



JFK Drive Separated Bikeways Final Report

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SUMMARY AND KEY FINDINGS

In 2012 the San Francisco Municipal Transportation Agency (SFMTA) implemented San Francisco's first parking-separated bikeway on John F Kennedy (JFK) Drive in Golden Gate Park. The goal of the project was to make JFK Drive accessible and safe for all users, including pedestrians and bicyclists of all abilities. In public meetings and through online surveys, San Franciscans expressed their interest in slowing down traffic, increasing safety, and maintaining the family-friendly nature of Golden Gate Park. In order to evaluate the new bikeway configuration, SFMTA staff collected data on traffic volumes, bicycle speeds, vehicle speeds, and user perceptions.

This preliminary report documents the results of data collection for which the SFMTA has been able to conduct the "after" data collection, including bicycle and vehicle speeds and intercept survey results. Key findings include:

- Motor vehicle and bicycle speeds decreased roughly 2-3 miles per hour on average after the project was implemented.
- Public perception of bicycle safety on JFK Drive increased after the project was implemented (from 71% to 84% of survey respondents rating bicycling as safe), but perception of pedestrian safety decreased slightly (from 91% to 88%).
- After the cycle track installation, 87% of all survey responders feel like they understand the configuration of the street and 61% like the configuration.
- Despite the conversion of roughly 80 parking spaces to accommodate the cycle track, public perception of parking availability improved slightly.

These findings have led SFMTA staff to recommend the following considerations for future cycle track installations:

- Improve comprehension and reduce parking encroachment in the buffer zone through messaging, increased width of buffer zone and parking lane, and using different materials or colors in the buffer and/or bicycle lane. Consider physical separation in the buffer zone.
- Ensure accessibility by maintaining accessible parking spaces and considering reduced distances between curb ramps.
- Improve the bicycling experience with wider bike lanes and better pavement quality



PROJECT BACKGROUND

In the spring of 2012 the (SFMTA) installed "separated bikeways" on John F. Kennedy Drive between Kezar Drive and Traverse Drive in Golden Gate Park. The separated bikeway, or cycle track, offers a wide, comfortable place for bicyclists to ride that is protected from moving vehicles, while freeing the adjacent paths for people walking or jogging, as shown here:



The goal of the cycle track is to make JFK Drive accessible and safe for all users, including pedestrians and bicyclists of all abilities. In public meetings and through our surveys, San Franciscans expressed their interest in slowing down traffic, increasing safety, and maintaining the family-friendly nature of Golden Gate Park.



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Treatment

There are two travel lanes on JFK Drive, one 10 foot lane in each direction. Prior to the installation, parallel parking was located adjacent to the curb. Bicyclists typically rode in the space between the travel lane edge-line and the parking lane.

To formalize the space for bicyclists, a bikeway was created adjacent to the curb. Parallel parking was relocated adjacent to the travel lane. The 6.5 foot bikeway and 7 foot parking lane are separated from each other by a buffer zone that allows for vehicle loading and prevents car doors from opening into the bikeway.

The street width of JFK Drive varies from 42 feet at the narrowest to 80 feet at the widest, when it is two lanes in each direction. The bicycle, vehicle, and parking lane width are consistent along the corridor; the presence of parking and width of the buffer vary in correspondence with available street width. At certain points along JFK Drive, parking was removed to accommodate a minimum buffer width of 3 feet.



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VEHICLE SPEEDS

A decrease in motor vehicle speeds was found in both directions at both locations where data was collected, with lower speeds during the daytime when there is more activity in the park. This may be attributable to the fact that with the new configuration, the placement of parked cars immediately adjacent to the vehicle lanes makes the roadway seem narrower; additionally, people parking and exiting vehicles are more likely to impact traffic speeds compared to the "before" conditions where there was excess space between the travel lane and parked vehicles. This reduction in vehicle speeds accomplishes one of the goals identified in public outreach meetings for the project, bringing speeds down to an 85th percentile of less than 30 mph; the speed limit of John F. Kennedy Drive is 25 miles per hour.

Vehicles speeds were recorded in both directions of travel at two locations along JFK drive for one 24-hour period before, and one 24-hour period after the cycle track installation. The following graphs show the changes in speed by location during the daytime.¹



¹ All 85th percentile speeds based on linear intrapolation within 5 mph bins.



BICYCLE SPEEDS

A decrease in bicycle speeds was also found on JFK Drive in observations conducted before and after the installation of the bikeway. Speeds dropped an average of 2.3 miles per hour, resulting in around a 1-2 minute increase in the time it takes a bicyclist to ride the 1.5 miles of the cycle track. The charts below show that these drops were consistent across day of the week and location along JFK drive.



A few explanations could account for the decrease in bicycle speeds. Prior to the bikeway installation, bicycles could travel in and adjacent to the vehicle lanes, allowing for more flexibility for bicyclists who prefer to go fast, but potentially putting pressure on bicyclists who would have otherwise travelled more slowly. The new configuration relieves pressure for some bicyclists who prefer to go more slowly and could have attracted riders who ride more slowly or who are generally less confident. The new configuration is also more constrained, and more likely to have pedestrians crossing the bicycle's path of travel, which also factor into bicycle speeds.

Over 400 bicycle speed observations were recorded at two midblock locations. The two locations are:

- Westbound JFK Drive between Middle Drive East and Conservatory Drive West
- Eastbound JFK Drive between Stow Lake Drive and Rose Garden

At each of these locations, staff recorded the time it took individual bicyclists to travel a known and marked distance.



VEHICLE VOLUMES

Vehicle volumes decreased slightly after implementation of the JFK Drive cycle track, according to data collected in July 2011 and July 2012. As shown in the charts below, volumes decreased most in the westbound (outbound) direction. This reduction in volume could be a result of motorists experiencing the new configuration as requiring them to drive more cautiously and/or more slowly, or choosing to use an arterial street outside of the park instead of usind JFK Drive. Although reducing vehicle volumes was not identified as a specific goal of this project, the Golden Gate Park Master Plan includes a long-term goal of reducing use of JFK drive as a cut-through route to the western neighborhoods



BICYCLE AND PEDESTRIAN VOLUMES

Bicycle and pedestrian volumes both increased somewhat between January 2012 and January 2013, though in the case of the bicycle volumes, a decrease was seen during the PM peak (4:00 to 6:00 PM).



Vehicle, bicycle and pedestrian volumes are highly dependent on activity levels in the park due to weather and special events. While SFMTA staff made every attempt to mirror "before" and "after" conditions when collecting volume data, it is difficult to draw conclusions about the project's effects on transportation mode choice without more rigorous study.



COLLISIONS & SAFETY ANALYSIS

Records of collisions along JFK Drive 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, but 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.

SFMTA staff performed observations of potential conflict points such as intersection approaches, crosswalks, and areas with high levels of pedestrian activity. Staff observed that right turning motor vehicles typically merged into the bikeway as intended and the design did not seem to increase the likelihood of right-hook crashes compared to standard bike lanes. Users of JFK drive have contacted the SFMTA with anecdotal reports of "near misses" between bicyclists and pedestrians. Staff recognizes that there is an increased perception of conflict due to passengers crossing the cycle track to access parked cars and the sidewalk, but no evidence of injuries from this perceived conflict was found. The SFTMA will continue to monitor the safety of the facility, including monitoring collisions trends.



INTERCEPT SURVEY RESULTS

In-person surveys were conducted before and after the cycle track installation in order to systematically gather qualitative user feedback. The survey asked respondents to rate their sense of safety on the facility, to provide information about where they lived and how they travelled to the park, and, after the cycle track was completed, to note whether they liked or understood various aspects of the new configuration. The results allow for comparison between different types of respondents, as detailed below.

249 individual surveys were collected before and 239 surveys were collected after the installation. Staff conducted surveys along JFK Drive as well as at the De Young Museum, the Conservatory of Flowers, the Rose Garden, the Concourse and Stowe Lake.

"Understand the Configuration" versus "Like the Configuration"

Respondents were asked whether or not they liked the new configuration, as well as whether or not they felt they understood it. After the cycle track installation, nearly all survey respondents (87%) felt like they understood the configuration of the street, and most (62% of all survey respondents) said they liked the configuration – 24% did not like the configuration and 14% were not sure. The graphs below show the breakdown of survey respondents based on where they live and how they arrived at the park.



Respondents were more likely to understand the configuration if they worked near the park or lived in San Francisco. These respondents likely have more exposure to the facility compared to visitors from other parts of the Bay Area and beyond. However,



these groups, particularly people who work or live nearby, were more split in terms of whether they liked the configuration. Nearby neighborhood residents were less likely to report that they liked the facility compared to people who lived in other neighborhoods or outside of San Francisco. These findings are consistent with feedback that the SFMTA has received from local residents and other interested stakeholders.

The type of transportation respondents had used to get to the park had less of an impact on whether they liked the configuration compared to where they lived. While bicyclists were most likely to understand and like the configuration, it is only by a slight margin compared to those arriving by foot, transit, or driving.

Favorability of Design Details

Because this is the first design of its type in San Francisco, the survey was an opportunity to review certain details of the cycle track design, which could influence the design of future cycle tracks. To that end, respondents were asked about their perception of the width of the bike lane and the buffer, how they felt about the need for pedestrians to cross the bike lane, and how they felt about the placement of the bikeway next to the curb.

For each of the design aspects they rated, the majority of survey participants found the features to be "acceptable," though each feature to differing degrees. Of the features, having to cross the bike lane was found to be the least acceptable. The parking lane width and buffer width also received lower favorability ratings relative to other aspects of the design, which is consistent with comments the SFMTA has received from the general public. The chart below shows the favorability breakdown of each feature.



The placement of the bike lane and the need to cross the bike lane are the features that define a parking-buffered cycle track; the other features can be adjusted while still keeping the overall configuration.



Sense of Safety

Though the SFMTA is monitoring quantitative data related to collisions and safety on JFK drive, an important measure of the cycle track design is how users of the facility perceive their level of safety. To help evaluate these perceptions, survey respondents were asked to rate the following features of JFK Drive from "very good" to "very bad:"

- ... As a safe place to bike
- ... As a safe place to drive
- ... As a safe place to walk

Both before and after the installation, the majority of survey takers rated their sense of safety on JFK Drive as somewhat or very good, whether as a place to drive, bike, or walk. In particular, bicyclist increased their rating from 58% thinking of JFK as a safe place to bike, up to 85%.

The charts below show the results from surveys taken before and after the installation, and compare overall responses to those of folks who used the most corresponding type of transportation to access the park.



Bicycling on JFK Drive had the biggest change in people's perception of safety, both amongst respondents who biked before and those who didn't. This is not surprising considering the project was to add a dedicated, separated bicycle facility; in the "Before" case there were more people, particularly amongst bicyclists, who did not think that JFK felt very or somewhat safe. In the "After" case, many more bicyclists feel safe in the facility, but the number of bicyclists who feel unsafe also increased, likely due to the increased constraints in the new facility and the fact that pedestrians sometimes cross the cycle track.





The perception of safety while driving increased somewhat among people who had driven to the park, perhaps because of the reduction in vehicle speeds.



Walking in the park was the only way of getting to the park that was seen as less safe on average after the installation – however, it should be noted that walking was still seen as more safe than bicycling or driving, both overall and by respondents who walked. In the "before" case, JFK Drive was a fairly standard roadway configuration with the added benefit to pedestrians of wide pathways set away from the road; only two of the respondents in the "before" survey rated JFK's as very unsafe for walking. The new configuration includes features that are not seen elsewhere in San Francisco and may be more likely to elicit a negative response.

One notable response across all transprotation choices is that the "after" results are more polarizing overall. This can be seen by the reduction across every category of the number of people who responded "neither good nor bad" for each mode. The fact that the "after" configuration is new and unusual for San Franciscans likely contributed to the fact that more people expressed stronger opinions about the facility.



Ability to Find Parking

One primary concern in the planning of the JFK cycle track was the fact that all of the proposed configurations had the potential to remove parking; this was particularly of concern to various park institutions that were concerned for their visitors' ability to find parking. To help evaluate this concern, survey respondents were asked to rate JFK in terms of the ability to find parking. The following chart shows the before and after perceptions of ability to find parking on JFK drive.



Although the total number of parking spaces in the park was reduced, this was not manifest in user perceptions of parking availability. In fact, after the cycle track was built, a greater proportion of people rate the ability to find parking as good or somewhat good. This pattern is even stronger among people who arrived to the park by driving. This finding indicates that concerns about the effects of parking loss did not bear out in the actual experience of park visitors.



ADDITIONAL PUBLIC FEEDBACK

SFMTA staff received a multitude of feedback from the general public and organized stakeholder groups via email and telephone, and through a web form that was set up for this purpose. Feedback provided voluntarily through these means was primarily in opposition to the controversial cycle track. This feedback fell into two general categories: commenting on the **fundamental design concept**, versus commenting on **specific design details**.

Fundamental Design Concept

These comments generally criticized the fundamental design of a parking-buffered cycle track; some were specifically related to safety concerns while others include general dislike of the bike lane placement. Below are some quotes from such comments:

- "Would rather have the bike lane next to the road lanes."
- "Do not like the fact that both left and right car doors open into traffic."
- "As a pedestrian I am concerned about having to walk into an active bikeway to cross the street or to get into a parked car."

Specific Design Details

Other comments focused on the design details of the cycle track. These were comments regarding bike lane width, buffer width, signs, roadway color, and other design details. Some example quotes from this category include:

- "There is not enough room to safely pass slower bicyclists in the bike lane."
- "I would really love for the tracks to be painted green so they stand out more."
- "Wide loading zone protects cyclists from getting doored."
- "The loading area should be raised to make it a more obvious separator between the parked cars and the bike lane."

Many positive comments were received as well. People using different modes found the cycle tracks a welcome change for many reasons. Below are quotes from some of the positive comments that were received.

- "I very much like being able to bicycle away from the danger, noise and smells of cars."
- "Great to be at less risk from moving cars and opening doors."
- "I'm also pleased that the new parking configuration slows down traffic through the park, which is often unacceptably fast."
- "It is a significant improvement for bikers and pedestrians because is causes drivers like me to slow down and pay more attention."

The SFMTA appreciates the numerous comments submitted and will look into addressing concerns and suggestions. It is important to note that feedback received through email, telephone, and the online form are subject to sampling bias as responders were self-selected.



ACCESSIBILITY CONCERNS

Throughout the development, construction, and evaluation of this project the SFMTA has received concerns from people with disabilities about how the project might impact their safety and access to on-street parking. In order to understand and attempt to address these concerns, SFMTA staff met with various committees including the Physical Access Committee of the Mayor's Disability Council, the Multimodal Accessibility Advisory Committee, the Paratransit Coordinating Council, as well as the larger Mayor's Disability Council.

As a result of these meetings, staff made adjustments to the project design, including the addition of six curb ramps and new accessible parking spaces. After the project was constructed, staff led a field visit with members of the Physical Access Committee and the Pedestrian Safety Advisory Committee to discuss how the new design was functioning. The SFMTA acknowledges that despite the design changes that were made to improve accessibility along JFK Drive, some individuals remain concerned about the safety of the street and about parking buffered cycle tracks in general. The following key concerns were identified by accessibility stakeholders with regard to JFK Drive as well as other potential future separated bikeway installations:

- Vulnerable pedestrians feel uncomfortable crossing an active bikeway to access parked cars
- Cyclists don't always yield to pedestrians crossing the bikeway and pedestrians are not always aware that they are crossing an active bikeway
- Buffer zones should be wide enough to deploy wheel chair side lifts from all parking spaces
- Parked cars and bicyclists encroach into the buffer zone
- Access from parked cars to the sidewalk could be improved by having a shorter distance between curb ramps and by using signs and markings to direct pedestrians toward the closest curb ramp

Recommendations for how future projects can be designed to better address these specific concerns are included in the following section.



CONCLUSION AND RECOMMENDATIONS

The cycle track on John F. Kennedy Drive met many of the goals identified in the planning process. In particular, there was a decided increase in the perception of safety for cyclists in the park, as well as a measurable reduction in vehicle speeds. Based on these results, the SFMTA recommends considering parking-buffered cycle tracks in other locations in San Francisco where speed reduction and improved bicycle facilities are desired.

Certain goals of the project could not be fully evaluated based on existing data. For instance, the change in volume of cyclists and vehicles was not strong enough to draw conclusions about changes in mode split on JFK Drive, and collision data is not yet available to evaluate the true impact of the new design on injury collisions. Studies in future years will be needed to draw conclusions about these outcomes.

Finally, accessibility concerns and the fact that perception of pedestrian safety decreased have led the SFMTA to develop recommendations for future parking-buffered cycle track projects to better accommodate all users.

A comprehensive set of recommendations is provided below, but the key findings are that increasing the widths of the parking lane and loading zones and improving access to curb ramps and blue zones would go a long way towards reducing the feeling identified by many users of JFK Drive that the new configuration feels crowded and constrained.

Recommendations

The cycle track on John F. Kennedy Drive was the first of its kind in San Francisco and has provided valuable lessons for future implementation of parking-buffered bicycle lanes in this city.

Through staff observations as well as feedback from stakeholders and park visitors, the following key issues have been identified for consideration in future parking-buffered cycle tracks:

• Parking comprehension: Although the user survey indicated a high level of comprehension of the configuration, motorists occasionally park fully in the buffer zone area. Future projects could consider "No Parking" signs, increased use of the "No Parking" stencil, colored epoxy, or closer spacing of cross-hatching. Physical measures could also improve parking comprehension; see "Buffer area encroachment" recommendations, below. Additionally, there has been some confusion for motorists turning right onto JFK and thinking they are stuck behind a line of stopped traffic. The end of the parking zone should be demarcated in a way that makes it clear where the parking lane is.



- **Buffer area encroachment:** More common than parking fully in the buffer area is the incidence of vehicles parked just over the border of the buffer area, particularly in locations where the road is curved; presumably the drivers understood the configuration but felt more comfortable parking further from the vehicle travel lane, or had difficulty parallel parking in a seven foot parking lane. Future installations should include a parking lane at least eight feet wide. Additionally, future projects could consider wheel stops or a raised buffer area to limit vehicle encroachment: these treatments were not considered appropriate for JFK because they would detract from car-free Sundays, but could be effective in other contexts.
- **Buffer area width:** The three foot minimum buffer width along JFK Drive was selected based on national best practices. The area is intended as a flexible space to accommodate open vehicle doors and passenger loading activities out of the traveled bikeway. However, many users noted that three feet is not sufficient width for these activities, especially if passengers are using wheelchairs, crutches or other mobility assistance devices. In the future, a buffer zone at least four feet wide is more desirable, but a buffer zone of at least three feet is acceptable depending on parking turnover, space availability, and other factors.
- **Curb ramp spacing:** Because vehicles do not park directly adjacent to the sidewalk, special attention should be paid to the placement of curb ramps to allow vehicle passengers to access the sidewalk. Because JFK Drive has unusually long spacing between intersections, the SFMTA added six additional curb ramps along JFK Drive to improve curb ramp access. Future projects should consider curb ramp spacing as well as measures to help people identify the nearest curb ramp.
- **Bikeway width:** Although there is room for two bicyclists to ride abreast or for one bicyclist to pass another within the six-foot wide cycle track, when there are high volumes of bicyclists, it is common for bicyclists to use the buffer zone to allow more space when they pass. When space is available, wider bicycle lanes should be considered.
- **Pavement color:** The SFMTA would consider the use of green pavement color to increase the conspicuity of the bikeway, discourage parking encroachment in the bikeway, and alert pedestrians to look for bicyclists before stepping into the bikeway; the effectiveness of this treatment would need to be evaluated before recommending it for all cycle tracks.
- **Pavement quality:** Placing a bikeway in the portion of the roadway formerly used as a parking lane requires special attention to drainage and pavement quality. Improvements to storm drains, gutters and valve covers to make them flush with the surrounding pavement and ensure that the bikeway is free of hazards should be considered as part of future cycle track projects.



- Accessible parking: Accessible parking spaces are located and designed to
 ensure curb ramp and sidewalk access for people with disabilities. Designers of
 parking buffered cycle tracks should consider adding accessible parking spaces,
 and consider using the International Symbol of Access and outlining the spaces
 in blue in addition to standard signs and curb markings.
- Parking availability: Based on feedback from local cultural institutions and stakeholders, the SFMTA minimized on-street parking removal by using a three foot wide buffer zone in some locations along JFK drive. In locations where even a three foot wide buffer zone would not fit, parking was removed to accommodate the bikeway and buffer area. Despite the removal of approximately 80 parking spaces, our survey findings indicate that the public perception of parking availability did not diminish. In general, concerns about parking loss tend to be overstated compared to empirical evidence about the actual convenience or economic impacts of parking changes. The SFMTA is conducting further research and improving how it communicates with the public about this potential trade-off so that future projects can focus on achieving their safety and quality of life goals.
- **Construction:** The construction period for the JFK Drive cycle track occurred between January and April of 2012. Construction took longer than expected due to inclement weather and the complexity of installing pavement markings along a curvy street with varying cross section widths. The combination of temporary construction conditions and the novel street configuration caused some initial confusion and gave a negative first impression to the general public. Construction should be timed to occur in the dry season and better outreach should be conducted to local stakeholders to explain the temporary conditions.
- Outreach and Communication: The SFMTA recognizes that separated bikeway projects require more outreach than typical bike projects, and that a range of local and citywide stakeholders should be involved at all stages of project development, construction, and post-construction. In particular, posting temporary banners and having staff and volunteers in the field to direct people where to park and hand out informational flyers after the project was completed was very helpful. Future projects should factor in the significant cost of thorough public outreach, post construction communication, and project evaluation.
- Enforcement: SFMTA staff waited until parking compliance was at approximately 85% (about 6 weeks after project completion) before directing parking control officers to issue citations. SFMTA staff recommend a similar approach of outreach and warnings followed by enforcement in future separated bikeway projects.





Initially, some motorists mistakenly parked in the new bikeway.



Banners explain how to use the new configuration.

Changes to JFK Drive

In the first weeks and months after the cycle track's construction, minor changes were made to address basic comprehension challenges, mainly the addition of NO PARKING stencils in various locations in the buffer area. Since these changes, SFMTA staff have observed a high level of comprehension and compliance with the design. To that end, while recommendations for future cycle tracks differ subtly from the design details of the implemented facility, the SFMTA does not have plans for major modifications to the JFK Drive cycle track in the near term, though if funding becomes available, the SFMTA will consider adding green color to the bicycle lanes and making changes to the buffer zone and parking area to enhance legibility and compliance.