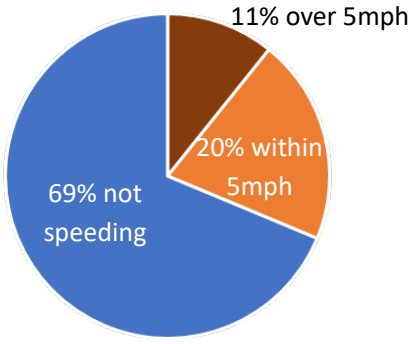
Because of the specific purpose of the protected bike lane to serve Nina Otero students, widespread promotion was passed over in favor of targeted promotion. The Bike Train Tuesday organizer, teacher Jeri Lyn Salazar, made announcements to students and staff, including a robocall telephone message. The MPO also created Bike Train Tuesday reminder stickers that Mrs. Salazar passed out to all 3rd through 6th graders the Monday before the pop-up protected bike lane. As an incentive, the MPO used AARP grant funds to purchase breakfast burritos to serve to the students after their bike ride to school. Some local partners joined the Bike Train Tuesday morning ride, and others met for a community cruise after school started.

Data

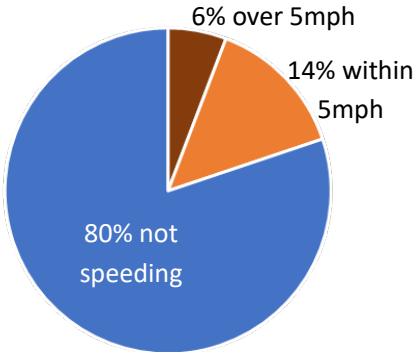
Less formal count data was collected for this pop-up protected bike lane. Approximately 15 students and staff biked to school and 10 participated in the afterschool bike ride. Upon arrival at school, an informal survey was conducted asking if the riders felt safer with the protected bike lane. All responded yes.



Vehicle speeds were recorded on Tuesday, November 8th and Tuesday, November 30th from 2:30pm to 4:30pm. The northbound lane was recorded for the first hour, followed by southbound. These times were selected to capture vehicle speeds during Nina Otero and Capital High School release times, during which more students are walking and biking. The data collection point was approximately 450 feet north of the Nina Otero school zone. Speeding was not especially prevalent either day, however, speeding and excessive speeding (5mph over the 25mph speed limit) were both reduced.



502 vehicle speeds recorded without a protected bike lane, Nov. 8



487 vehicle speeds recorded during the protected bike lane, Nov. 30

CONCLUSIONS

Safety

In line with research on protected bike lanes, perceived safety and actual safety increased during the protected bike lane demonstrations. Vehicle speeds above the speed limit and especially those greater than five miles per hour over the speed limit were substantially reduced during the protected bike lane demonstrations. Additionally, survey results and personal anecdotes all point to improvements in the user experience of biking in the protected bike lane compared to a normal bike lane.

Future Demonstrations

The Santa Fe MPO in partnership with the City of Santa Fe Streets Division has the capacity to continue organizing pop-up protected bike lanes throughout the city. As the Safe Routes to School Program continues to grow, more opportunities will arise to create protected bicycle routes in partnership with schools. Additionally, the MPO plans to take advantage of Bike Month events during May by coordinating with planned events or organizing events with a pop-up protected bike lane.

There are many potential locations for future demonstration projects. Some are identified in MPO plans, and others can be identified based on the stress level of the road, proximity to a school or employer, equity analysis, or stakeholder requests.

Locations identified in the Metropolitan Transportation Plan[17] as candidates for a road diet including bike lanes:

- Paseo de Peralta: West Alameda southwest to Guadalupe
- Paseo de Peralta / NM 475: St. Francis Drive to Washington Avenue (NMDOT owned)
- St. Michaels Drive between Cerrillos Road and St. Francis Drive
- Cerrillos Road northeast of St. Francis Drive

Locations identified in the Bicycle Master Plan[13] for new bike lanes:

- Sandoval: Southbound bike lane, Alameda to Montezuma
- Alta Vista Street.: RR tracks to Salvador Perez Park
- Calle Mejia, Viento Drive to cul-de-sac at Reserve
- Camino Carlos Rey south of Zia to Gov Miles
- Govenor Miles Road, within Pueblos del Sol (Camino Carlos Rey to west of playground)
- Hospital Drive, Lupita to St. Michael's Drive
- San Mateo: St. Francis Drive to Rail Trail at 2nd St.
- Wagon Road

High stress bike lanes:

- Airport Road
- Agua Fria Street
- St. Michaels Drive (east of St. Francis)/Old Pecos Trail

- Rodeo Road
- Zia Road
- Siler Road
- Richards Road

Safe routes to school opportunities

- Rufina Street
- South Meadows Road
- Paseo del Sol Road
- Llano Street

West Zia bike lanes may not be comfortable for all ages and abilities due to high traffic speeds and volumes.

Other candidates:

- Cordova Road from St. Francis to Don Diego Avenue
- Any road meeting speed and volume thresholds from the preferred bikeway types for urban and suburban contexts chart in the Santa Fe Bicycle Design Toolkit

Considerations for Permanent Installations

The advantage of demonstration protected bike lanes is that they are low cost and low commitment. However, the next logical step will be the consideration and commitment of permanent installations. Locations may be selected based on community need, safety, and feasibility. Having a successful pop-up protected bike lane in the proposed location first is a strategy to understand functionality and operational elements of the location.

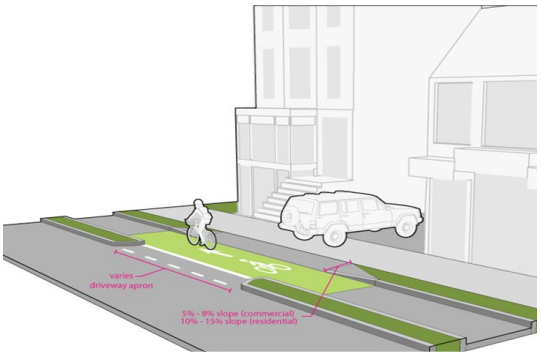
Funding

The cost of a permanent installation will depend on if the protected bike lane can be accomplished on the existing street (cheapest), or if the street will require a reconstruction (most expensive). The cost of adding a barrier to a bike lane on an existing street is estimated at $22 per foot, including design, materials, and installation. Generally, state or federal grants are used to fund road reconstructions and the cost of adding protected bike lanes can be included in these grant funds. The Streets Division under Public Works is key to the success of protected bikeway installation and maintenance. With their support, a full on-street installation is recommended with direct local funding to the division. The MPO will commit to monitoring installation with resources listed above and a report submitted to the City after a one year monitoring program.

Access Points and Driveways

Any bicycle facility on a road with many driveways or non-intersection access points presents a risk of conflict between turning vehicles and people biking. This risk can be mitigated by ensuring adequate sight distance at driveways so turning vehicles and people biking are all visible. If the protected bike lane includes car parking, the parking should end a minimum of 20 feet before the driveway. Additionally, colored paint can be used to clearly indicate to vehicle drivers that they are crossing a bike lane and should look for people biking. If possible, consolidating driveways to reduce the number of crossings will help reduce conflicts.[18]

Green continental stripes indicate a crossing



Solid green highlights a driveway entrance[19]

Maintenance

Finally, once a location and funding are identified, a plan should be made for maintenance such as street sweeping, snow removal, and maintaining the barriers. Many municipalities that receive heavier snowfall than Santa Fe manage snow removal with narrower trucks that can fit between the curb and the bike lane barrier. It is recommended that the City utilize existing vehicles used to plow trail systems for protected bike lane snow removal. Discussion with Streets Division is recommended to determine a solution for street cleaning. Municipal Street Sweepers specifically designed to address bike lanes, multi-use trails and difficult to access shoulders are now available in electric versions providing a unique and sustainable approach to maintenance.

ACKNOWLEDGEMENTS

Much of this work was funding through a $6,000 AARP Community Challenge Grant to purchase materials. Additional thanks goes to the City of Santa Fe Streets Division for on-the-ground set up and take down of past and future pop-up protected bike lanes and the Santa Fe Safe Routes to School Program.

RESOURCES

FHWA Separated Bike Lane Planning and Design Guide, https://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/separated_bikelane_pdg/page00.cfm

The Pop-Up Placemaking Tool Kit, AARP, https://www.aarp.org/livable-communities/tool-kits-resources/info-2019/pop-up-tool-kit.html

AARP Community Challenge, https://www.aarp.org/livable-communities/community-challenge/

Santa Fe Safe Routes to School, https://sfct.org/safe-routes-to-school/

Santa Fe Metropolitan Bicycle Design Toolkit, https://santafempo.org/wp-content/uploads/2019/07/SFM-BMP-2019-appendix-A-final.pdf

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