GRAHAM STREET ADVISORY BIKE LANES EXPERIMENT

9(09)-125 (E) – ADVISORY BICYCLE LANES – PRESIDIO TRUST

Final Report

July 5, 2023

CONTENTS

INTRODUCTION

On September 9, 2020, the Presidio Trust received Federal Highway Administration (FHWA) approval on its Request for Experimentation with Advisory Bike Lanes (ABLs). The Presidio Trust received permission to install ABLs in the Main Post area of the Presidio, along a 1,000-foot segment of Graham Street from Sal Street to Lincoln Boulevard. Prior to the ABLs' installation, Graham Street was a bidirectional two-lane roadway with on-street parking in the southbound direction (Figure 1a). On May 13, 2021, ABLs were installed on Graham Street as a part of a routine resurfacing project, resulting in a bidirectional roadway with a single, central travel lane for motor vehicles traveling in both directions and a southbound on-street parking lane (Figure 1b).

This document is the final of three reports being submitted to FHWA as part of the Presidio Trust's Monitoring and Evaluation Plan throughout the experimentation process. The pre-experiment Existing Conditions Report, submitted to FHWA in February 2021, outlines roadway conditions prior to ABL installation. The Mid-Experiment Report, submitted in March 2022, discusses roadway conditions and public perception six months after installation of the ABLs. This Final Report was prepared twenty-four months after installation of the ABLs. In addition to the three reports, two brief experiment status updates were submitted to FHWA, twelve months and eighteen months after installation of the ABLs.

Similar to the Mid-Experiment Report, the Final Report includes four primary analyses:

- crashes within or adjacent to the project area;
- motor vehicle volumes, speeds, and classifications and bicyclist volumes;
- video observation of road user behavior; and
- public engagement responses.

Analyses conducted for the Existing Conditions and Mid-Experiment Reports were replicated for this Final Report. Additional information on Graham Street and the Request for Experimentation is provided in Appendix A. The Existing Conditions Report is provided in Appendix B, and the Mid-Experiment Report is provided in Appendix C.

Figure 1a: Graham Street Prior to ABL Installation (Looking North)

Figure 1b: Graham Street After ABL Installation (Looking North)

CRASH ANALYSIS

The primary goal of the advisory bike lanes is to provide a safe bicycling facility along Graham Street. In order to determine safety impacts of the ABLs, it is important to analyze crashes along Graham Street before and after installation.

The crash analysis included a review of crash reports provided by the United States Park Police (USPP) for the most recent period in which data is available: 2015-2023. There were eight crashes reported along or adjacent Graham Street, four of which occurred in the project area (refer to Figure 2). Table 1 below provides additional information on each crash that occurred during the analysis period, including those that were discussed in the Existing Conditions Report and the Mid-Experiment Report. There were no crashes reported between 2019 and 2021. Three crashes occurred in the 24 months following the ABL installation.

The USPP crash reports are provided in Appendix D, including those reported in the Existing Conditions and Mid-Experiment Reports.

Table 1: Summary of Reported Crashes on Graham Street, 2015-2023

Crash Number	Crash Date	Location	Project Area	Crash Type & Description	Injuries?	Lighting Conditions
1	2/26/2015	Lincoln Blvd at Graham St	Yes	Sideswipe; truck making westbound left turn onto Graham Street from Lincoln Boulevard westbound through lane struck vehicle in westbound left turn lane.	No injuries (property damage only)	Night
2	4/14/2015	Graham St at Lincoln Blvd	No	Sideswipe; southbound bus struck southbound vehicle when pulling out of bus turnout on north side of intersection.	No injuries (property damage only)	Day
3	7/28/2017	Graham St at Owen St	Yes	Head-on; motorcycle making eastbound left turn onto Graham Street from Owen Street lost control and collided with parked vehicle on Graham Street.	Severe injury and property damage	Day
4	8/19/2017	Lincoln Blvd at Graham St	Yes	Collision with animal; westbound vehicle on Lincoln Boulevard struck racoon just west of intersection with Graham Street.	No injuries or property damage	Night
5	7/13/2018	Graham St at Moraga Ave	No	Collision with bicyclist; northbound vehicle struck northbound bicyclist when turning right into Moraga Avenue parking lot from Graham Street	Minor injuries to bicyclist and some property damage	Day

Crash Number	Crash Date	Location	Project Area	Crash Type & Description	Injuries?	Lighting Conditions
6	3/31/2022	86 Graham Street	Yes	Run-off-road collision: Driver was driving northbound on Graham Street, swerved for unknown reasons, struck a curb, and overturned the vehicle onto the sidewalk. The driver was operating a GoCar tour buggy. The crash occurred in the Project Area.	Minor Injuries to driver and passenger	Day
7	8/20/2022	Graham Street and Sheridan Ave	No	Collision with bicyclist: Driver was travelling northbound on Graham Street and made a westbound turn on Sheridan Avenue. A bicyclist then struck the rear end of the vehicle on the driver's side. No injuries were reported. The intersection, which is outside the ABLs, has a stop sign on Sheridan Avenue.	No injuries reported	Day
8	9/24/2022	Graham Street and Sheridan Ave	No	Collision with Motor Vehicle: Driver was driving southbound on Graham Street and was about to make a right turn into Sheridan Avenue. The driver backed up into another driver behind them to avoid a potential crash with a taxi driver at the intersection. The crash report does not explain what direction or what street the taxi driver was headed. There were no injuries reported and the crash occurred outside of the ABLs.	No Injuries Reported	Day

Of the three crashes that occurred after the ABL installation, two occurred on Graham Street on segments outside of the ABL limits. Only one crash occurred in the study area. Based on the crash report, however, it is unlikely that the ABLs were a cause for the crash. The crash report narrates that the driver was operating a GoCar tour buggy, which flipped to its side, causing the vehicle to hit a curb. The narrative provides no evidence that the ABLs influenced the crash, as the officer at the scene concludes that they "did not notice any unevenness, cracks, dents, or any variable that could have contributed to the accident."

Figure 2: 2015-2022 Crashes Reported by United States Park Police

VEHICLE CLASSIFICATIONS, SPEEDS, & VOLUMES

The Existing Conditions Report established baseline vehicle (motor vehicle and bicycle) volumes and speeds on Graham Street prior to the installation of the advisory bike lanes to determine what effect, if any, the ABLs have on roadway operations. Please refer to the Existing Condition Report for pre-experiment volumes and speeds. The Mid-Experiment Report captured vehicle volumes and speeds six months after the ABLs' installation. This Final Report presents vehicle volumes and speeds 24 months after the ABLs' installation. Like the Mid-Experiment Report, the Final Report recorded vehicle classifications, speeds, and volumes for seven consecutive days: from Friday, April 14, 2023, through Thursday, April 20, 2023. An automatic traffic recorder was placed approximately 200 feet north of the Owen Street intersection to record this Final Report data. Vehicle volume, speed, and classification reports from the Mid-Experiment Report and Final Report, along with historic 2017-2019 vehicle volumes, are provided in Appendix E.

MOTOR VEHICLE CLASSIFICATIONS

Table 2 and Figure 3 present motor vehicle classifications, by percentage, recorded by day. Note that vehicles falling into the "not classified" category were not identified by the automatic traffic recorder and therefore could belong to any motor vehicle classification.

As shown in Table 2 and Figure 3, most of the motor vehicle traffic consisted of cars (approximately 69%), followed by two-axle vehicles (approximately 15%), with a minimal presence of other types of motor vehicles (less than 3.5% each). This large proportion of car traffic is expected, as most residents, employees, and visitors that drive within the Presidio typically do so in small private vehicles. The relatively large proportion of two-axle vehicle traffic is likely due to frequent Presidio GO shuttle service as well as small panel trucks, utility trucks, and delivery trucks traveling in the park. On weekends, there were higher proportions of car and motorcycle traffic than on weekdays and lower proportions of two-axle vehicles and all other vehicle types. This indicates the likely trend that there are more visitors using private vehicles on weekends and there is less Presidio GO shuttle service and fewer delivery trucks on weekends.

These vehicle classification findings are similar to those observed in the pre-experiment Existing Conditions Report and Mid-Experiment Report, indicating that the installation of the ABLs had little to no effect on the types of vehicles using Graham Street.

Table 2: Combined NB/SB Motor Vehicle Classifications on Graham Street, by Day (4/14/2023 to 4/20/2023)

Motor Vehicle Classification	Fri 4/14	Sat 4/15	Sun 4/16	Mon 4/17	Tues 4/18	Wed 4/19	Thurs 4/20	Week Average
Motorcycle	3.00%	3.00%	2.50%	1.30%	1.30%	2.90%	1.80%	2.30%
Cars & Trailer	68.40%	73.90%	71.30%	67.60%	67.40%	65.90%	66.80%	69.10%
2 Axle Long	15.20%	12.40%	13.30%	18.40%	16.50%	17.60%	15.20%	15.40%
2 Axle 6 Tire	3.80%	2.00%	1.80%	3.70%	4.40%	3.50%	3.70%	3.20%
Buses	3.30%	1.20%	1.20%	3.10%	3.70%	2.60%	2.80%	2.50%
>2 Axle	0.50%	0.30%	0.10%	0.50%	0.80%	0.40%	0.40%	0.40%
Not Classified	5.90%	7.30%	9.70%	5.40%	5.80%	7.00%	7.12%	7.00%

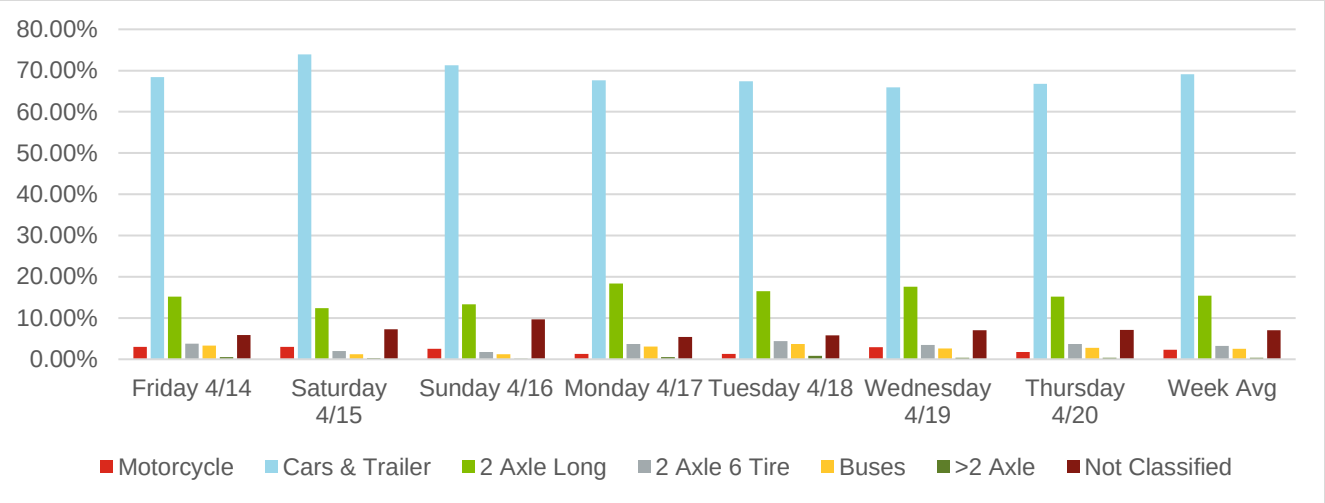

Figure 3: Combined NB/SB Motor Vehicle Classifications on Graham Street, by Day (4/14/2023 to 4/20/2023)

MOTOR VEHICLE SPEEDS

Table **3** and Figure 4 present motor vehicle speeds throughout the one-week observation period. In the cumulative, a little less than half (44%) of drivers drove at or below the posted speed limit of 25 miles per hour. Most drivers, in the cumulative, drove over the speed limit. Around 33% drove at 26-30 miles per hour, while 16% drove at 31-35 miles per hour.

The cumulative speeds in this report are similar to those found in the Mid-Experiment Report, with the majority of drivers driving faster than the posted speed limit. The speed data suggest that the advisory bike lanes did not affect driver speed in a significant way. The Mid-Experiment Report found that about 47% of drivers drove at or below the speed limit of 25 miles per hour, 32% of drove at 26-30 miles per hour, and 15% drove at 31-35 miles per hour.

Motor Vehicle Speed (mph)	Northbound		Southbound		Combined	
	Categorical	Cumulative	Categorical	Cumulative	Categorical	Cumulative
1-15	8.8%	8.8%	8.7%	8.7%	8.7%	8.7%
16-20	8.5%	17.3%	9.5%	18.2%	8.9%	17.6%
21-25	27.1%	44.4%	26.1%	44.3%	26.7%	44.4%
26-30	33.1%	77.5%	31.9%	76.2%	32.7%	77.0%
31-35	16.4%	93.9%	17.7%	93.9%	16.8%	93.9%
36-40	4.8%	98.7%	4.8%	98.7%	4.8%	98.7%
41-45	1.1%	99.8%	0.9%	99.6%	1.0%	99.7%
46+	0.2%	100.0%	0.3%	99.9%	0.2%	99.9%
85th Percentile	32		32		32	
Average	25		26		25	
Median	25		25		25	

Table 3: NB, SB, and Combined NB/SB Motor Vehicle Speeds on Graham Street, 4/14/2023 to 4/20/2023 Average

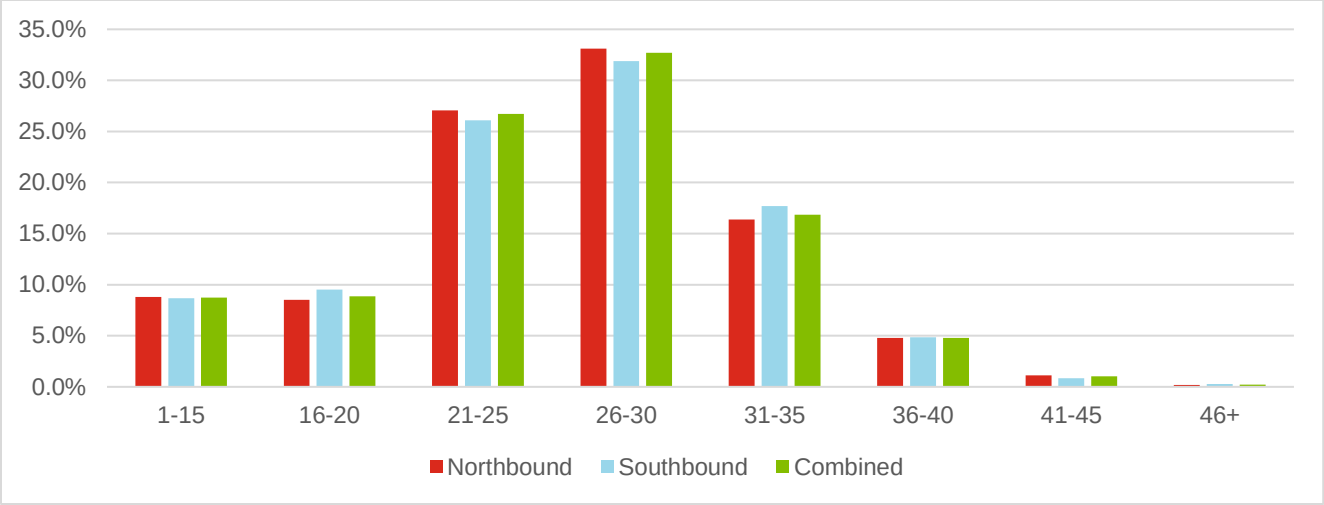

Figure 4: Categorical NB, SB, and Combined NB/SB Motor Vehicle Speed Distributions on Graham Street, 4/14/2023 to 4/20/2023 Average

While 85th percentile speeds increased slightly from the Existing Conditions Report to the Mid-Experiment Report, they remained consistent from the Mid-Experiment Report to the Final Report. The 85th percentile speed was 32 miles per hour for northbound, southbound, and combined traffic, consistent with the 85th percentile speeds observed in the Mid-Experiment Report.

Average speeds increased slightly relative to the Mid-Experiment Report. The northbound average speed remained the same as the Mid-Experiment Report at 25 miles per hour. In contrast, the southbound average speed increased from the Mid-Experiment Report's 24 miles per hour to 26 miles per hour, while the combined average speed remained 25 miles per hour. Median speeds remained similar to those in the Mid-Experiment Report. The median speed for northbound and combined traffic fell from 26 miles per hour to 25 miles per hour while the median southbound speed remained consistent at 25 miles per hour. While these median speeds are a slight decrease from the Mid-Experiment Report, speeds collected during the Final Report remain higher than those collected during the Existing Conditions Report.

There was an increase across the board for the mode speed in the data collected for the Final Report. The Existing Conditions Report found a mode speed of 23 miles per hour for all directions of travel. The Mid-Experiment Report found a mode speed of 27 miles per hour for northbound traffic, 24 miles per hour for southbound traffic, and 27 miles per hour for combined traffic. The Final Report saw a mode speed of 28 miles per hour for all directions of travel. An increase in the mode speed suggests that it is more common that drivers are driving faster compared to previous years. Figure 5 below shows how cumulative average speeds have slightly increased since the Existing Conditions Report.

As stated in the Mid-Experiment Report, although increased vehicle speeds following installation of advisory bike lanes appears counterintuitive, there are other changed aspects of the roadway that may have resulted in higher travel speeds, including a repaved roadway, resulting in a smoother driving surface.

Table 4: Weekly Motor Vehicle Speed Statistics in 2020, 2021, 2023

Motor Vehicle Speed	2020 Week Avg			2021 Week Avg			2023 Week Avg		
	NB	SB	NB/SB	NB	SB	NB/SB	NB	SB	NB/SB
85th Percentile	28	30	29	32	32	32	32	32	32
Average	23	24	23	25	24	25	25	26	25
Median	23	24	23	26	25	26	25	25	25
Mode	23	23	23	27	24	27	28	28	28

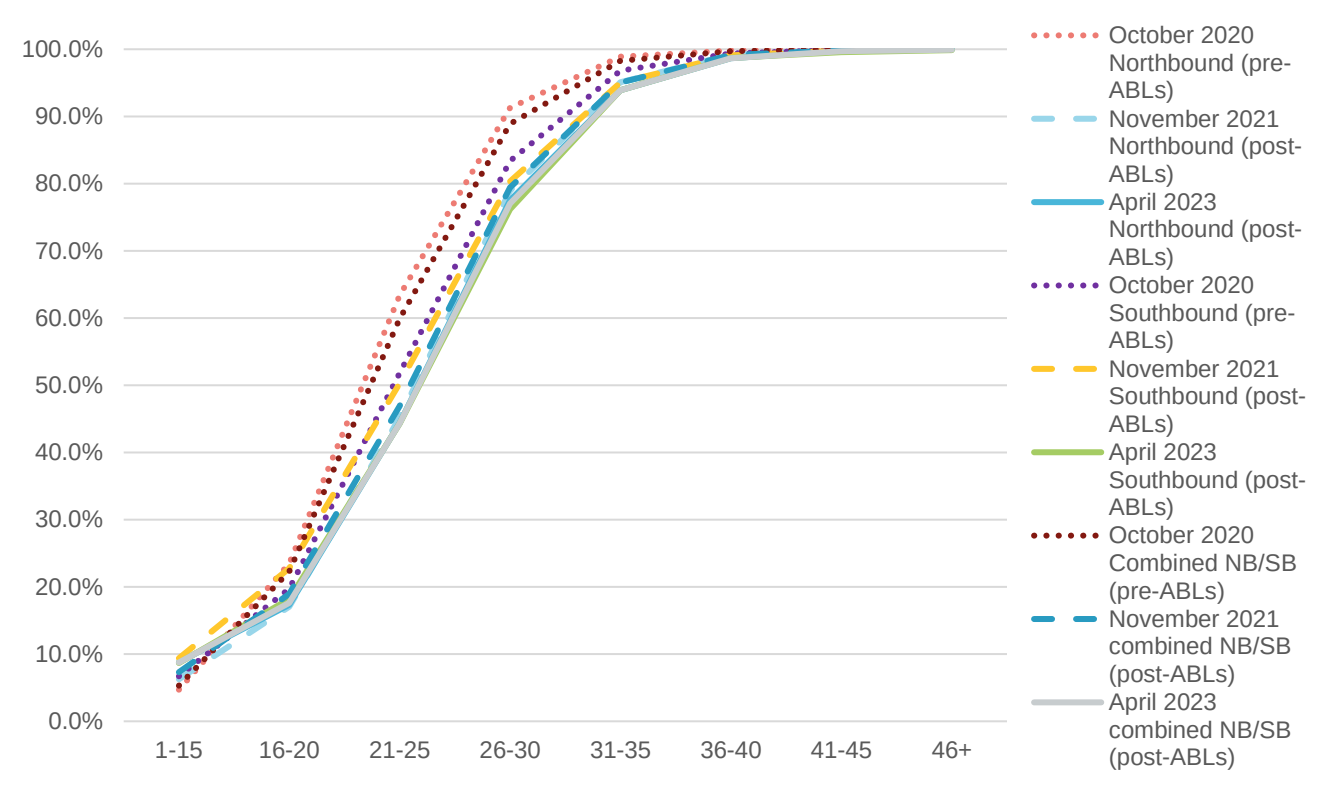

Figure 5: Cumulative NB, SB, and Combined NB/SB Motor Vehicle Speed Distributions on Graham Street, 10/14/2020 to 10/20/2020 Average (dot), 10/30/2021 to 11/5/2021 Average (dash), and 4/14/2023 to 4/20/2023 Average (solid)

Assessment of Advisory Bike Lanes Treatment Based on Motor Vehicle Speeds

In both the Mid-Experiment and Final Report, average motor vehicle speeds are less than or equal to the preferred speed threshold for ABLs of 25 miles per hour presented in the *Small Town and Rural Design Guide*. While 85th percentile speeds exceed this speed threshold, they remain less than the 35 mile-per-hour maximum speed threshold presented in the *Small Town and Rural Design Guide*, indicating that ABLs remain a viable design treatment on Graham Street, despite the observed motor vehicle speed increases between 2020 and 2023.

MOTOR VEHICLE & BICYCLE VOLUMES

Motor Vehicle Volumes

Table 5 and Figure 6 present motor vehicle volumes throughout the one-week observation period. Combined northbound and southbound motor vehicle volumes gradually increased throughout the workweek, ranging from a low of approximately 2,064 vehicles on Monday to a high of approximately 2,696 vehicles on Wednesday. Saturday recorded the highest vehicle volumes of the week at nearly 2,900 vehicles, while Sunday's 2,620 vehicles was more comparable to weekdays.

Traffic volumes collected in 2023 were significantly higher than those collected in 2021 for the Mid-Experiment Report. The Mid-Experiment Report recorded a daily average of 2,140 vehicles, while the Final Report saw over a 17% increase with a daily average of 2,518 vehicles. While the daily volume increased, peak hour vehicle volumes suggest that traffic was dispersed throughout the day. The Final Report found, like the Mid-Experiment Report, that the typical peak hour volumes hit the mid-200s, with a Saturday PM peak of 301 vehicles. The normalization of work-from home and hybrid work schedules, particularly for white collar workers, in recent years may have influenced a decrease in typical morning and evening rush hour peak volumes.

Table 5: NB, SB, and Combined NB/SB Motor Vehicle Daily Volumes on Graham Street, by Day (4/14/2023 to 4/20/2023)

Motor Vehicle Volume	Fri 4/14	Sat 4/15	Sun 4/16	Mon 4/17	Tues 4/18	Wed 4/19	Thurs 4/20	Week Average
Northbound	1684	1936	1807	1266	1421	1706	1741	1652
Southbound	791	891	813	798	853	990	927	866
Combined	2475	2827	2620	2064	2274	2696	2668	2518
Directional Split (NB / SB)	68 / 32	68 / 32	69 / 31	61 / 39	62 / 38	63 / 37	65 / 35	66 / 34
AM Peak Hour (Combined Volume)	9AM (179)	11AM (243)	11AM (226)	8AM (218)	8AM (240)	8AM (234)	8AM (273)	N/A
PM Peak Hour (Combined Volume)	3PM (260)	12PM (301)	2PM (280)	3PM (188)	3PM (232)	3PM (254)	3PM (284)	N/A

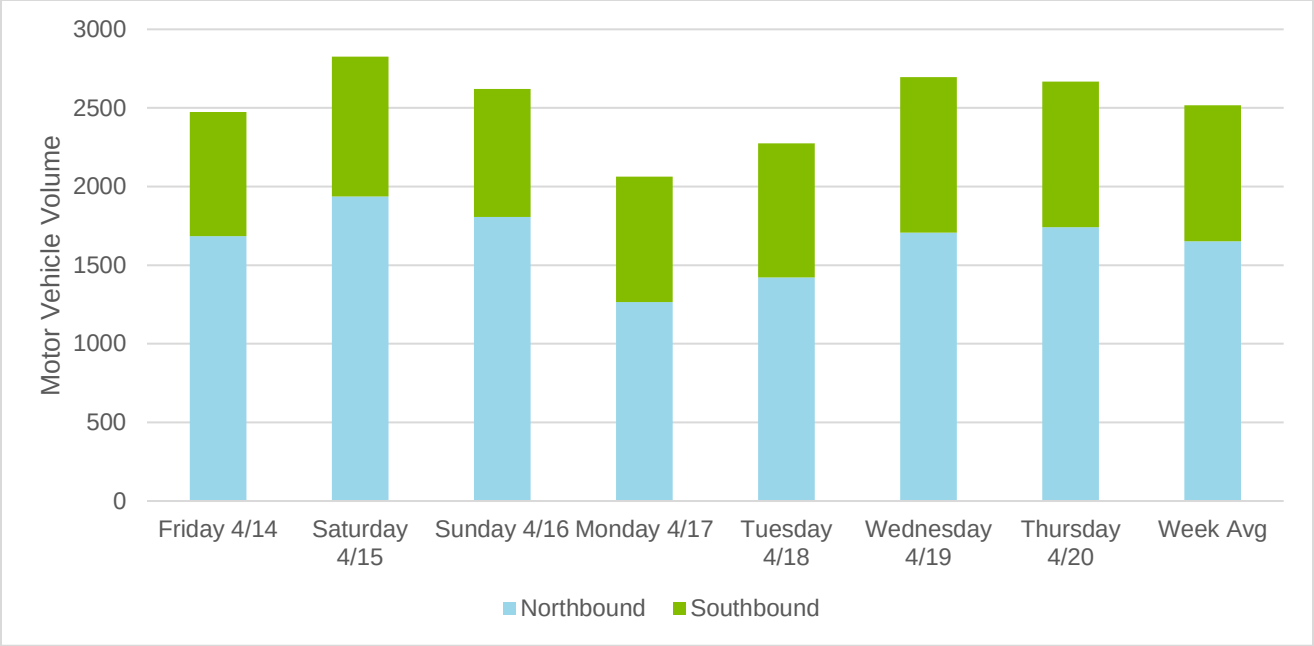

Figure 6: NB and SB Motor Vehicle Daily Volumes on Graham Street, by Day (4/14/2023 to 4/20/2023)

Weekday vehicle volumes in this report (2023) were higher than those observed in the Existing Conditions (2020) and Mid-Experiment (2021) Reports. The lowest weekday vehicle volume for 2023 (Monday with a volume of 2,064) was 12% larger than 2021's lowest weekday volume (1,843 on a Monday). In terms of peak, April 2023's weekday peak 2,827 on a Wednesday) was 13% larger than November 2021's (2,487 on a Friday). Vehicle volumes increased on the weekends as well, with a 26% increase on Saturday and a 54% increase on Sunday. Increased volumes on both weekdays and weekends can potentially be attributed to the easing and then lifting of COVID-19 restrictions over the three-report period, as well as potential seasonal differences between the Mid-Experiment data collection in fall and Final Report data collection in spring. The July 2022 opening of Presidio Tunnel Tops, a new park in the center of the Presidio at the northern end of Graham Street, also likely resulted in increased traffic volumes in 2023, particularly on weekends.

The northbound/southbound split for 2023 (0.66) was unchanged from the Mid-Experiment Report (also 0.66). The surrounding street network's configuration may be the reason for the split, as northbound travel on Graham Street is more convenient.

The recorded weekday morning peak hour for combined northbound and southbound motor vehicle traffic was 8AM on Monday-Thursday and 9AM on Friday, coinciding with morning commute times. Weekday evening peak hours were 3PM across the board. While the ebbs and flows of weekday peak hours are similar to those recorded in the Mid-Experiment Report, weekend peak hours differ. November 2021 saw an evening peak hour of 3-4PM for both Saturday and Sunday, while April 2023's was at 12PM for both Saturday and Sunday, most likely influenced by visitors entering the park at this time. The July 2022 opening of Presidio Tunnel Tops is the likely cause for the change in weekend peak hour patterns.

Adjustments for COVID-19

While the Mid-Experiment Report was conducted as jurisdictions began to loosen COVID-related restrictions, the Final Report was conducted when travel and commute patterns more closely resembled pre-pandemic conditions. The COVID-19 Pandemic disrupted travel behavior by normalizing remote and hybrid work for white collar workers. This section applies adjustment factors to simulate 2023 traffic volumes without the effects of the COVID-19 Pandemic and to maintain consistency with the Existing Conditions and Mid-Experiment Reports' adjustments.

The project team adjusted traffic volumes, collected using an automatic traffic recorder, using historic 2017-2019 volume data in the Presidio. The Final Report used volumes from the Arguello Gate counter to recreate the Existing Conditions and Mid-Experiment Report's volume adjustment methodologies. To maintain consistency with the method used in previous reports, September-November motor vehicle volumes were used to calculate an adjustment factor for the Final Report. 2022 September-November motor vehicle volumes are 79% of 2017-2019 September-November motor vehicle volumes; therefore, the collected Final Report volumes were multiplied by a factor of 1/0.79 to estimate normalized "non-pandemic" volumes. Similarly, 2022 September-November bicycle volumes are 123% of 2017-2019 September-November bicycle volumes, so Final Report volumes were multiplied by a factor of 1/1.23. COVID-adjusted April 2023 volumes are shown in Table 6.

Table 6: COVID-Adjusted NB, SB, and Combined NB/SB Motor Vehicle and Bicycle Daily Volumes on Graham Street, by Day (04/14/2023 to 04/20/2023)

Vehicle Volume		Fri 4/14	Sat 4/15	Sun 4/16	Mon 4/17	Tues 4/18	Wed 4/19	Thurs 4/20	Week Average
Motor Vehicles	NB	2132	2451	2287	1603	1799	2159	2204	2091
	SB	1001	1128	1029	1010	1080	1253	1173	1096
	NB/SB	3133	3578	3316	2613	2878	3413	3377	3187
Bicycles	NB	91	124	150	65	75	98	119	103
	SB	17	28	22	20	41	34	35	28
	NB/SB	108	153	172	85	115	133	154	131

Assessment of Advisory Bike Lanes Treatment Based on Motor Vehicle Volumes

The Existing Conditions Report and Mid-Experiment Report used COVID-19 adjusted volumes to assess the viability of ABLs on Graham Street. The Final Report includes a section that covers adjustments for COVID-19 to maintain consistency across all reports. This report, however, pivots to using actual volumes, rather than adjusted, to gauge the treatment's viability given the uncertainty of whether travel changes during the COVID-19 will persist. The 2023 counts exceed the 2,500 preferred daily volume threshold for ABLs provided in the *Small Town and Rural Design Guide*. However, combined northbound and southbound motor vehicle volumes are far less than 6,000 vehicles per day, the threshold at which the *Manual on Uniform Traffic Control Devices* requires inclusion of a centerline (thus precluding an ABL treatment). This indicates that ABLs remain a viable design treatment along Graham Street.

Bicycle Volumes

Table 7 and Figure 7 present bicycle volumes throughout the one-week Final Report observation period. Combined northbound and southbound bicycle volumes were lowest on Monday, with 104 bicycles, and highest on Sunday, with 211 bicycles. Similar to the Mid-Experiment Report, high bicycle volumes were observed on the weekend, as well as on Thursday. In general, bicycle volumes in April 2023 were higher than those observed during both the November 2021 Mid-Experiment Report period and the October 2020 Existing Conditions Report period. The 2023 week average volume in both directions (161) is 30% higher than the volumes observed in 2020 (123) and 48% higher than those observed in 2021 (109), signaling a substantial increase. This could be due to a variety of factors, such as a difference in weather between the observation periods or the opening of Presidio Tunnel Tops.

The directional split is identical to that in the Mid-Experiment Report, with approximately four times more bicyclists traveling northbound on Graham Street compared to southbound. The surrounding street network's configuration may be the reason for the split, as northbound travel on Graham Street is more convenient.

Table 7: NB, SB, and Combined NB/SB Bicycle Daily Volumes on Graham Street, by Day (4/14/2023 to 4/20/2023)

Bicycle Volume	Fri 4/14	Sat 4/15	Sun 4/16	Mon 4/17	Tues 4/18	Wed 4/19	Thurs 4/20	Week Average
Northbound	112	153	184	80	92	121	146	127
Southbound	21	35	27	24	50	42	43	35
Combined	133	188	211	104	142	163	189	161
Directional Split (NB / SB)	84 / 16	81 / 19	87 / 13	77 / 23	65 / 35	74 / 26	77 / 23	79 / 21
AM Peak Hour (Combined Volume)	9-10 AM (14)	9-10 AM (21)	10-11AM (19)	8-9AM (13)	8-9AM (26)	8-9AM (29)	8-9AM (27)	n/a
PM Peak Hour (Combined Volume)	3-4PM (22)	2-3PM (31)	12-1PM (28)	5-6PM (12)	5-6PM (22)	5-6PM (22)	5-6PM (22)	n/a

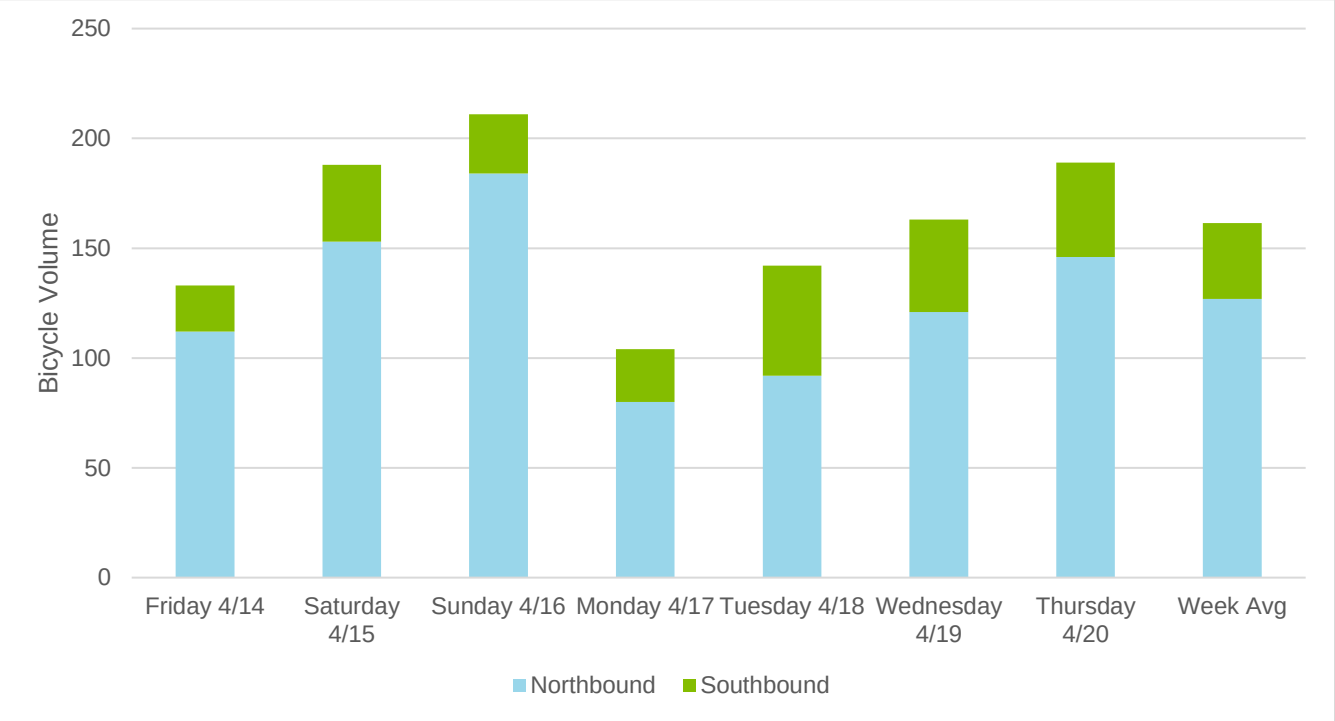

Figure 7: NB, SB, and Combined NB/SB Bicycle Daily Volumes on Graham Street, by Day (4/14/2023 to 4/20/2023)

VIDEO ANALYSIS

Video cameras were placed along Graham Street to capture road user behavior following the installation of the ABLs (Figure 10). Placement of cameras was at the discretion of the vendor; although camera placement varied between the Mid-Experiment Report and Final Report, both ensured coverage of the entire project area. Behavior observed during this video analysis can be compared against behavior pre-installation of the ABLs and after six months of installation to determine the effects of the new roadway configuration on road users. Recorded video was analyzed from 7:00 AM to 9:00 PM on two consecutive days: Friday, April 14, 2023 and Saturday, April 15, 2023. Note that roadway behavior could not be observed from the video between 8:00 PM and 9:00 PM due to lack of ambient lighting.

Graham Street has a curb-to-curb width of 32 feet, divided into the following zones, all measured from the east curb, facing south: Northbound Bicycle Lane (0-6 feet), Shared Vehicle Lane (6-17 feet), Southbound Bicycle Lane and Parking Lane Buffer (17 - 24 feet), and Southbound Parking Lane (24 – 32 feet). The pavement markings include dashed bicycle striping delineating the bicycle lanes from the vehicle lanes with a bicycle symbol within the bike lane and a solid stripe delineating the parking lane from the bicycle lane.

Road user behavior that was analyzed during review of the video recordings included:

- motorist riding location within the roadway
- bicyclist riding location within the roadway;
- passing distances when motorists overtake bicyclists;
- yielding events among road users; and
- near collisions.

In total, 343 bicyclists (267 northbound and 76 southbound) were observed during the video analysis, which is slightly less than the 352 bicyclists observed pre-installation but more than the 234 observed six months post-installation. Additional information on the video analysis methodology is detailed in Appendix F.

MOTOR VEHICLE RIDING LOCATION

Motor vehicle riding location within the roadway was measured as the lateral distance, in feet, between the right wheel of the vehicle and the adjacent curb (i.e., the western curb for southbound motorists and the eastern curb for northbound motorists). Riding location measurements were taken at one point along the corridor – the midpoint between the midblock crosswalks approximately 200 feet north of the Owen Street intersection – to avoid multiple measurements for the same vehicle, given that multiple cameras recorded video of Graham Street.

Given the high volume of vehicles, riding location was recorded for Friday, April 14, 2023. Values obtained for Friday were used to estimate riding location for Saturday for times when parking lane usage was similar to Friday's parking lane usage, based on a scaling factor obtained from vehicles volumes for each day as described in the Motor Vehicle & Bicycle Volumes section. The number of vehicles in each riding location bracket (0-2 ft, 2-4 ft, etc.) was obtained by multiplying the number of vehicles observed on Friday in each bracket with the scaling factor (~0.707).

There is one refinement to this methodology as vehicles were parked in the parking lane near the measurement point on Saturday between 1:45 PM and 4:45 PM. Their presence had a noticeable impact on riding location compared to Friday and other periods on Saturday when no vehicles were parked near the measurement point. To account for this, riding locations were recorded for a representative period where vehicles were parked on Graham Street near the measurement point on Saturday, from 2:00 PM to 2:45 PM and scaled for the entire three-hour period based on volumes recorded from 1:45 PM to 4:45 PM.

Based on the directly observed motor vehicle riding locations recorded on Friday when parking lane usage was lower near the measurement point, southbound motorists drove 11.4 feet from the western curb and northbound motorists drove 7.1 feet from the eastern curb. At an average distance of 11.4 feet from the western curb, many southbound motorists drove in the southbound advisory bicycle lane, instead of the designated vehicle lane. Compared to the Mid-Experiment Report values (12.5 ft southbound and 7.5 ft northbound), vehicles were driving closer to the curb, particularly in the southbound direction. The overall increase in vehicle volumes may be contributing to this change as drivers are more likely to see and adjust to oncoming traffic.

In contrast, based on the directly observed motor vehicle riding locations recorded on Saturday, when vehicle parking spaces were occupied near the measurement point, southbound motorists drove 13.9 feet from the western curb and northbound motorists drove 6.4 feet from the eastern curb. The presence of parked vehicles helped establish the designed intent of the ABL, by moving vehicles towards the shared drive lane and bicycles into the bike lane, achieving a more symmetrical cross section of drivable roadway width. Figure 8 shows the distribution of vehicle locations across the Graham Street cross section as observed and estimated on both Friday and Saturday, with and without parked cars.

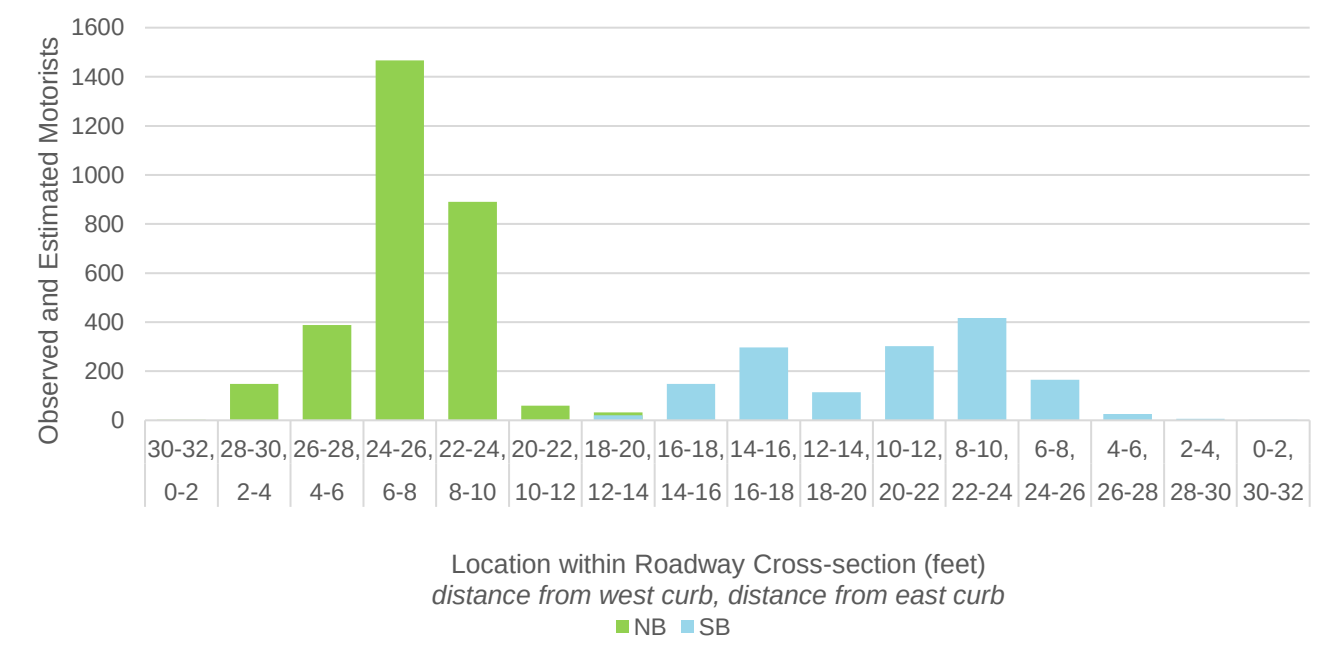

Figure 8: Distribution of Motorist Driving Locations on Graham Street

BICYCLIST RIDING LOCATION

Bicyclist riding location within the roadway was measured as the lateral distance, in feet, between the center of the bicycle and the adjacent curb (i.e., the western curb for southbound bicyclists and the eastern curb for northbound bicyclists). Riding location measurements were taken at one point along the corridor – the midpoint between the midblock crosswalks, approximately 200 feet north of the Owen Street intersection – to avoid multiple measurements for the same bicyclist, given that multiple cameras recorded video of Graham Street. Bicyclists riding on the sidewalk or grass were not included in this analysis. The term “bicyclist” includes other wheeled active modes, such as e-scooters, but excludes pedestrians walking or running in the ABLs or parking lane. Figure 9 provides a chart of the distribution of bicyclist riding location.

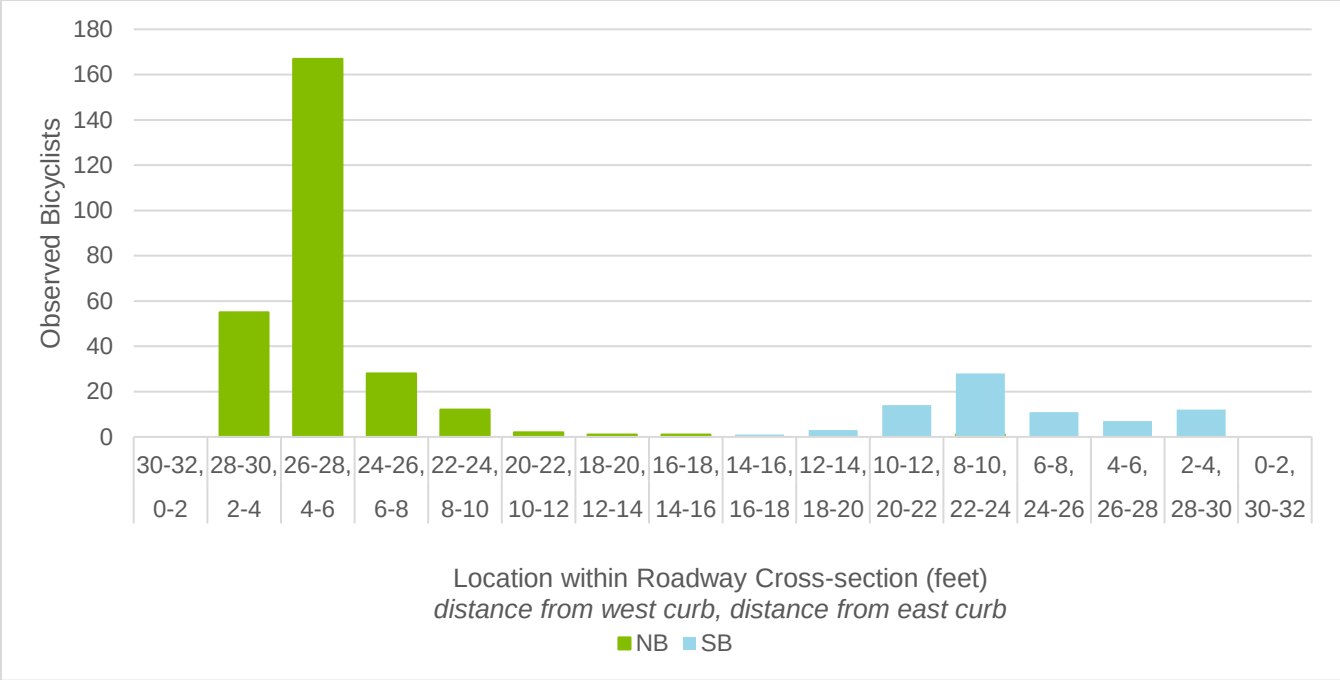

Figure 9: Distribution of Bicyclist Riding Locations on Graham Street, Looking South (200 Feet North of Owen Street)

On average, southbound bicyclists rode 8.4 feet from the western curb, just next to the eight-foot-wide parking lane, and northbound bicyclists rode 4.9 feet from the eastern curb. Southbound bicyclists tended to ride closer to or in the southbound parking lane when unoccupied by parked vehicles, likely to increase the horizontal separation between themselves and southbound motorists driving in the bicycle lane. Compared to the Mid-Experiment Report, southbound bicyclists rode an average of 3.1 feet closer to the curb. The increase in motor vehicle volumes and the shift closer to the curb for southbound vehicles, discussed above, may be contributing to southbound bicyclists riding closer to the curb in order to maintain comfortable separation from vehicle traffic.

Northbound bicyclists typically rode in the western half of the northbound bike lane, closer to the vehicle lane and away from the curb. Northbound bicyclists may have positioned themselves further from the eastern curb because they were traveling at higher speeds on the downhill grade and wanted to avoid potential curb pedal strikes. Higher downhill bicyclist speeds also may mean less speed differential between bicyclists and motor vehicles, which may result in bicyclists feeling more comfortable centering themselves near the travel lane (unlike in the uphill, southbound direction). This observed northbound bicyclist riding location is consistent with the Mid-Experiment Report, with only a 0.1 foot difference.

While over 80% of northbound bicyclists used the northbound bike lane, almost 40% of southbound bicyclists used the southbound parking lane. Compared to the Mid-Experiment Report, the proportion of southbound bicyclists riding in the parking lane decreased. This may seem contradictory to the observation above, with southbound bicyclists observed riding closer to the curb, but it appears that riding location may have consolidated: more bicyclists rode *closer* to the parking lane, while not necessarily riding *in* the parking lane itself. This may indicate that bicyclists are accustoming themselves to the new design by riding in the space marked for their use.

PASSING DISTANCES

Passing distances between vehicles and bicyclists were measured by direction when a motorist passed a bicyclist traveling in the same direction. Passing distances were calculated as the bicyclist riding location (i.e., distance from the center of the bicycle to the adjacent curb) subtracted from the motorist driving location (i.e., distance from the passenger side of the vehicle to the adjacent curb).

A total of 54 passing events were observed: 24 northbound events and 30 southbound events. This is a notable increase from the 17 passing events observed six months post-installation of ABLs. On average, the southbound passing distance was 8.0 feet and the northbound passing distance was 5.6 feet. In southbound passing occurrences, vehicles that were positioned in the bike lane moved left, reverting to the center vehicle lane, while bicyclists typically rode closer to the curb, near or in the parking lane. The bike lane essentially served as a buffer during these passing events.

Compared with pre-experiment conditions, passing distances decreased by 0.4 feet in the southbound direction and 1.6 feet in the northbound direction. Compared with mid-experiment conditions, however, the passing distances increased by 2.0 ft in the southbound direction and 1.6 ft in the northbound direction, meaning that passing distances are more similar to pre-experiment conditions than to mid-experiment conditions. Past research suggests that some variables, including presence of bicycle facilities, affect motorists' passing behavior. While the sample size of this study was low, other findings suggest that these variables alter motorists' risk calculations for crashes, as they perceive bicyclists (specifically bicyclists presenting as male or wearing a helmet) and marked bicycle facilities like bike lanes as making bicyclists less vulnerable to a crash[1].

YIELDING EVENTS

All instances when one road user yielded to another road user were noted (using all cameras throughout the project area). This included any combination of yielding between pedestrians, bicyclists, and motorists.

A total of 94 yielding events were observed: 61 in the northbound lane and 33 in the southbound lane, a notable increase from the six yielding events observed six months post-installation of ABLs in the mid-experiment observation period. Most (92%) of the observed yielding events were due to motor vehicles yielding to pedestrians crossing Graham Street at one of the uncontrolled midblock crossings. In five cases, vehicles yielded to pedestrians crossing outside marked crossings. Finally, there were two instances of vehicles yielding to oncoming traffic (pulling over and stopping to make space), in what appears to be a misunderstanding of the street function. These latter events occurred near the northern limit of the ABLs near Lincoln Boulevard.

NEAR COLLISIONS

All instances of near collisions were noted. A close interaction between two road users or a road user and static object was considered a "near collision when at least one of the following criteria were met:

- one or more road users performed an unexpected or sudden evasive maneuver (e.g., swerving or braking) to avoid colliding with another roadway user or static object; or
- road users came within approximately two feet of each other.

Only one potential near collision was observed on Friday, April 14, 2023, at 2:05 PM. A northbound vehicle froze in the middle of the shared vehicle lane when seeing an oncoming pick-up truck. The northbound vehicle moved right as the truck came closer. The camera angle did not allow for the precise measurement of the distance between the vehicles. The distance appeared small, but potentially greater than two feet, so it is uncertain whether this event qualifies as a near collision.

Each of the three reporting periods (pre-experiment, six months post-installation and two years post-installation) recorded a single near collision. Each near collision featured different characteristics and do not seem to point to a common cause.

[1] Walker, Ian. "Drivers overtaking bicyclists: Objective data on the effects of riding position, helmet use, vehicle type and apparent gender," *Accident Analysis & Prevention*, vol. 39, no 2, 2006, pp 417-425.

Figure 10: Placement of Cameras along Graham Street for Video Analysis

IN-PERSON & ONLINE PUBLIC ENGAGEMENT

The project team used in-person and online surveying as the public engagement strategy to find patterns and trends among road users' experiences with the Graham Street advisory bike lanes (ABLs). The survey provided critical quantitative and qualitative data to analyze respondents' perceptions and understanding of Graham Street's new configuration with ABLs. The data collected in this survey will be compared to the data in the Mid-Experiment Report to evaluate how attitudes and perceptions changed during the year.

The online survey was open for four weeks from March 31, 2023 to April 26, 2023 on Alchemer, an online survey platform. The project team administered intercept surveys along Graham Street on Friday March 31, 2023 from 3-6 pm and on Saturday April 1, 2023 from 12-3 pm. The same survey instrument was used for both online and intercept surveys. Raw (unedited) in-person and online engagement responses are provided in Appendix G.

RESPONDENTS

The online survey captured 63 unique responses in total. Of the 52 respondents who provided their postal code, 9 or 17% respondents stated that they lived in the Presidio's postal code. The Final Report's turnout was much smaller compared to the Mid-Experiment Report, which saw 463 responses, despite the project team conducting similar efforts as the Mid-Experiment Report to drive engagement towards the survey. It is unknown why the response rate fell, though possible reasons include survey fatigue, declining interest in sharing concerns/ideas about the project as the ABLs' novelty waned over time, or timing between engagement efforts and the survey's publishing. The smaller sample size may adversely affect some of the findings in this analysis. For example, a much smaller sample size in infrequent visitors to the Presidio makes it difficult to draw conclusions about the perceptions this group may have about the ABLs configuration.

Of the 59 respondents who provided their gender, 18 (30%) said they identified as female and 37 (63%) identified as male. Four (7%) chose "other." Those who identified themselves as female were less represented compared to the Mid-Experiment Report, where 44% of respondents self-identified as female. Overall, these results indicate that most responses came from respondents who self-identified as being male.

Table 8: Respondent Gender

Male	37	63%
Female	18	30%
Other	4	7%
Total	**59**	**100%**

Similar to the Existing Conditions and Mid-Experiment Reports, the highest number of survey respondents (49%) were in the 35 to 54 age range. This was followed by the 18 to 34 age group and 55 or older age group, with 26% and 25% of respondents, respectively. The sample size for this question was 60 respondents.

Table 9: Respondent Age

Below 18	0	0%
18 to 34	16	26%
35 to 54	29	49%
55 or older	15	25%
Total	**60**	**100%**

Survey respondents noted that they traveled on Graham Street most commonly by motor vehicle, with 45% of respondents noting that they traveled by this mode. This was followed by walking and biking, with 26% and 24% of respondents noting that they traveled by these modes, respectively. Table 10 outlines mode choice survey question results. Note that this was a multi-select question, meaning that some respondents selected more than one mode and the grand total was higher than total number of survey respondents. Given this, the mode share data demonstrates that Graham Street serves as a multimodal street for those who took the survey. These trends are similar the findings in the Mid-Experiment Report, albeit with walking mode share exceeding bicycling in the Final Report.

Table 10: Respondent Mode Share

Drive or ride in a motor vehicle	43	45%
Walk	25	26%
Bicycle	23	24%
Transit	3	3%
Other	1	1%
Total	**95**	**100%**

Based on the 60 responses, the most common trip purpose was “Recreation/ sightseeing/ visiting in the Presidio,” with 42% of respondents choosing this answer. “Commuting to my workplace in the Presidio” followed with 35% of respondents, or 25%. Eighteen percent of respondents said that they were “Only passing through, going somewhere outside Presidio.” Eight percent said that they were “Commuting to my workplace outside the Presidio” and seven percent selected “Some other reason” as their trip purpose. Table 11 outlines trip purpose survey question results.

The Final Report’s results mirror the findings in the Mid-Experiment Report, with the only notable difference being a reduced percentage of respondents selecting “some other reason” as their trip purpose (7% vs 13% in the mid-experiment phase). These data suggest that survey respondents over the past two years are mostly visiting the Presidio or commuting to their workplace situated inside the Presidio.

Table 11: Primary Trip Purpose on Graham Street

Recreation/sightseeing/visiting in the Presidio	25	42%
Commuting to my workplace in the Presidio	15	25%
Only passing through, going somewhere outside Presidio	11	18%
Commuting to my workplace outside the Presidio	5	8%
Some other reason	4	7%
Total	**60**	**100%**

Table 12 summarizes the zip codes of survey respondents. The highest number of survey respondents indicated that they live in zip code 94118, just south of the Presidio. About 17% of survey respondents indicated that they live in the Presidio (zip code 94129.) The Final Report saw a slight increase in the share of Presidio zip code respondents compared to the Mid-Experiment Report, which only saw 8% of respondents state they live in the Presidio zip code.

Table 12: Respondent Zip Codes

94118	13	25%
94129 (Presidio)	9	17%
94123	5	10%
94122	3	6%
94117	3	6%
94108	2	4%
94127	2	4%
94110	1	2%
94965	1	2%
94925	1	2%
94112	1	2%
94025	1	2%
94062	1	2%
94105	1	2%
94115	1	2%
94133	1	2%
97608	1	2%
94941	1	2%
94015	1	2%
Total	**52**	**100%**

Taken together, these demographic data suggest the Final Report survey reached a similar array of respondents as the Mid-Experiment Report survey, despite the marked difference in sample sizes.

ENGAGEMENT ANALYSIS: METHODOLOGY

Where the Existing Conditions Report relied on qualitative data, the Mid-Experiment and Final Reports used both qualitative and quantitative analysis. The project team exported results from Alchemer, an online survey platform, into Excel, where survey results were analyzed. A more extensive quantitative dataset allowed the project team to explore potential patterns and trends among different variables using pivot tables. Most questions were presented in a Likert scale to gauge perceptions of safety and comprehension of ABLs, along with some categorical questions. Free response data was qualitatively coded to find recurring sentiments.

PERCEPTIONS OF ADVISORY BIKE LANES

Perceptions of Baseline Design from Existing Conditions Report

The Existing Conditions Report found that perceptions of Graham Street's baseline configuration were "somewhat positive." Road users found the baseline design to be a comfortable experience, though they had negative reactions towards the built environment qualities and road user behavior, primarily regarding the high travel speeds of drivers on Graham Street. Before repaving, most road users' concerns revolved around uneven and bumpy pavement. Drivers were most likely to find the baseline configuration to be comfortable, and pedestrians also reported positive experiences traveling Graham Street. Bicyclists described Graham Street as an easy bicycling experience but were less likely than people driving or walking to describe it as comfortable or safe.

Perceptions of ABLs Configuration from the Mid-Experiment Report

The Mid-Experiment Report found that respondents had mostly mixed or negative feelings towards Graham Street's ABL configuration. Negative sentiment stemmed from users' (whether driving, biking, or walking) confusion and unfamiliarity with the configuration. Some respondents were concerned that the configuration's novelty may cause drivers to crash with other roadway users. Respondents with mixed feelings appreciated the new infrastructure but found the signage and wayfinding wanting.

Overall Perceptions of Advisory Bike Lanes

The Final Report survey indicated that overall perceptions of advisory bike lanes remained similar to those in the Mid-Experiment Report with some slight deviations. Respondents (who were comprised primarily of frequent visitors to Graham Street) still found the ABL configuration to be confusing, with some concerns that drivers still did not fully understand how the configuration worked. Drivers still found themselves concerned that they might strike a bicyclist. The share of respondents that found the configuration unsafe or uncomfortable, however, decreased.

General Perceptions of Safety and Comfort

When asked "Thinking about the potential for collision with a vehicle or bicyclist, how safe do you feel traveling on Graham Street in the Presidio?" (Table 13), respondents' answers suggested safety concerns regarding the ABL configuration. Twenty-six percent of respondents each indicated that they felt "very unsafe" or "somewhat safe" traveling on Graham Street. Twenty-one percent found the configuration "somewhat unsafe," while 16% said they found it "very safe." When analyzing at the data as an aggregate, 42% of respondents perceived the treatment as safe, while 47% found it unsafe. Compared to the Mid-Experiment Report, there was an increase in respondents who perceived the configuration as safe (42% in the Final Report versus 36% in the Mid-Experiment Report) or neutral (12% in the Final Report versus 8% in the Mid-Experiment Report) and a decrease among those who perceived it as unsafe (47% in the Final Report versus 54% in the Mid-Experiment Report). Overall, this suggests modest increases in perceptions of safety over the experimental period.

Table 13: Respondent Perceptions of Safety Conditions

Very safe	9	16%
Somewhat safe	15	26%
Neutral	7	12%
Somewhat unsafe	12	21%
Very unsafe	15	26%
Total	**58**	**100%**

Perceptions of safety vary, however, based on the respondents' zip code. Respondents who reported a Presidio zip code were more likely to perceive the ABL configuration as unsafe compared to those in non-Presidio zip codes. Only 33% of respondents in the Presidio zip code found the configuration safe (with none choosing "very safe"), with 55% finding it unsafe. In contrast, 42% of non-Presidio zip code respondents found the configuration safe while 44% found it unsafe.

This is an interesting reversal compared to the Mid-Experiment Report, which found that Presidio zip code respondents were more likely than non-Presidio zip code respondents to find the configuration safe. There was, however, a smaller sample size and much lower number of Presidio respondents compared to the Mid-Experiment Report (which saw 35 Presidio respondents), reducing the likelihood that these responses are a valid indication of a negative shift in opinion among Presidio residents. The table below outlines the differences in responses among the two groups for the Final Report.

Table 14: Respondent Perceptions of Safety Based on Presidio/Non-Presidio Zip Codes

	Presidio Zip Code Respondents			Non-Presidio Zip Code Respondents		
Very safe	0	0	33%	9	18%	42%
Somewhat safe	3	33%		12	24%	
Neutral	1	11%	11%	6	12%	12%
Somewhat unsafe	1	11%	55%	11	22%	44%
Very unsafe	4	44%		11	22%	
Total	**9**	**100%**	**100%**	**49**	**100%**	**100%**

While only 42% of respondents indicated that they found the ABL configuration to be safe, most respondents (54%) indicated that they found the configuration to be comfortable. The survey gauged respondents' perceived level of traffic stress by asking their comfort level travelling on Graham Street by mode. While most bicyclists (68%) and pedestrians (53%) reported that they felt comfortable traveling on Graham Street, only 37% of drivers found the configuration as comfortable to drive on, with 58% finding it uncomfortable.Comfort levels across all modes improved from the Mid-Experiment Report. The Mid-Experiment Report found that 47% of bicyclists, 42% of pedestrians, and 34% of drivers felt comfortable traveling on Graham Street, compared to 68%, 53%, and 37% in the Final Report, respectively. This may indicate some growing comfort since the previous report, though this is based on a smaller sample size.

The perception of the configuration as uncomfortable by drivers is not an indication that the design is not working, especially when considered alongside the perception of the configuration as comfortable for pedestrians and bicyclists. Driver discomfort can translate into more cautious driving, which can result in an increase in safety for all users.

Table 15: Comfort Levels on Graham Street by Mode

	Bicyclists			Drivers			Pedestrians		
Very comfortable	8	25%	53%	10	23%	37%	16	42%	68%
Somewhat comfortable	9	28%		6	14%		10	26%	
Neutral	3	9%	9%	3	7%	7%	5	13%	13%
Somewhat uncomfortable	6	19%	38%	11	26%	58%	4	11%	33%
Very uncomfortable	6	19%		13	30%		3	8%	
Total	**32**	**100%**	**100%**	**43**	**100%**	**100%**	**38**	**100%**	**100%**

Perceptions of Safety by Mode

There were some variations in perceptions of safety and comfort by mode (Table 16). In general, 65% of bicyclists perceived the ABL configuration as safe or had a neutral opinion, compared to 59% in the Mid-Experiment Report, with the percentage of bicyclists with a neutral opinion about the configuration increasing from 9% to 22% from the Mid-Experiment Report to the Final Report and the percentage of bicyclists with a safe perception decreasing from 50% to 43%. The sample size for bicyclists for the Final Report (23) is much smaller compared to that in the Mid-Experiment Report (227). The small sample size makes it difficult to infer why more bicyclists feel neutral and fewer perceive the configuration as safe.

Drivers' and pedestrians' perceptions were much more negative, as most that fell within this group saw the configuration as unsafe. Fifty percent of drivers indicated that they felt unsafe, compared to 61% in the Mid-Experiment Report, suggesting that drivers may be getting used to the ABL configuration.

Fifty-two percent of pedestrians indicated that they felt unsafe, compared to 28% in the Mid-Experiment Report. The sample size for pedestrians for the Final Report (25) is much smaller compared to that in the Mid-Experiment Report (264). Access to a sidewalk may explain the inconsistency between pedestrians feeling comfortable on Graham Street but perceiving the configuration as unsafe. Pedestrians may have felt comfortable walking on Graham Street (where they do not mix with vehicular traffic) but perceived the configuration as unsafe for other users, with some noting that they observed drivers frequently disobeying stop signs. Drivers may simply perceive the configuration as unsafe, despite crash data indicating that there were zero crashes related to the configuration, due to the uniqueness of the configuration in American road design.

Table 16: Perceptions of Safety by Mode

	Bicyclists			Drivers			Pedestrians		
Very safe	0	0%	43%	5	12%	36%	2	9%	35%
Somewhat safe	10	43%		10	24%		6	26%	
Neutral	5	22%	22%	6	14%	14%	3	13%	13%
Somewhat unsafe	3	13%	35%	10	24%	50%	5	22%	52%
Very unsafe	5	22%		11	26%		7	30%	
Total	**23**	**100%**	**100%**	**42**	**100%**	**100%**	**25**	**100%**	**100%**

Perceptions of Safety by Frequency of Visit

The project team also analyzed safety perceptions of the ABLs by frequency of visit to identify any possible trends or correlation between the two variables. There were mixed perceptions of safety by those who live, work, or commute through the Presidio, with similar percentages feeling safe versus unsafe traveling on Graham Street. More respondents who described themselves as frequent visitors to the Presidio indicated they felt unsafe traveling on Graham Street. The survey reached very few people who indicated that they visit the Presidio less than once a week, making it difficult to make reliable comparisons between those groups or against prior analysis periods. In-person intercept surveys indicated that some respondents noted that they "didn't feel qualified" to offer an opinion if they were a first-time user of Graham Street, which may have resulted in fewer survey responses from infrequent visitors, although everyone was encouraged to participate in the survey. Figure 11 shows safety perceptions by frequency of visit.

Compared to the Mid-Experiment Report, there was an increase in survey respondents who live, work or commute through the Presidio that perceived the ABL configuration as safe, although overall results were still mixed. In the Mid-Experiment Report, survey respondents who live, work or commute through the Presidio overwhelmingly perceived the configuration as unsafe.

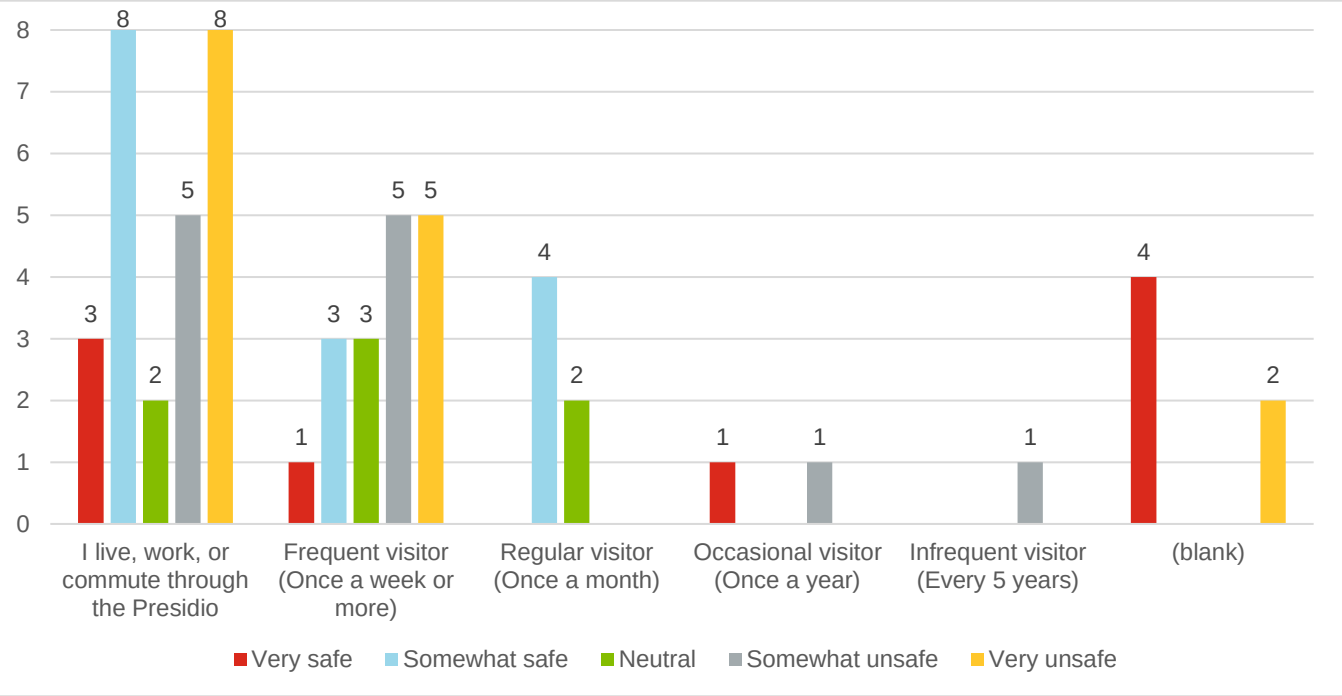

Figure 11: Perceptions of Safety by Frequency of Visit

The project team sought to investigate whether there were differences in perceptions of safety between in-person respondents and those who completed the survey online. Unfortunately, the survey platform did not distinguish between those who responded in-person or online, and thus this limitation prevented a direct comparison between the two.

Perceptions of Comfort by Mode and Frequency of Visit

Comfort by mode was also noted based on how frequently respondents visited the Presidio. When considering these data, it is important to note that the small sample size for both regular and less frequent visitors limits any meaningful conclusion that compares comfort across visitor frequency. One highlight is that many people who live, work or commute through the Presidio do not cycle on Graham Street, but more frequently walk or drive along it. Drivers who are infrequent visitors almost unilaterally indicated that they were “very uncomfortable” traveling on Graham Street. Regardless of frequency of visit, almost all pedestrians indicated that they were “comfortable” or “very comfortable” crossing Graham Street.

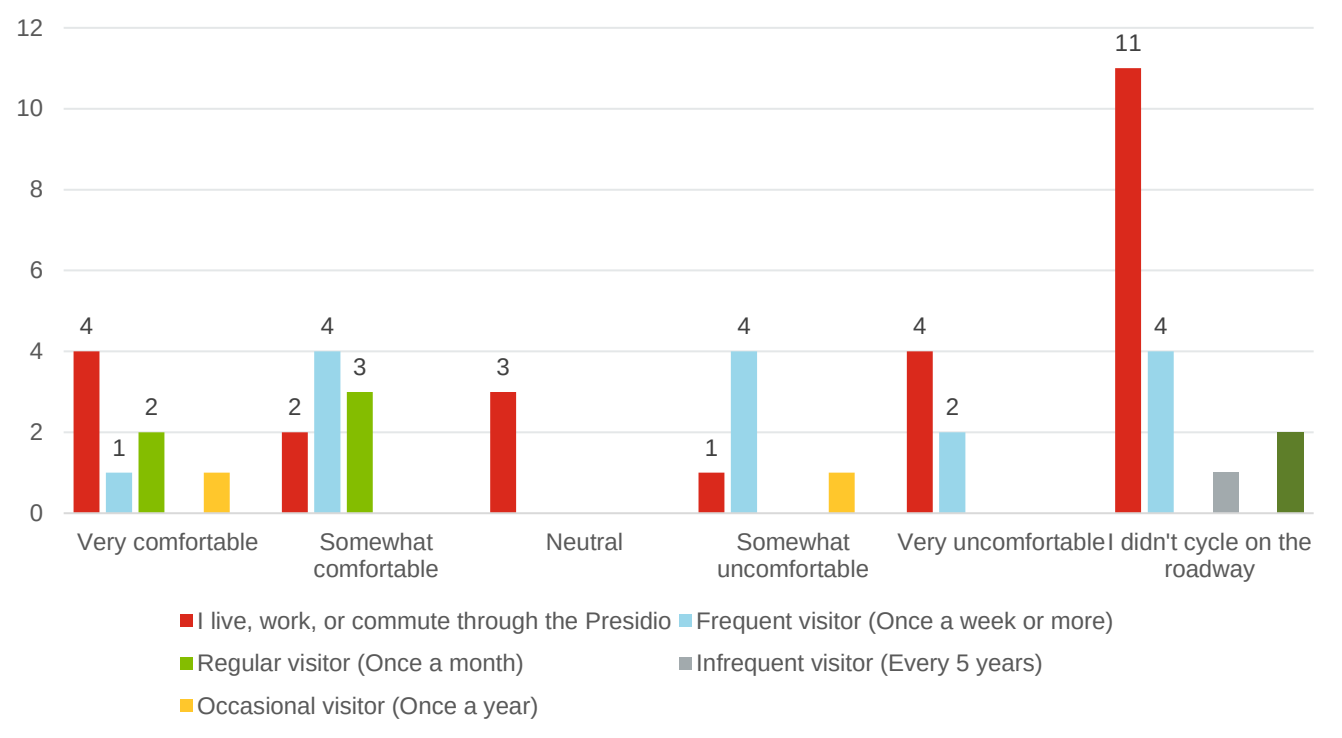

Figure 12: Cyclist Comfort by Frequency of Visit

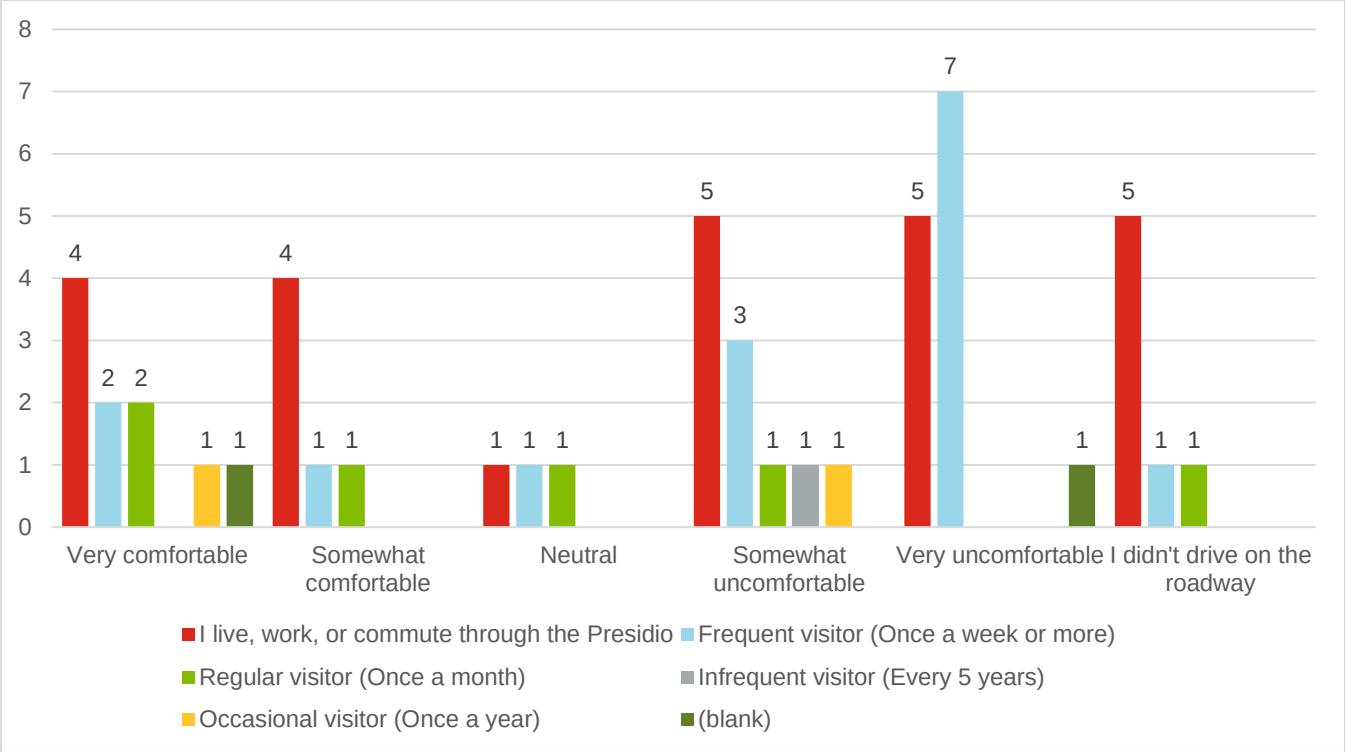

Figure 13: Driver Comfort by Frequency of Visit

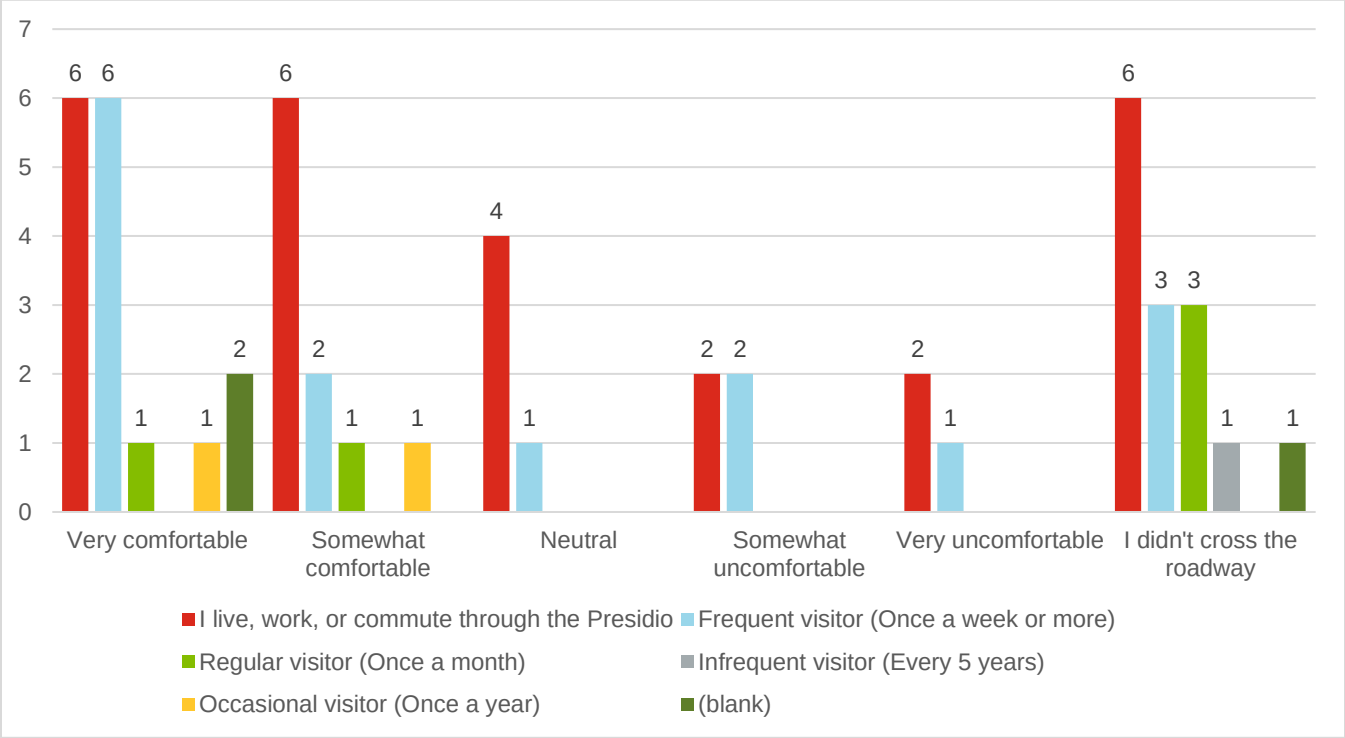

Figure 14: Pedestrian Comfort by Frequency of Visit

Qualitative Responses Offered by Users Who Felt Unsafe

The survey asked a follow-up question to respondents who perceived the treatment as unsafe, in turn providing critical qualitative data. The project team coded responses to provide a normalized dataset from which to draw trends and patterns. The following table lists common safety concerns.

Table 17: Qualitative Responses Regarding Feeling Unsafe

General Comment	15	34%
Lack of Understanding - Drivers	14	32%
Need for Better Wayfinding/Signage	8	18%
Lack of Clarity/Confusing	6	14%
General Safety Issue	1	2%
Total	**44**	**100%**

The Final Report found that, not counting General Comments, that a lack of understanding of the ABL configuration by drivers was the most common concern. Respondents stated that they were still anxious that drivers were unable to interpret pavement markings or may be confused by the configuration. One respondent found that "most drivers don't know to share the road and go into the bike lane when cars coming towards them," while another stated that it is "kind of a free for all because it's unclear." Another common concern was the need for better wayfinding/signage, which aligns with respondents' concerns that drivers may not understand the configuration. For example, one respondent found that the configuration "looks like a one-way street," while another stated that "better visuals and signs would help."

ANTICIPATED AND REALIZED CONDITIONS

The engagement summary in the Existing Conditions Report presented a diagram and explanation of ABLs to respondents to gauge their first impressions. The Mid-Experiment and Final Reports surveyed residents after installation to gauge sentiment and user experience. This section synthesizes findings from the Final Report survey with previous findings to compare and contrast users' predicted and real-life experience.

Perceptions by Mode

Bicyclists had a positive reaction toward the proposed ABLs during the Existing Conditions Report's engagement efforts. Survey data post-installation suggests that bicyclists have a more tepid reception toward ABLs. Bicyclists who were pessimistic that drivers would not understand or comply with ABLs found their concerns realized, as drivers misunderstanding ABLs was a common thread throughout the Mid-Experiment and Final Report engagement efforts. Drivers in the Existing Conditions Report stated that they had concerns regarding ABLs' safety, lack of intuitiveness, and possibility for congestion.

Survey findings in the Mid-Experiment and Final Reports confirm concerns regarding safety and intuitiveness of the ABLs expressed in the Existing Conditions Report. Concerns over traffic congestion, however, were unfounded as the Mid-Experiment and Final Reports showed that the ABLs had no adverse impacts on traffic flow. Qualitative data gathered from the "If you feel unsafe or very unsafe, describe why" question suggests that drivers recognized that ABLs were easier to navigate after multiple uses. For instance, one respondent in the Mid-Experiment survey stated that "I was confused by the two-way road and fortunately did not encounter a bike or another car in the incoming shared lane. Now that I see how it is supposed to work, I am more comfortable with it." This shows that confusion can be remedied with frequent use.

Perceptions of Signage and Striping

About 47% of respondents disagreed with the statement, “The two-way traffic sign on Graham Street helped me understand how I share the road with oncoming vehicles or bicyclists,” aligning with the Mid-Experiment 41%. Unlike the Mid-Experiment survey, however, only 11% of respondents agreed with this statement (compared to 38% in the Mid-Experiment survey), and 42% of respondents felt neutrally or had not noticed the signage (compared to 21% in the Mid-Experiment survey). During the Mid-Experiment survey, the two-way traffic signs were still supplemented with orange flags to increase conspicuity, which may have resulted in the higher percentage of respondents who indicated that they did not notice the signage in the Final Report.

Striping, too, was perceived as confusing. Forty-five percent of respondents disagreed with the statement, “The pavement markings on Graham Street helped me understand how to share the roadway with other bicyclists or vehicles,” while 32% agreed with the statement and 18% felt neutrally or hadn’t noticed. Like in the Mid-Experiment Report, some survey respondents stated that drivers are still unfamiliar with the markings used in the ABLs configuration, with some mistaking them as indicating that Graham Street was a one-way street.

Table 18: Respondents' attitudes to traffic sign and pavement markings on Graham Street

	The two-way traffic sign on Graham Street helped me understand how I share the road with oncoming vehicles or cyclists.		**The pavement markings on Graham Street helped me understand how to share the roadway with other cyclists or vehicles**	
Agree	6	11%	18	32%
Neutral or Didn't Notice	23	42%	12	23%
Disagree	26	47%	25	45%
Total	**55**	**100%**	**55**	**100%**

The project team explored how perceptions of signage and striping are influenced by whether the respondents were bicyclists or drivers (Table 19). Note that this is a broad exploratory analysis, as respondents were able to choose more than one mode in the survey and respondents who chose multiple modes were counted in both categories.

Those who drove were more likely to agree than bicyclists that the two-way traffic sign helped them understand how to share the road (12% of drivers versus 4% of bicyclists). Both modes saw a drop in the proportion of respondents stating that signage was helpful compared to the Mid-Experiment Report, where 19% of bicyclists and 21% of drivers agreed that the signage was helpful.

Drivers were more likely, however, to disagree that the signage helped them understand the configuration (42%) than indicating that they felt neutral or did not notice the signage (36%). Similarly, bicyclists were also more likely to disagree that the signage helped them understand the configuration (47%) than indicating that they felt neutral or did not notice the signage (43%).

Table 19: Respondents' Attitudes to Traffic Signs by Bicycling or Driving

The two-way traffic sign on Graham Street helped me understand how I share the road with oncoming vehicles or cyclists.	Bicyclists			Drivers		
Strongly Agree	0	0%	4%	0	0%	12%
Agree	1	4%		6	12%	
Neutral	2	9%	43%	8	16%	36%
Didn't notice	8	35%		15	30%	
Disagree	4	17%	47%	6	12%	42%
Strongly Disagree	7	30%		15	30%	
(blank)	1	4%	4%	18	6%	6%
Total	**23**	**100%**	**100%**	**50**	**100%**	**100%**

The data presented in Table 20 suggests that pavement markings were more helpful for bicyclists than they were for drivers. Around 39% of bicyclists stated that they found the pavement markings helpful, compared to 9% of drivers. The data suggest that drivers may not even notice pavement markings, with 49% respondents stating that they had a neutral opinion or did not notice the markings. The data for drivers is noticeably different from the data found in the Mid-Experiment Report, where 23% of drivers found the pavement markings useful. However, the Final Report found that 38% of drivers disagreed with the statement, which is a reduction from the Mid-Experiment Report's 62%.

The frequency of visits data may offer a hint as to why reactions towards pavement markings and signage were less favorably received for this report compared to the Mid-Experiment Report. As the frequency of visit data indicates, most of the survey's respondents were frequent visitors to or lived in the Presidio. Frequent visitors and residents may have grown accustomed to the pavement markings and signage over time, in turn making these less noticeable. Roadway users who have been acclimated to the ABLs may no longer need to reference pavement markings or signage after becoming accustomed to the configuration.

Table 20: Respondents' Attitudes to Pavement Markings by Bicycling or Driving

The pavement markings on Graham Street helped me understand how to share the roadway with other cyclists or vehicles	Bicyclists			Drivers		
Strongly Agree	2	9%	39%	0	0%	9%
Agree	7	30%		4	9%	
Neutral	5	22%	22%	8	19%	49%
Didn't notice	0	0%		13	30%	
Disagree	3	13%	35%	5	12%	38%
Strongly Disagree	5	22%		11	26%	
(blank)	1	4%	4%	2	4%	4%
Total	**23**	**100%**	**100%**	**43**	**100%**	**100%**

CONCLUSION

SUMMARY OF EXPERIMENT

This Final Report compares observations and analyses to those presented in the Mid-Experiment and Existing Conditions Reports. Motor vehicle speeds increased between the Existing Conditions Report and Mid-Experiment Report but remained consistent between the Mid-Experiment Report and Final Report, suggesting that: the ABL striping has been ineffective in calming traffic speeds; drivers have become more familiar to the configuration; or the repaving of Graham Street along with the ABL installation has resulted in increased travel speeds.

Collision data and video analysis results suggest that motorists are responding and reacting to the ABLs without major incidents. Passing distances have increased since the Mid-Experiment Report, returning to close to the pre-experiment conditions. Average motor vehicle speeds are less than the 25 mile-per-hour preferred speed threshold for ABLs, but 85th percentile speeds exceed it, although they are still below the 35 mile-per-hour maximum speed threshold. Safety data, traffic volumes, and video data suggest that ABLs are functioning safely and are well-suited as a striping configuration for Graham Street.

Although data show that conditions on Graham Street are safe, survey responses suggest that the public perceives the ABLs as unsafe and that users are still growing accustomed to the ABLs on Graham Street. Perceptions of safety and comfort are mixed, and qualitative data indicate that respondents would like to see clearer visual communications on how to use the configuration. Compared to the Mid-Experiment Report, there has been a decrease in the proportion of people indicating that they feel uncomfortable or unsafe traveling on Graham Street. Of all road users, drivers vocalize the most discomfort and safety concerns regarding the ABL configuration. In contrast, bicyclists and pedestrians skew towards positive or neutral perceptions of safety or comfort. Presidio residents indicate feeling safer compared to in Mid-Experiment Report, suggesting an adjustment to the configuration, but overall sentiment remains mixed.

FUTURE STEPS

Given that the data have confirmed the safety benefits of the ABLs but that the engagement has identified confusion among different types of street users, additional outreach efforts should be conducted to communicate how the street should be used. This could include experimental educational signage explaining how the roadway is intended to be used, experimental pavement markings, or other outreach efforts.

Given the mixed perceptions of safety and comfort of people traveling on Graham Street, an attempt to decrease vehicle travel speeds may be considered, with a goal of achieving an 85th percentile speed at or below the 25 mile-per-hour preferred speed threshold for ABLs. A decrease in vehicle travel speeds would likely increase people's feelings of safety and comfort when driving, biking, and walking along the street. This could be achieved by installing traffic calming treatments at select locations: flexposts between the bike lanes and center travel lane to create pinch points, speed bumps in the center travel lane, restriction of parking at select locations so cars cannot simply circumnavigate the traffic calming, or a combination of the above.

Alternatively, larger design updates could be considered. Although parking utilization data was not collected as part of this experiment, video data and feedback from street users indicate that there may be low parking utilization on Graham Street and that this additional space may be a factor in confusion about the function of the roadway. Given this, parking removal could be considered to allow for a design that provides a dedicated space for each roadway user (e.g., one travel lane and one bike lane in each direction.) Given that there is an existing accessible on-street parking space, this would require an evaluation of accessible parking prior to further consideration. If this option is implemented, vehicle travel speeds may increase due to the provision of a dedicated lane for each direction of vehicular travel. Given this, it is recommended that vertical traffic calming treatments (speed cushions, speed bumps, etc.) be implemented in the vehicle travel lanes.