SFMTA
Municipal
Transportation
Agency

Twin Peaks Figure 8 Pilot Project

Final Report

November 2017

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Summary and Key Findings

In July 2016, the SFMTA implemented a pilot project along Twin Peaks Boulevard that repurposed roadway space for a bike- and pedestrian-only right of way on the eastern half of the “Figure 8” roadway surrounding the peaks. Because Twin Peaks is an iconic open space landmark enjoyed by local residents and visitors to San Francisco, providing safe and comfortable access to the panoramic views of San Francisco and the Bay is seen as vital to ensure the success of this attraction and meet City goals.

The project team evaluated the project from a number of angles, including traffic operations, safety, parking, and public feedback, with an emphasis on measuring whether or not the pilot met the project’s goals. This report summarizes the project team’s findings.

Key Findings:

There were a number of key findings that came to light after the pilot project was installed and evaluated:

- Vehicle speeds decreased slightly or remained the same after commencement of the pilot;
- Traffic safety impacts are unclear (due to the limited amount of data available at this point). However, the project team expects the number of collisions to decrease with the addition of several safety improvements, as well as a reduction in the number of conflict points between cars, pedestrians, and bikes as part of the pilot project;
- Vehicle circulation at Twin Peaks remains relatively unchanged;
- Parking supply remains relatively unchanged, with the exception of several formerly-informal spaces at the junctions of the Figure 8 being formalized under the pilot; and
- Public support for making the current configuration permanent is strong;

These and other findings are discussed in more detail in the sections that follow.

Project Background

San Francisco Recreation and Parks Department (Rec Park) secured a Priority Conservation Area Grant to fund the Twin Peaks Connectivity Planning Project (Connectivity Project), a planning effort to study and prepare redesign proposals for Twin Peaks Boulevard with the support of San Francisco Public Works (SFPW) and the SFMTA. The goals of the Connectivity Project include:

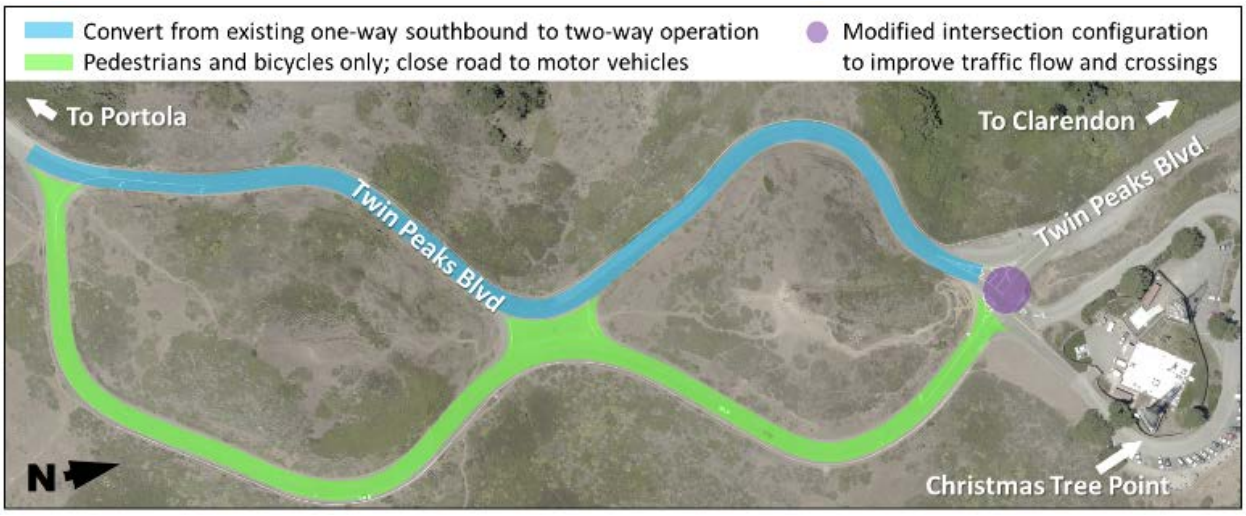
- Reallocate a portion of the existing roadway from vehicle use to pedestrian and bicycle use;
- Locate pedestrian crossings to link with trail sections; and
- Recommend realignment of the Bay Area Ridge Trail to cross over Twin Peaks Blvd.

The Department of Public Works (Public Works) completed a paving project in the project area during the pilot.

Implementation of the Rec Park's Connectivity Project is several years away, requiring detailed design, environmental review, and allocation of funding. The project team identified an opportunity to test the key concept considered in the Connectivity Project through temporary and low cost treatments, and originated the Twin Peaks Boulevard Figure 8 Pilot Project.

In July 2016, the SFMTA implemented the pilot project to test a new roadway configuration around Twin Peaks. The western half of the Twin Peaks Boulevard Figure 8 roadway was opened to two-way vehicle traffic, and the eastern half was opened to people walking and biking. Under the pilot project, vehicle access is allowed on the western side of the Figure 8 as a two-way street with vehicles traveling in both directions, as opposed to the previous one-way configuration for all vehicle traffic. The two-way western alignment maintains access to Christmas Tree Point Road, as well as from Twin Peaks Boulevard to the north and south as it previously existed.

In the year following implementation, SFMTA evaluated the new configuration in terms of traffic operations, as well as public input and preferences. The pilot roadway configuration is shown below.



Project Goals

Goals of the pilot project include:

- Obtaining public feedback on a major change to an iconic location;
- Engaging a broad set of public to understand proposal and share thoughts (survey); and
- Observing/collecting data to ensure that pilot does not uncover new safety issues or circulation issues.

Project Location

The project is located along the Figure 8 on Twin Peaks Boulevard near the summit of Twin Peaks. The project extends between Christmas Tree Point Road (northern end of the Figure 8) to the southern end of the Figure 8. The project straddles two San Francisco supervisorial districts, District 7 and District 8.

Traffic Circulation, Vehicle Speeds, and Volumes

Traffic Circulation

Generally, vehicular circulation was unchanged as the pilot configuration has continued to provide full access in both directions to destinations along Twin Peaks Boulevard.

Bike and pedestrian circulation has mostly improved with the additional protected space and improved trail connections. Several trail crossings have been eliminated, making it unnecessary for those on foot to cross vehicular traffic. However, some bicyclists have reported difficulty transitioning from the pedestrian and bicycle only side of the Figure 8 to the mixed traffic side.

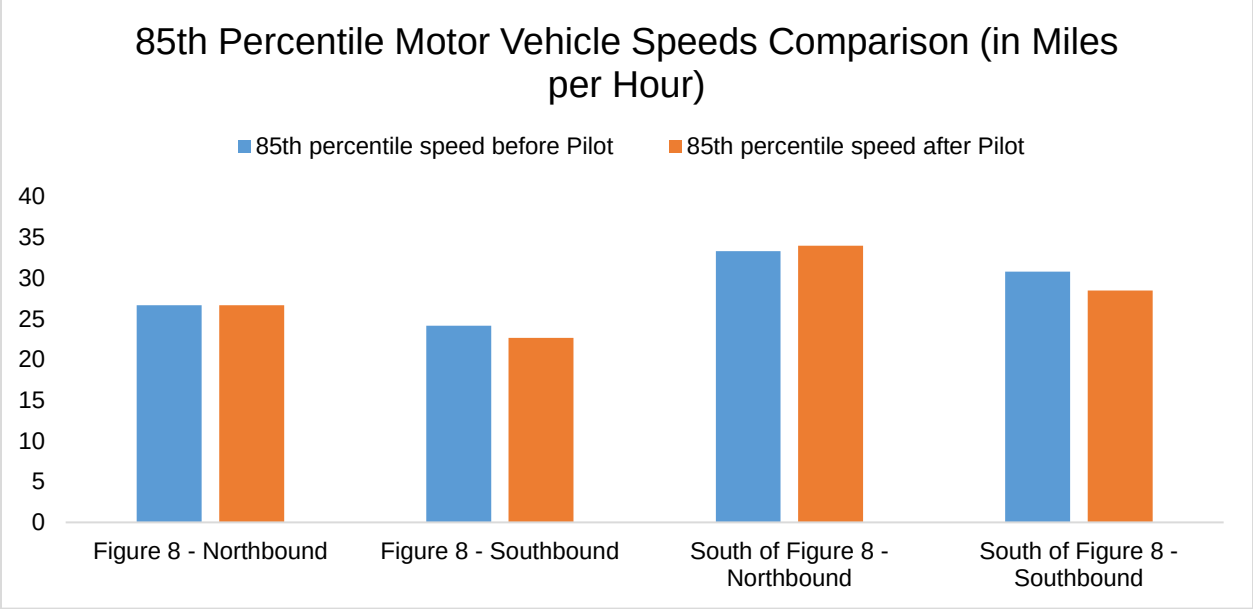
User compliance—i.e. visitors accurately using the facilities as designed—has been very good and would likely improve further with permanent infrastructure replacing temporary barriers. The project team did receive some feedback about congestion during the construction associated with the Public Works repaving project, but reports have since diminished. Minor traffic congestion continues to occur at peak afternoon/evening times after the pilot installation as was observed before the pilot. Very short queues have been observed during these times. However, this does not appear to be a broad issue, and is not in conflict with the goals of the project.

Vehicle Speeds

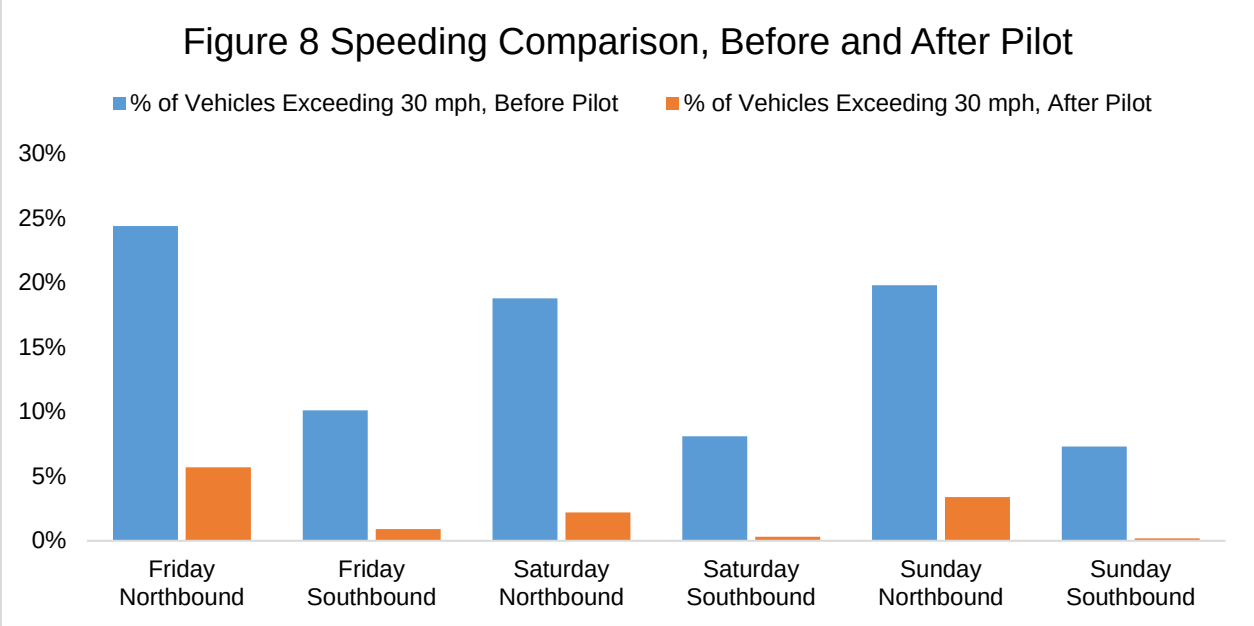
In general, vehicle speeds decreased slightly or remained the same after commencement of the pilot. The exception was south of the project, where northbound speeds increased slightly.[1]

Vehicles speeds were recorded in both directions of travel at two locations along Twin Peaks Boulevard for one 24-hour period before, and one 24-hour period after the pilot installation. The following graphs show the changes in speed by location during the daytime.[2]

[1] Speeds were collected south of the Figure 8 before the pilot on a Tuesday over a 24-hour period, while speeds data were collected after the pilot installation over a 72-hour period Friday through Sunday. Therefore, direct before/after comparisons at this location should be made with caution.
[2] All 85th percentile speeds based on linear interpolation within 5 mph bins.



Speeding—which the project team defines as exceeding the posted speed limit of 30 mph—decreased significantly in the Figure 8 after the pilot was installed, especially in the northbound direction, as shown in the following chart.



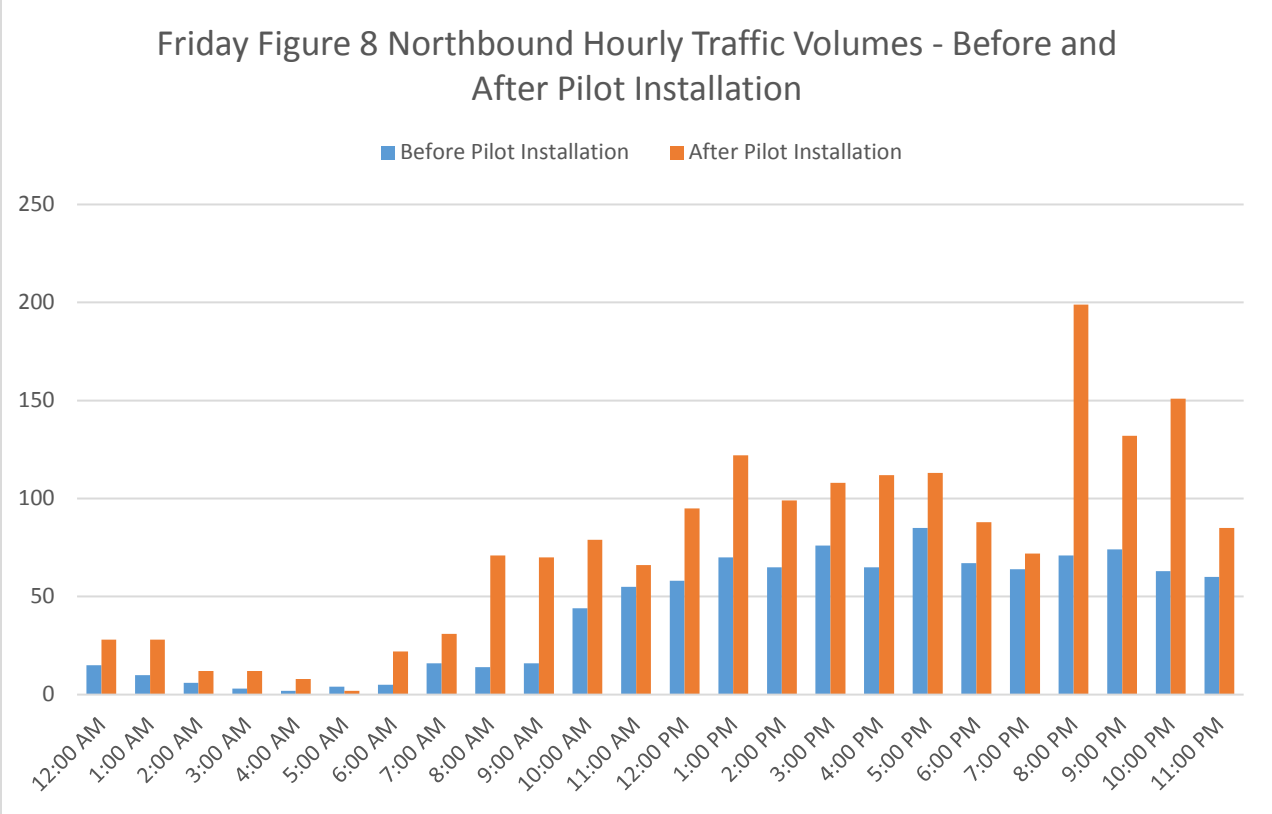
Vehicle Volumes

Observed vehicle volumes fluctuated based on the day of week, time of year, and weather conditions. Generally, weekdays in the wintertime saw the lowest average daily traffic volumes (ADTs) (1,500 vehicles per day or fewer), while summer and fall weekends saw the highest ADTs (2,500 to 3,100 vehicles per day).

The project team was able to compare before and after volumes in the Figure 8 from a 72-hour period (Friday, Saturday, and Sunday) on February 20-22, 2015 with those from January 27-29, 2017, after the pilot was installed. In general, bi-directional vehicle volumes increased after the pilot was installed, as seen in the ADT graphs below. The highest volumes were observed in the afternoon and early evening, while the lowest volumes were observed in the pre-dawn hours. Interestingly, total daily northbound volumes increased, while southbound volumes decreased. The project team suspects that a number of factors contributed to the overall increase in volumes reflected in the graphs, including potential double counting of vehicles, differing weather conditions during the two observation periods, etc. Additionally, the City has seen a general increase in overall ADTs during the period due to a growing population and changing travel patterns. Despite the increased volumes, the impacts on congestion were not significant, and the project team is not aware of any significant increase in vehicle queueing.

Vehicle classification data were also analyzed to determine whether there was a change in large vehicles as a percent of overall vehicles traveling on Twin Peaks Blvd. Before the pilot, large vehicles—such as tour buses—comprised 5.2% of all vehicles. After the pilot was installed, large vehicles were 4.6% of all traffic along Twin Peaks Blvd., representing a small decrease.[3]

[3] Vehicle classification surveys were taken during 48-hour periods (Saturday and Sunday). The “before” survey was taken on 10/10/15 and 10/11/15, while the “after” survey was taken 2/10/17 and 2/11/17. Large vehicles are those with an FHWA Vehicle Category Classification of 4-13.


Friday Figure 8 Northbound Hourly Traffic Volumes - Before and After Pilot Installation
Before Pilot Installation
After Pilot Installation
250
200
150
100
50
0
12:00 AM
1:00 AM
2:00 AM
3:00 AM
4:00 AM
5:00 AM
6:00 AM
7:00 AM
8:00 AM
9:00 AM
10:00 AM
11:00 AM
12:00 PM
1:00 PM
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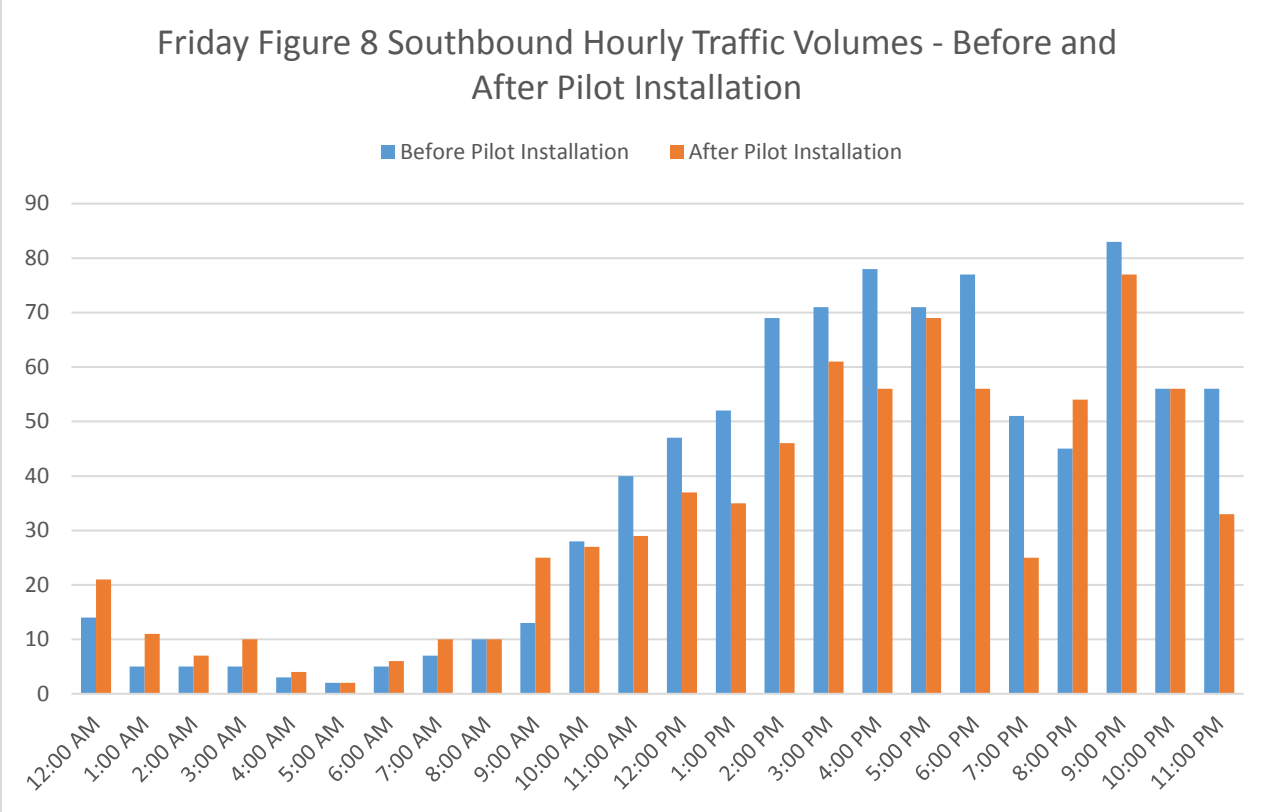
Friday Figure 8 Southbound Hourly Traffic Volumes - Before and After Pilot Installation
Before Pilot Installation
After Pilot Installation
90
80
70
60
50
40
30
20
10
0
12:00 AM
1:00 AM
2:00 AM
3:00 AM
4:00 AM
5:00 AM
6:00 AM
7:00 AM
8:00 AM
9:00 AM
10:00 AM
11:00 AM
12:00 PM
1:00 PM
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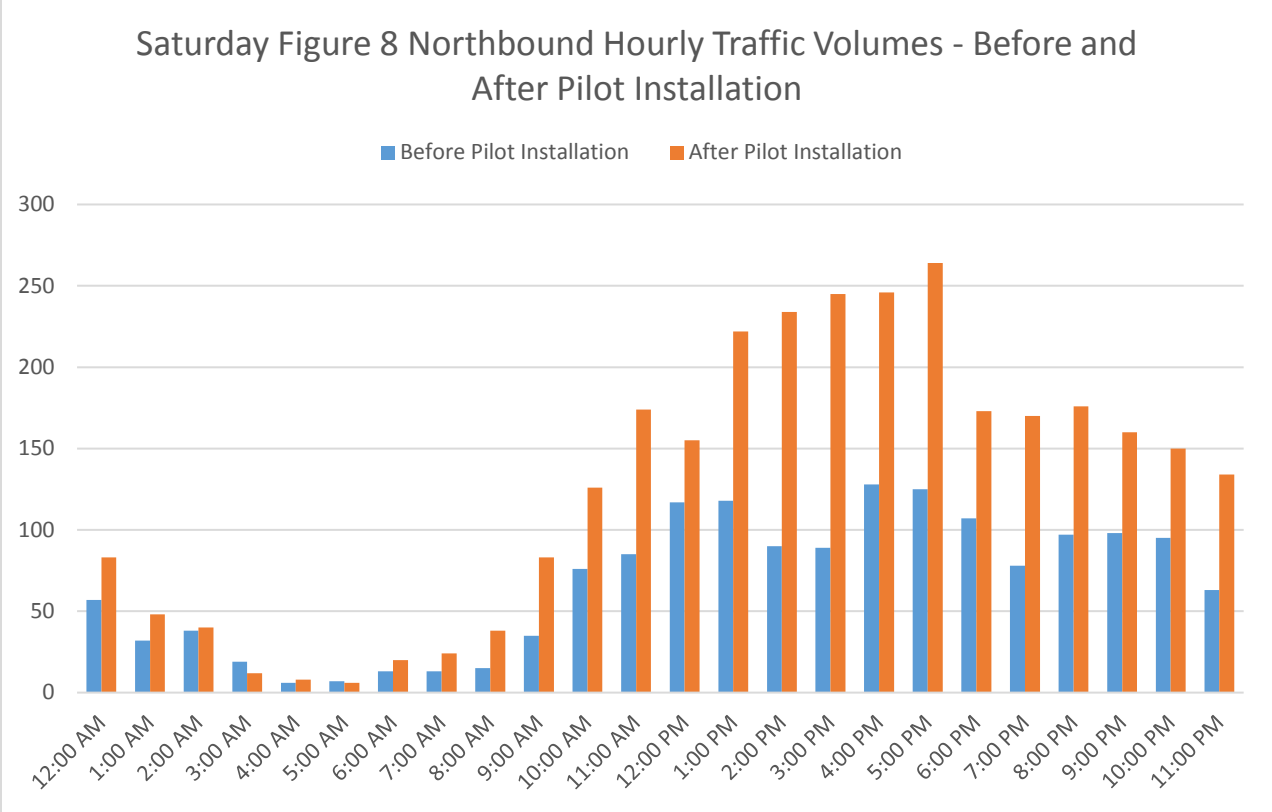
Saturday Figure 8 Northbound Hourly Traffic Volumes - Before and After Pilot Installation
Before Pilot Installation
After Pilot Installation
300
250
200
150
100
50
0
12:00 AM
1:00 AM
2:00 AM
3:00 AM
4:00 AM
5:00 AM
6:00 AM
7:00 AM
8:00 AM
9:00 AM
10:00 AM
11:00 AM
12:00 PM
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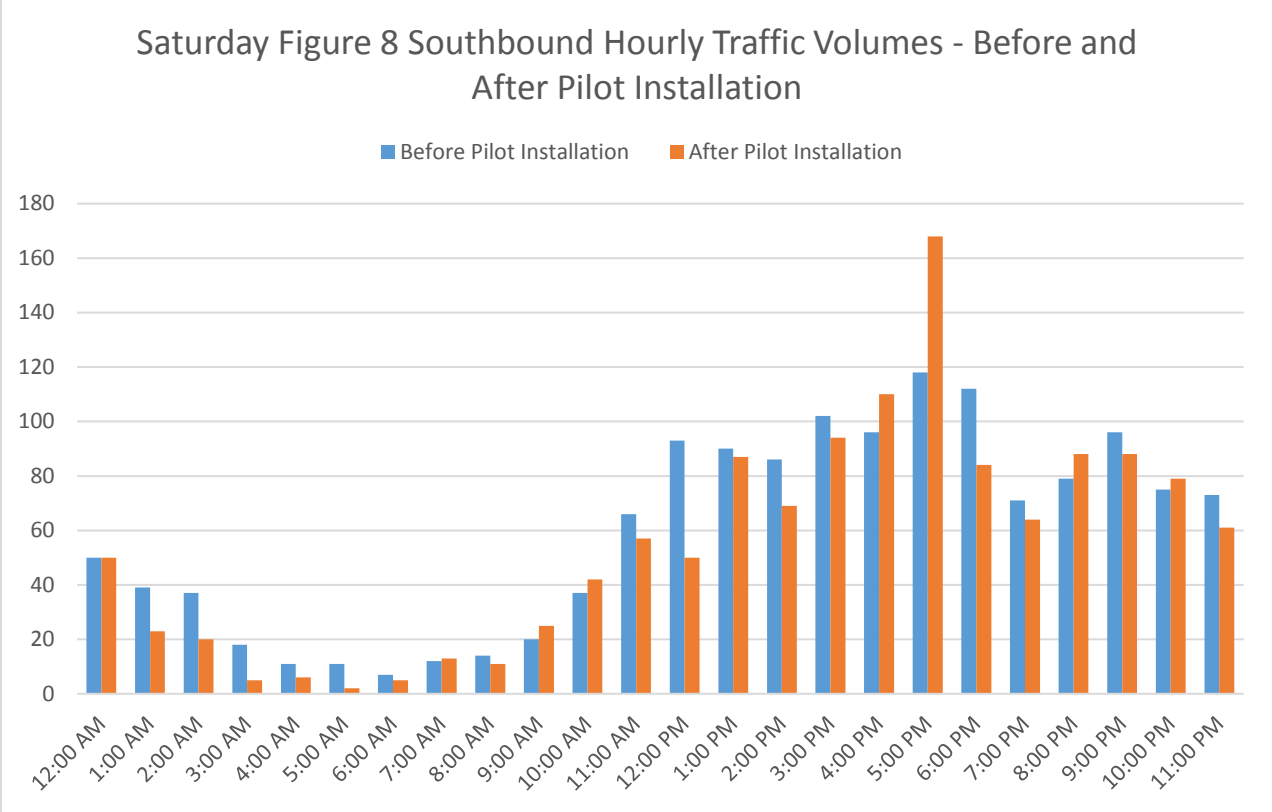
Saturday Figure 8 Southbound Hourly Traffic Volumes - Before and After Pilot Installation
Before Pilot Installation
After Pilot Installation
180
160
140
120
100
80
60
40
20
0
12:00 AM
1:00 AM
2:00 AM
3:00 AM
4:00 AM
5:00 AM
6:00 AM
7:00 AM
8:00 AM
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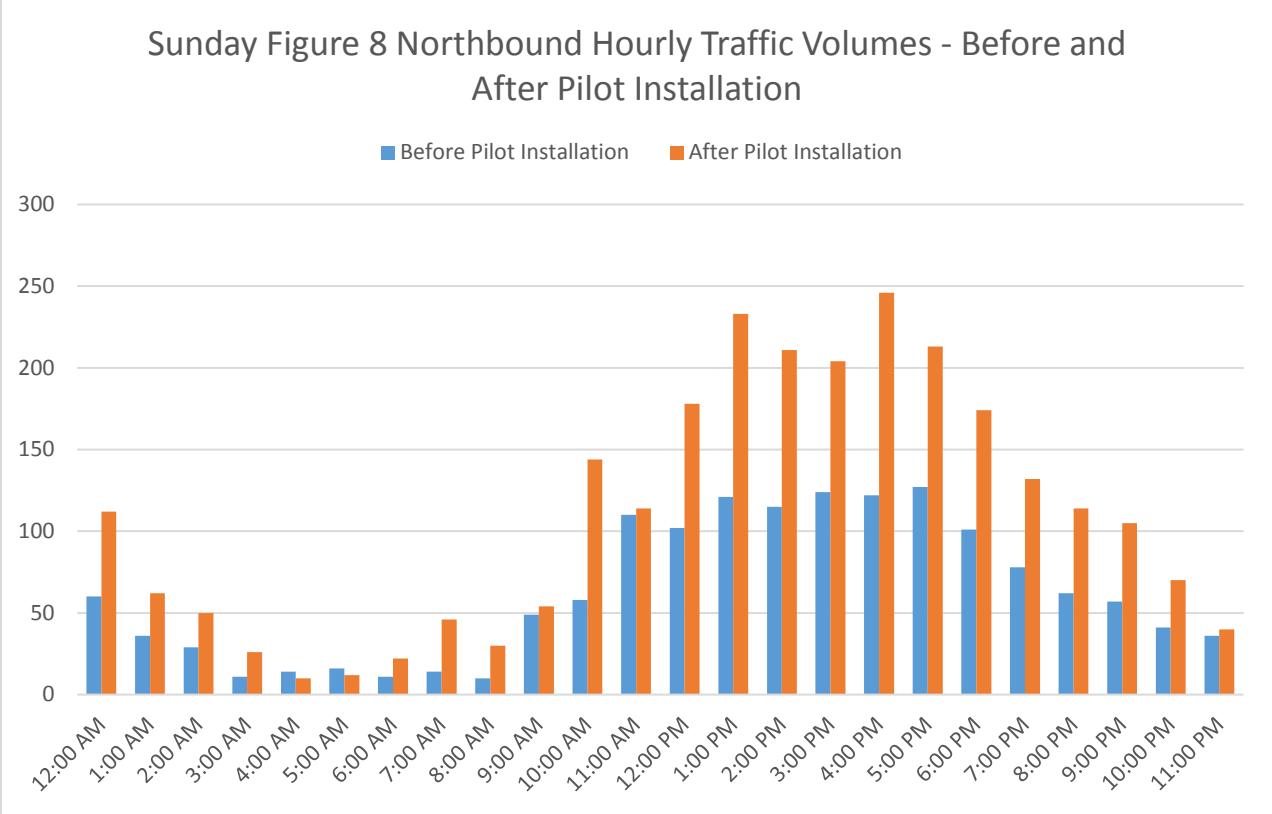
Sunday Figure 8 Northbound Hourly Traffic Volumes - Before and After Pilot Installation
Before Pilot Installation
After Pilot Installation
300
250
200
150
100
50
0
12:00 AM
1:00 AM
2:00 AM
3:00 AM
4:00 AM
5:00 AM
6:00 AM
7:00 AM
8:00 AM
9:00 AM
10:00 AM
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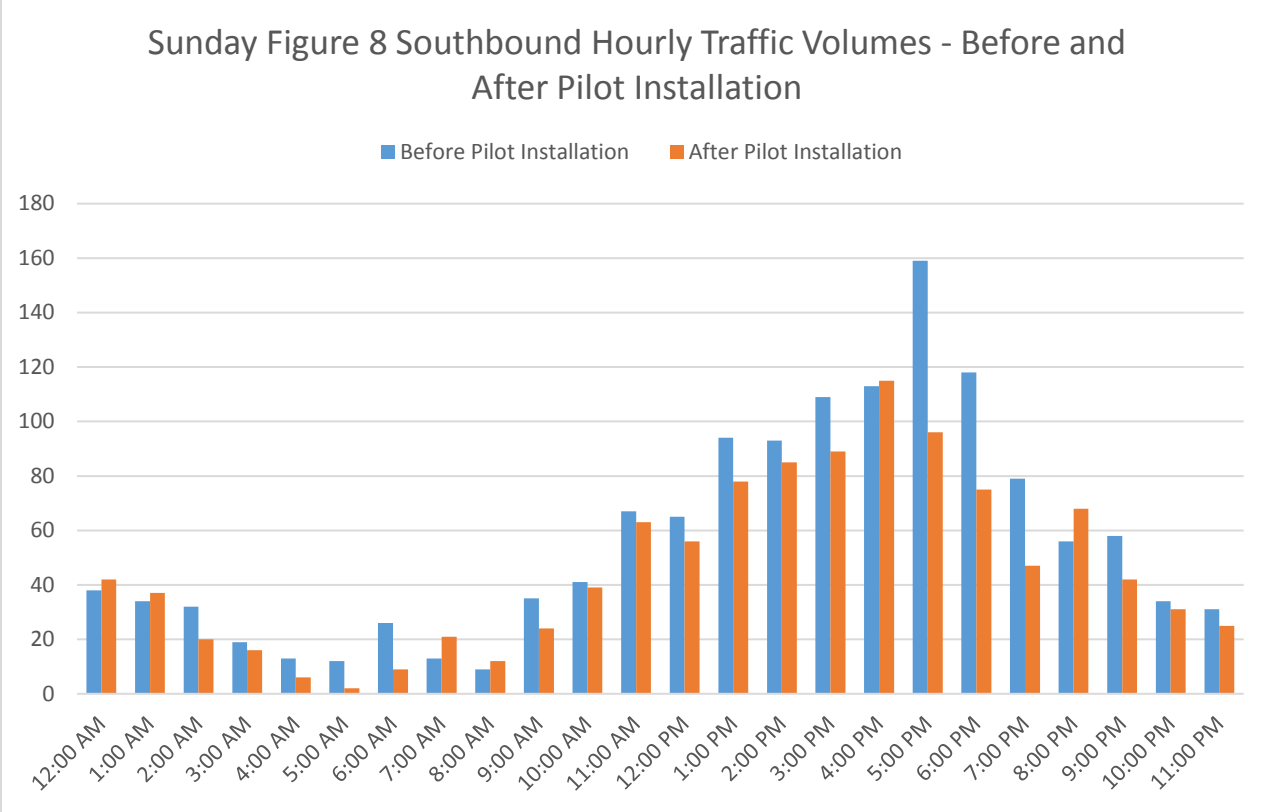
Sunday Figure 8 Southbound Hourly Traffic Volumes - Before and After Pilot Installation
Before Pilot Installation
After Pilot Installation
180
160
140
120
100
80
60
40
20
0
12:00 AM
1:00 AM
2:00 AM
3:00 AM
4:00 AM
5:00 AM
6:00 AM
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Collisions & Safety Analysis

Records of collisions along Twin Peaks Boulevard after the implementation of the project were not available at the time of writing this report. The SFMTA receives collision data through a statewide database as well as hard copies of collision reports from the San Francisco Police Department (SFPD).There is typically a delay of one to two years before staff has the information to analyze collision patterns. Furthermore, because collisions are infrequent events, several years of data are usually required to provide an accurate comparison to conditions before and after a project is implemented.

During the pilot, Twin Peaks Boulevard was repaved by Public Works. SFMTA did receive notice from the SFPD of a property damage collision at the intersection of Twin Peaks Boulevard and Christmas Tree Point Road that was primarily related to the construction-related traffic control and not the pilot roadway configuration.

The number of conflict points between cars, pedestrians, and bikes has decreased since the pilot project was first installed. The project team anticipates that this will lead to a reduction in crashes. Additional changes have also been installed after the repaving of Twin Peaks Boulevard in the summer of 2017. These include:

- Installing an all-way stop controlled intersection at Twin Peaks Boulevard and Christmas Tree Point Road;
- Building a new trail from Christmas Tree Point Road to the Sutro Tower (the Mt. Sutro Connector Trail);
- Constructing a new crosswalk to connect the Mt. Sutro Connector Trail to the northern Twin Peaks Trail; and
- Installing solid white edge lines around the Figure 8 and down Twin Peaks Boulevard to Burnett Avenue.

The safety impacts of these changes have not yet been analyzed. However, the SFMTA will continue to monitor the safety of the facility, including monitoring collisions trends.

Public Perception of Safety - Roadway Configuration

In general, visitors to Twin Peaks feel much safer with the current configuration compared with the original roadway design. While a survey conducted after the pilot was installed did not specifically ask about public perceptions of safety, respondents indicated their thoughts on safety in the questions that asked “what did you like?”/”what did you not like” [about the current roadway configuration]. Qualitative feedback from the public on the perception of safety of the roadway configuration included:

“It's a great use of space. It invites greater pedestrian and cyclist use, creating a safe space.”

“The biking and walking space is lovely! The views are great, and it's easy to access the second peak. I'd never been up there until yesterday for fear of being hit while crossing the road.”

“The current configuration is great! By closing the road to cars, you've opened it to everything else! It's not just walking and biking; it's effectively a new hilltop park with the best view in the City!”

“It's great to walk without worrying about traffic.”

Most respondents who mentioned biking spoke positively about the safety benefits of the project. There are a few exceptions, namely a small number of cyclists, who find navigating between mixed traffic and pedestrian and bicycle only sections to be difficult, and that the west/mixed traffic side of the Figure 8 now makes it more difficult for drivers to pass people riding bikes.

Public Safety

Public safety has been noted by stakeholders as an issue of concern. Members of the public have stated that removing vehicles from the east side has contributed to a feeling of isolation, especially during off-peak hours. Additionally, vehicle break-ins and robberies were reported both before and during the pilot. The project team continues to collaborate with SFPD Park District on efforts to improve public safety in the area.

Parking

Generally, the parking restrictions around the Twin Peaks Boulevard Figure 8 have not changed. Prior to the pilot, two lanes of one-way traffic circled the peaks. At very busy times before the pilot was installed, vehicles were observed parking in one of the two travel lanes, as well as at Figure 8 intersections, shoulder areas, and turn out areas.

During the pilot before Twin Peaks Boulevard was repaved, vehicles were observed parking at Figure 8 intersections, shoulder areas, and turn out areas. Once paving construction started, construction equipment was staged in these informal parking areas. Vehicles were then observed parking partially blocking a travel lane and parking off the pavement on park land. This behavior is both illegal and undesirable, especially given the endangered species habitat that is sometimes found directly adjacent to the pavement.

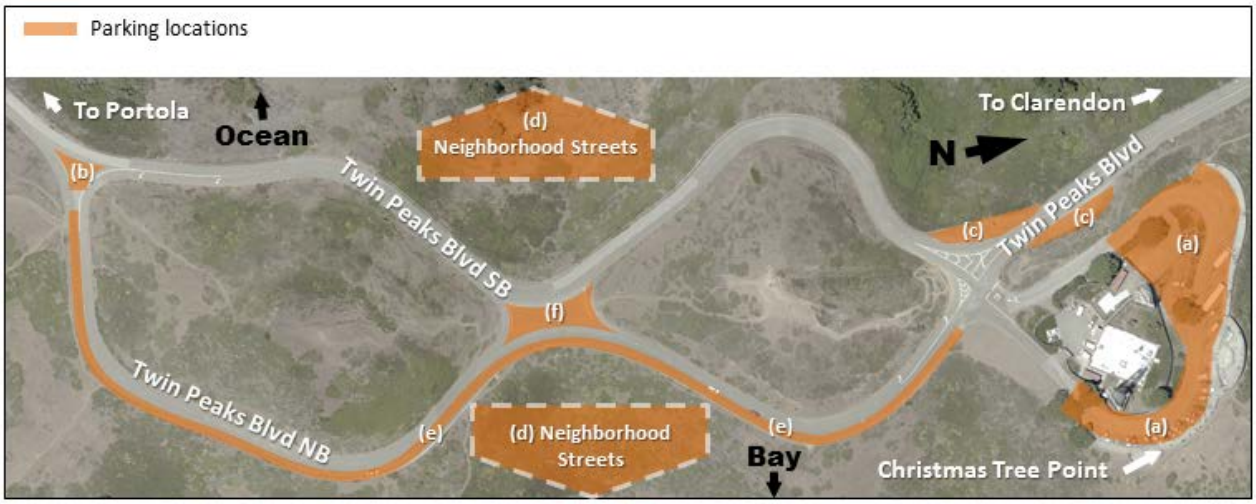
Emergency response times were discussed with the SFPD during paving construction. Having a travel lane partially blocked hinders SFPD's ability to respond quickly to emergencies. The project provides for emergency vehicle access to the eastern side/pedestrian and bicycle only side at the intersections of the Figure 8. Chains are strung between concrete barriers with fire lane pavement markings denoting these access points.

Given the history of vehicles parking in travel lanes around the Figure 8, SFMTA installed solid white edge lines after repaving. These edge lines delineate the edge of the travel lane, making it clearer to drivers that they should not be parking in active travel lanes. It also provides a clear line to enforcement to cite vehicles blocking the travel lanes. These edge lines were recently installed and compliance will be evaluated as people adjust to the new striping configuration.

The formal parking area for visitors to Twin Peaks is along Christmas Tree Point Road. There are about 45 marked passenger vehicle stalls and eight large tour bus loading zones. Parking in this area remains unchanged during the pilot.

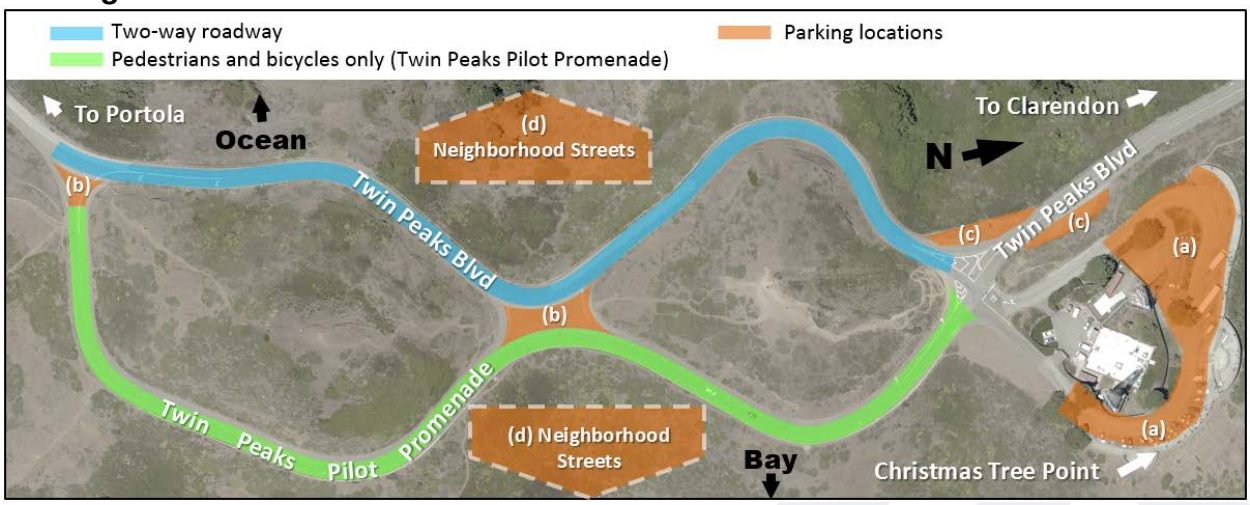
A comparison of parking areas before and after the pilot configuration was installed can be found below.

Parking Locations – Before Pilot



Parking locations before the pilot installation included: a) main parking lot at Christmas Tree Point; b) area between northbound/southbound through lanes and southbound left-turn lane at southern junction of Figure 8; c) along side of roadway just north of Figure 8/Christmas Tree Point Road; d) neighborhood streets near Twin Peaks; and e) the rightmost travel lane of the Figure 8 (note that this was an illegal use of the travel lane as parking).

Parking Locations – After Pilot Installation



Parking locations after the pilot installation include: a) main parking lot at Christmas Tree Point; b) areas between the two-way vehicle traffic (western) and pilot promenade (eastern) sides at the central and southern junctions of the Figure 8; c) along side of roadway just north of Figure 8/Christmas Tree Point Road; and d) neighborhood streets near Twin Peaks.

According to the online survey conducted after the pilot was installed, most visitors who drove parked at the main parking lot at Christmas Tree Point or at turn outs between Twin Peaks Boulevard and the new pedestrian and bicycle only area. More information on the survey results can be found in the following section, which includes a “Where Visitors Parked” subsection.

Public Feedback

Online surveys were conducted before and after the pilot project's installation. The first survey, conducted in spring 2015, solicited feedback on various project alternatives. 450 responses were received, of which 67% supported the design proposed for the Pilot Project.

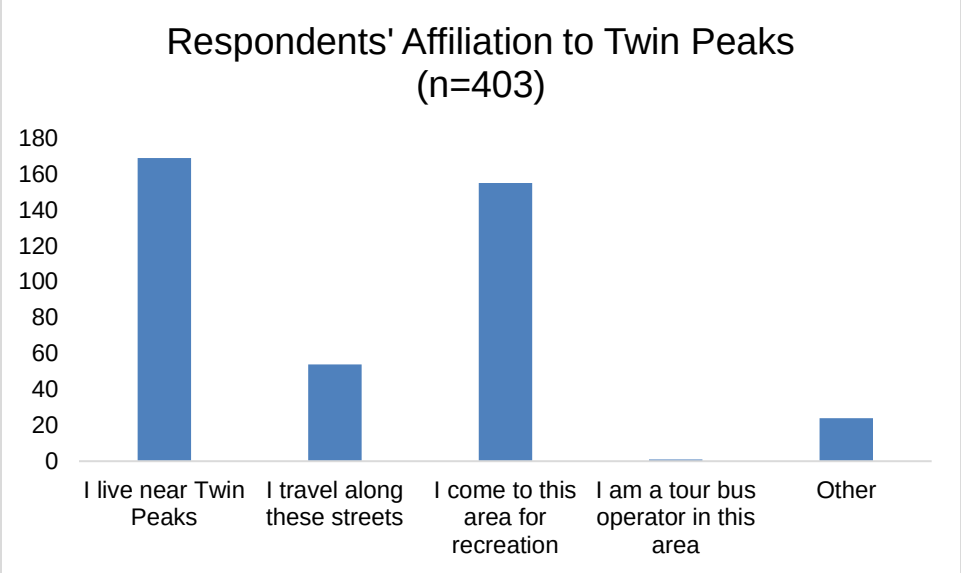
The second online survey—taken after the pilot's installation—asked respondents a number of questions about the new roadway configuration and about their visit(s) to Twin Peaks. Questions in the survey included:

- A description of what they liked and disliked about the pilot roadway configuration;
- How they felt about making the pilot configuration permanent;
- Features they'd like to see in any permanent configuration;
- The date and time of their visit, the mode by which they arrived to Twin Peaks;
- Which parts of Twin Peaks they visited;
- Where they parked (if they drove);
- Their home zip code;
- Their relationship to/interest in Twin Peaks;
- How often they visited Twin Peaks; and
- Any other items they wanted to share about the pilot project that weren't covered in the previous questions.

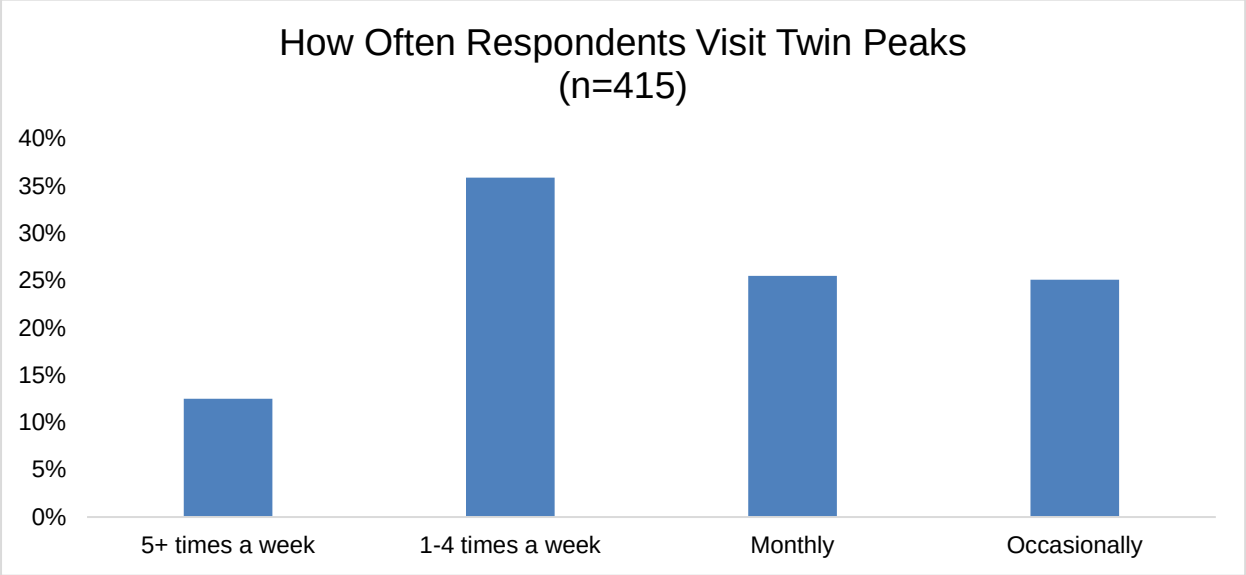
After installation of the pilot, 433 responses to a new survey were collected. Staff posted four banners at the entrances to, and along, the Figure 8, inviting visitors to provide their feedback online. Links to the online survey were also posted on the SFMTA and Rec Park project websites. Note that neither survey was a statistically valid, random survey, so results should be interpreted with caution.

Who Took the Survey

Survey respondents were asked to describe their interest in Twin Peaks and how often they visit the project area. Many of those who took the survey live near Twin Peaks and/or visit the area frequently, as shown in the figures below.

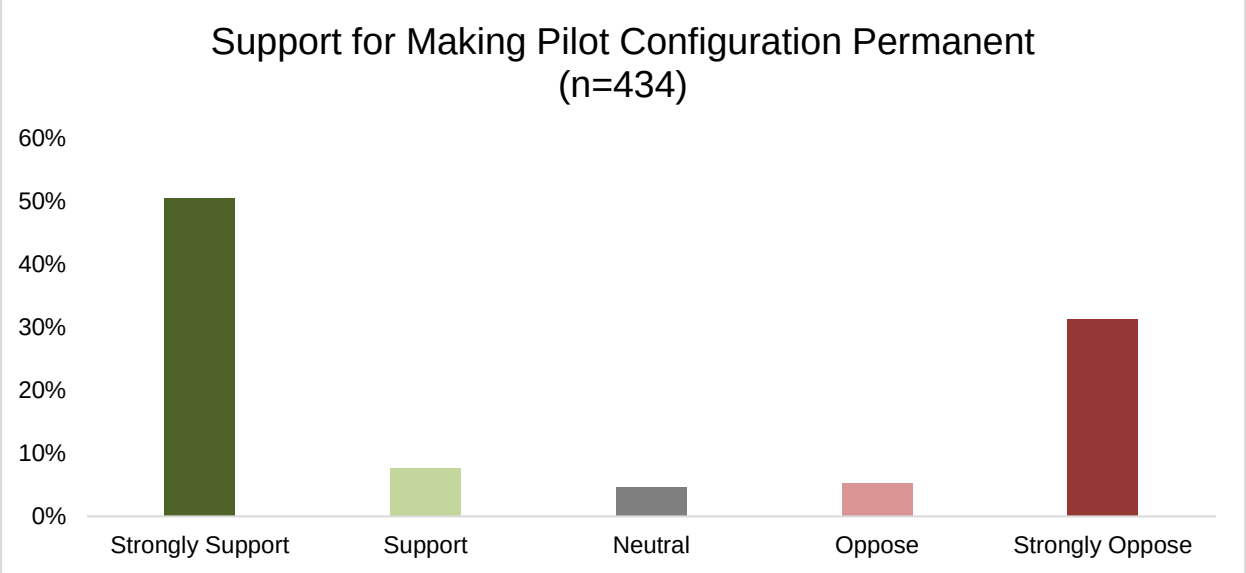


Note: Survey respondents were allowed to select more than one answer.

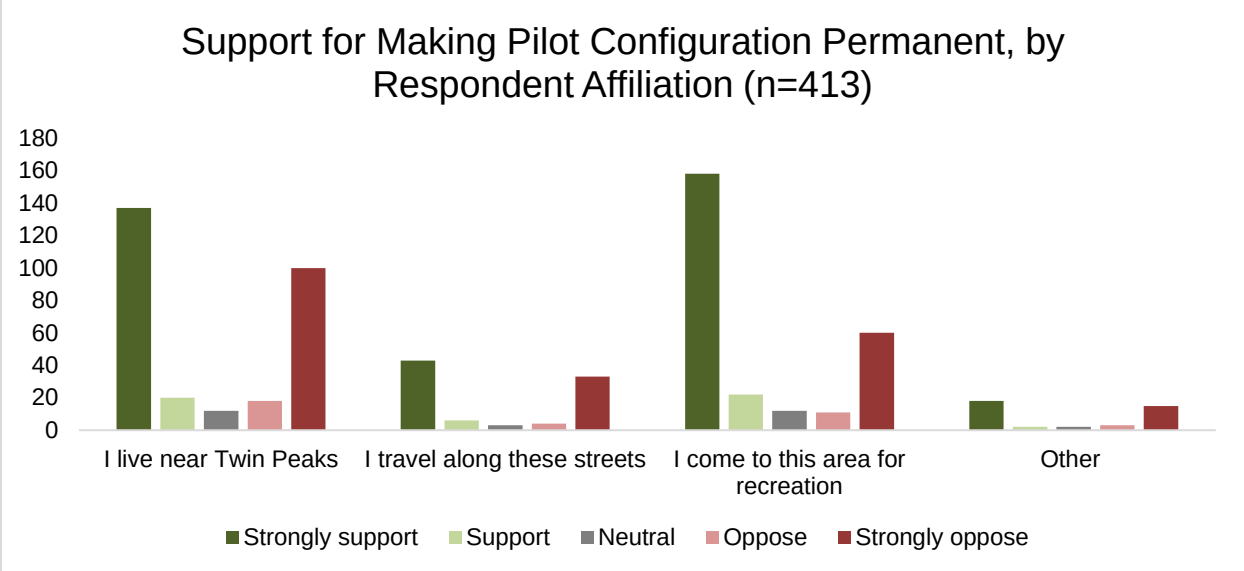


Support for Making the Pilot Configuration Permanent

Support for making the current configuration permanent is strong. Greater than 58% of respondents support (8%) or strongly support (51%) making the pilot configuration permanent. Those opposed (5%) or strongly opposed (31%) to making the configuration permanent represent just over 1/3 of all respondents, while 5% are neutral.

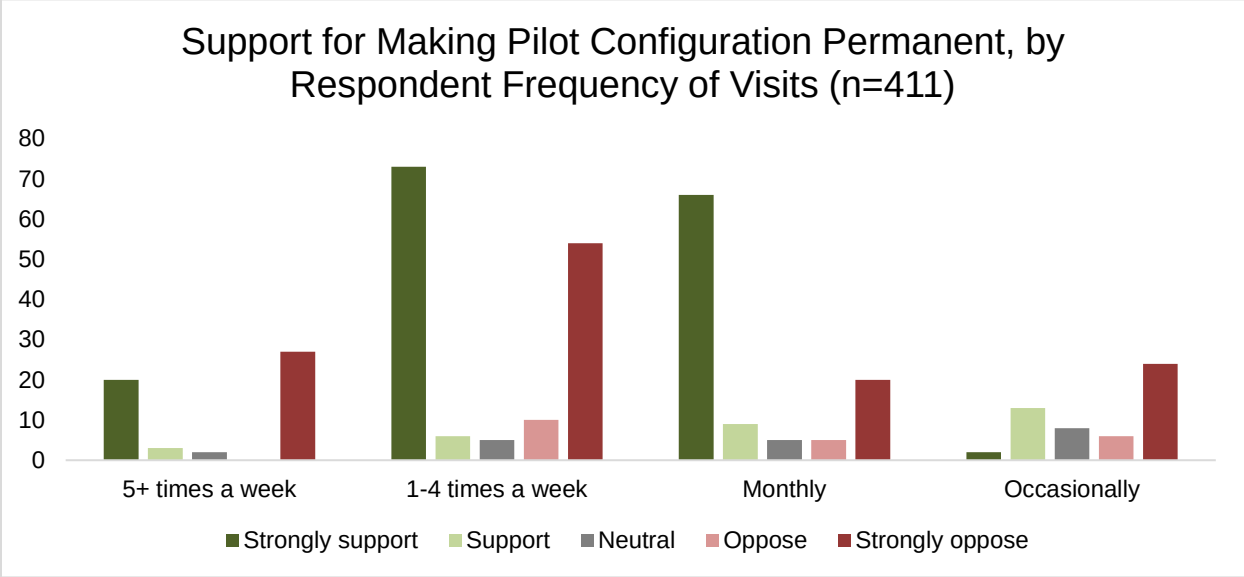


The study team analyzed support for making the pilot configuration by respondent's relationship to Twin Peaks, as shown below. Respondents who live near Twin Peaks generally supported making the configuration permanent (137 strongly supported, vs. 100 strongly opposed). Those who travel along Twin Peaks Boulevard were more evenly split; 43 respondents strongly supported, while 33 respondents strongly opposed. Those who come to Twin Peaks for recreational purposes were the mostly likely group to support making the pilot configuration permanent—180 strongly supported or supported this, whereas 71 opposed or strongly opposed.



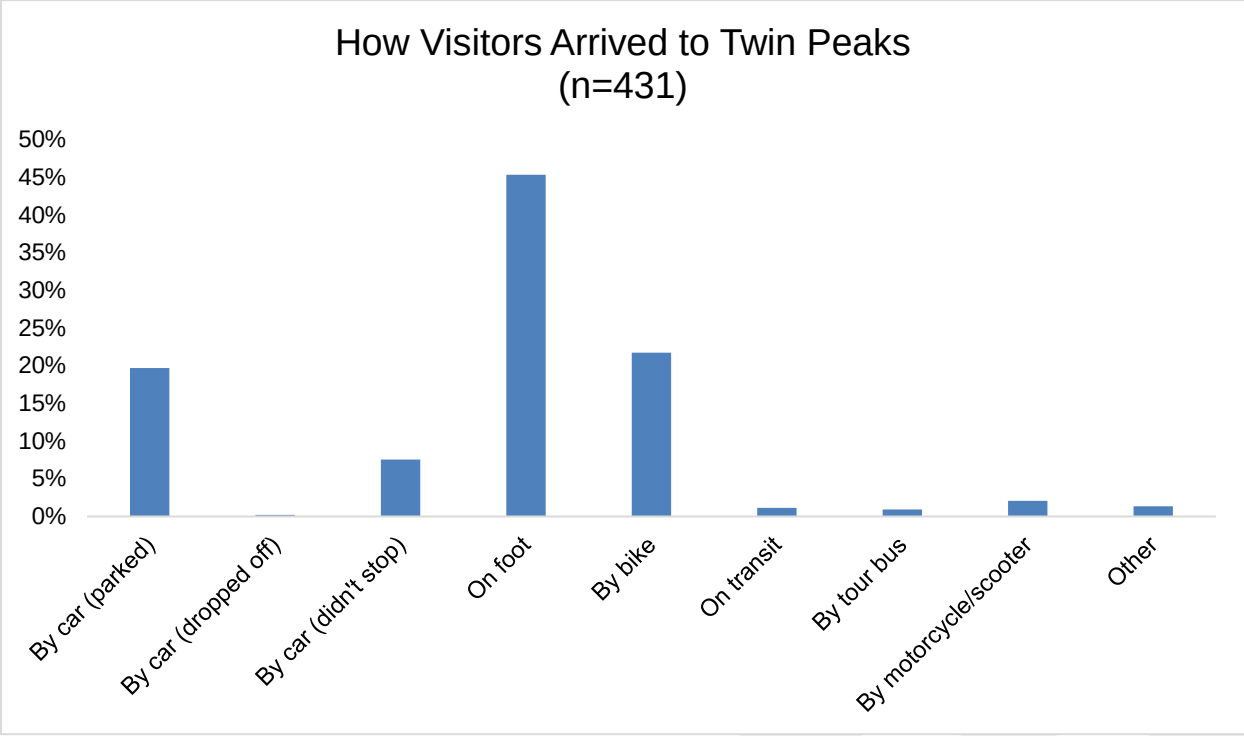
Survey respondents were also asked how frequently they visit Twin Peaks. Those who visit Twin Peaks most frequently were the least likely to support making the pilot

configuration permanent, as shown below. Respondents who visit Twin Peaks monthly were the most likely to support making the configuration permanent.



How Visitors Arrived to Twin Peaks

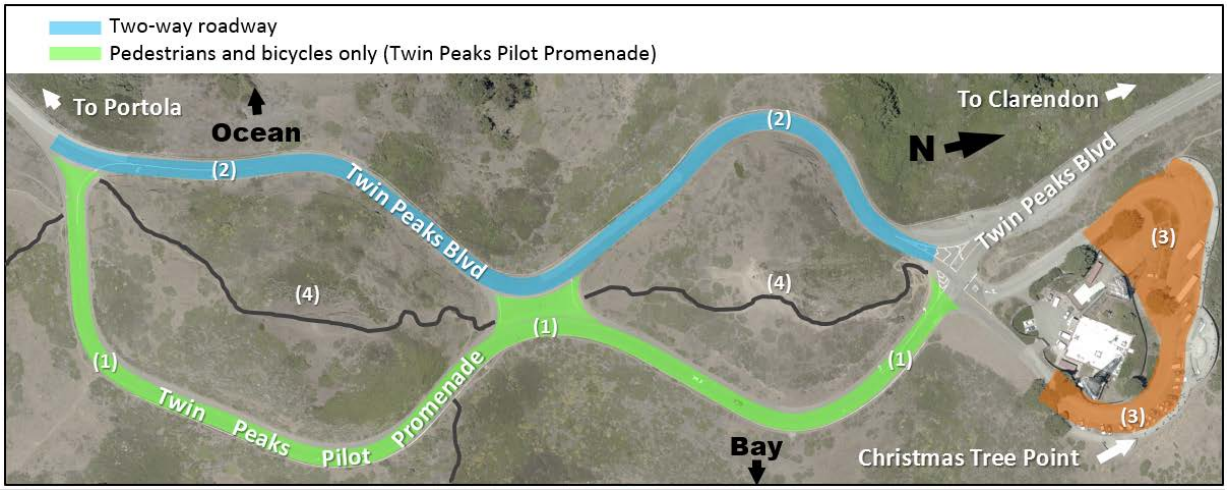
The vast majority of survey respondents arrived to the Twin Peaks Figure 8 on foot (45%), followed by car (28%) and by bike (22%).

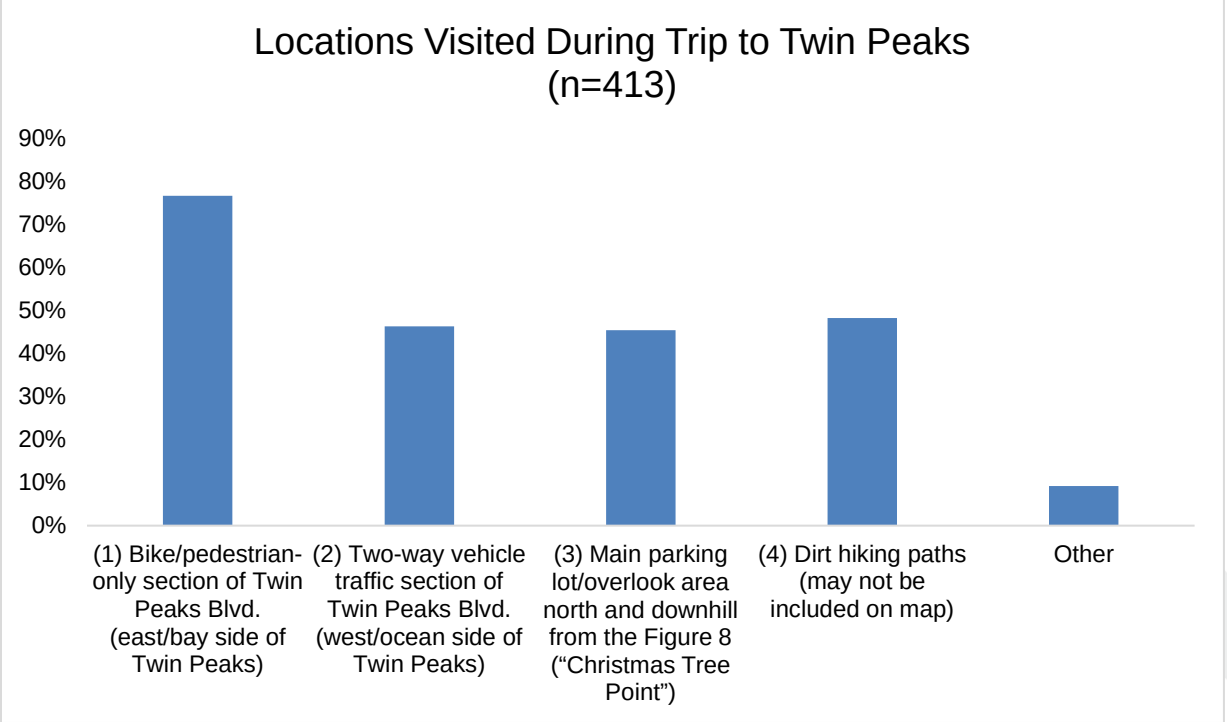


Note: Survey respondents were allowed to select more than one mode, so values may not add up to 100%.

Where Visitors Went During Their Trip to Twin Peaks

A majority of survey respondents (71%) visited the pedestrian and bicycle only section of the Figure 8 during their trip to Twin Peaks.

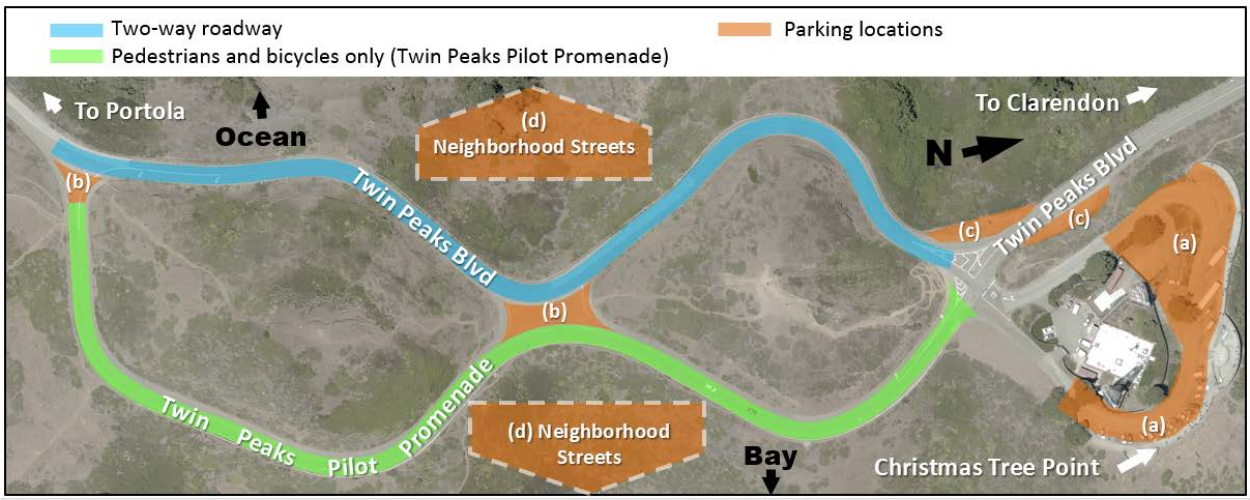


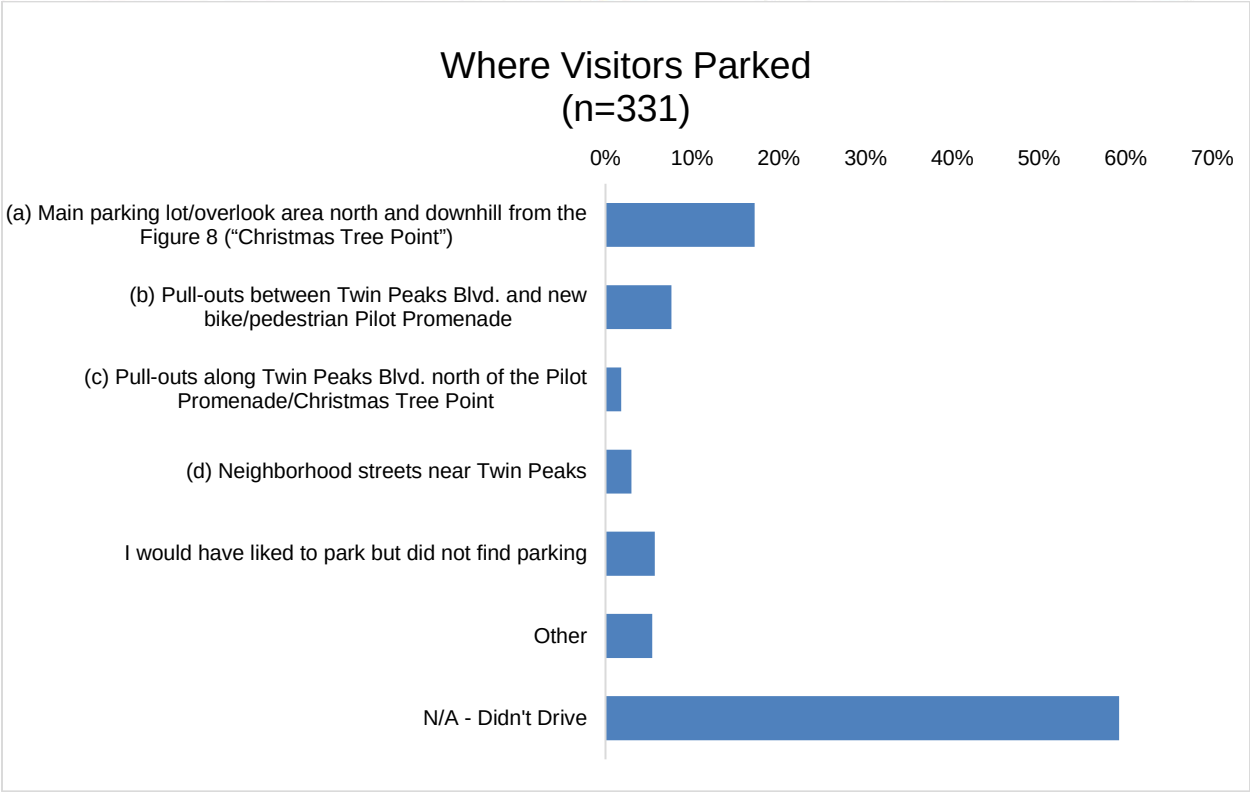


Note: Survey respondents were allowed to select more than one location, so values may not add up to 100%.

Where Visitors Parked

The survey asked participants to select where they parked during their visit. While the majority of respondents did not drive to Twin Peaks, those who did mostly parked at the main parking lot at Christmas Tree Point (17%) or at turn outs between Twin Peaks Boulevard and the new pedestrian and bicycle only area (8%). Interestingly, six percent of respondents stated that they would have liked to park but were unable to find parking.





What Respondents Like About the Pilot Roadway Configuration

Survey participants were asked what they liked most about the pilot roadway configuration. The most common responses included:

- Increased sense of safety related to physical separation of cars and bikes/pedestrians;
- More relaxing, quiet, and comfortable environment;
- Perceptions of slower and safer vehicular speeds on west side of Figure 8;
- Safer space for families with children walking, biking, and playing;
- Reduced litter levels downhill of east side of Figure 8;
- More space for people to be buffered from wind on east side (less windy side) of Twin Peaks; and
- Improved pedestrian crossing between the two peaks.

What Respondents Dislike About the Pilot Roadway Configuration

Survey participants were asked what they liked the least about the pilot roadway configuration. The most common responses included:

- Less access for the elderly and people with disabilities (compared with enjoying view of city from car);
- Broken glass/debris on east/city side of Figure 8, and need for better cleaning;
- Difficulty navigating junction between mixed/pedestrian and bicycle only section while on bike;
- Unsightly barriers; and
- Perception that west/ocean side may be less safe for cars and bikes, notably because of less space for cars to pass cyclists and due to reduced visibility of oncoming traffic around curves.

Responses to Public Feedback

In addition to receiving positive feedback about the project, the SFMTA also heard a number of concerns about the pilot roadway configuration, as discussed in the previous section.

Some concerns were raised about traffic safety. The number of conflict points between cars, pedestrians, and bikes has decreased since the pilot project was first installed, as noted in the Collisions & Safety Analysis section. The project team anticipates that this will lead to a reduction in crashes. Additional changes have also been installed after the repaving of Twin Peaks Boulevard in the summer of 2017. These include:

- Installing an all-way stop controlled intersection at Twin Peaks Boulevard and Christmas Tree Point Road;
- Building a new trail from Christmas Tree Point Road to the Sutro Tower (the Mt. Sutro Connector Trail);
- Constructing a new crosswalk to connect the Mt. Sutro Connector Trail to the northern Twin Peaks Trail; and
- Installing solid white edge lines around the Figure 8 and down Twin Peaks Boulevard to Burnett Avenue.

Because of the nature of collision data, the safety impacts of these changes have not yet been analyzed. However, the SFMTA will continue to monitor the safety of the facility, including monitoring collisions trends.

Some members of the public have expressed concerns about broken glass and other debris on the east side of the Figure 8. The SFMTA will continue to work with our sister agencies to ensure that the bike/pedestrian-only section of the Figure 8 is cleaned regularly. Additionally, residents are encouraged to utilize the City's 311 system to report any significant issues with cleanliness, which have and will be dealt with promptly by Public Works.

The project team also heard concerns about access to views on the east side of the Figure 8, particularly for people with limited mobility. However, people who have a harder time leaving their car can still enjoy the same view by parking in an accessible blue zone in the Christmas Tree Point parking lot.

Conclusion and Recommendations

The Twin Peaks Figure 8 Pilot Project met many of the goals identified in the planning process, including:

- Obtaining public feedback on a major change to an iconic location;
- Engaging a broad set of public to understand proposal and share thoughts (survey); and
- Observing/collecting data to ensure that pilot does not uncover new safety issues or circulation issues.

Given the generally positive feedback on the pilot roadway configuration, along with the lack of major unforeseen issues of safety or circulation, the project team believes the benefits justify the continuation of the project. Repurposing a large area of underutilized roadway for the enjoyment of people walking and biking at an iconic location has proven successful. **The project team therefore recommends making the pilot configuration permanent.**

Certain goals of the project could not be fully evaluated based on existing data. For instance, collision data were unavailable for a sufficient period after the pilot's installation date.

A permanent version of the Twin Peaks Figure 8 project could improve upon the pilot in a number of ways and address a number of the issues brought up by the public. These improvements might include improved/more aesthetically pleasing physical barriers, additional lighting, and more park-like elements such as benches and landscaping, perhaps as part of a future project. We also recognize that people who are driving through the area in their cars may have different views (facing west vs. east) as compared with before the pilot, but they can still enjoy the view at Christmas Tree Point, as well as on Twin Peaks Boulevard north of the Figure 8.

A set of recommendations is provided below, but the key findings are that enhancements to the design of the permanent project would go a long way toward improving the comfort and safety of visitors to Twin Peaks.

Recommendations

The Twin Peaks Figure 8 Pilot Project has provided valuable lessons for any future permanent version of the project.

Through staff observations as well as feedback from stakeholders and Twin Peaks visitors, the following key issues have been identified for consideration in permanent iterations of the project:

- **Additional design treatments**: A permanent version of the project could include several additional design treatments, such as a more permanent barrier (in lieu of k-rail), to make the project appear more permanent rather than temporary.

- **Future designs**: At some point in the future, a new set of infrastructure may exist in the pilot project area that incorporates more park-like elements that enhance the visitor experience. Feedback from this pilot and associated surveys could help inform that future design.