
FINAL REPORT

Northbound San Jose Avenue & I-280 Off-Ramp Road Diet Pilot Project City & County of San Francisco and California Department of Transportation

This memorandum, including all references and attachments, serves as the official final report by the San Francisco Municipal Transportation Agency (SFMTA or “City”) and the California Department of Transportation (Caltrans) for the pilot road diet project on northbound San Jose Avenue and the northbound Interstate 280 San Jose Avenue off-ramp. The original project agreement dated 11/25/2013, including all attachments thereto, is attached (Attachment A), and fully incorporated herein by reference.

Project Overview

The “Bernal Cut” section of San Jose Avenue between the I-280 off-ramp and Randall Street hosts freeway-like conditions on a city street. This problem is partially fed by a two-lane off-ramp from northbound I-280, which was widened from a single lane to accommodate detoured traffic after the 1989 Loma Prieta earthquake, which necessitated the closure of the Central Freeway. During a visioning project led by the Planning department, the Glen Park Community Plan, residents in the surrounding neighborhoods expressed concerns about the speeds and the negative effects speeding has on the safety of those who walk, drive and bike along San Jose Avenue. The San Francisco Municipal Transportation Agency (SFMTA) worked with the California Department of Transportation (Caltrans) to develop the Northbound San Jose Avenue & I-280 Off-Ramp Road Diet Pilot Project. The goal of this project is to reduce measured speeds along the corridor by 15 MPH to enhance safety for all road users.¹ Because this reduction was not achieved in Phase 1 (completed in June 2014), Phase 2 was implemented in June 2015. The two phases of the pilot included the following scope:

Phase 1 (completed June 2014)

- Merged the left lane of the I-280 off-ramp with the northbound lane from San Jose Avenue that passes underneath I-280.
- Reduced San Jose Avenue from three to two lanes north of St. Marys Avenue, and then opened roadway back up to three lanes just south of Randall Street to maintain the traffic calming effect of the road diet.
- Upgraded the San Jose Avenue bicycle lane to a more comfortable and separated bikeway (where space allowed).

Phase 2 (completed June 2015)

- Maintained Phase I changes on the surface street portion of San Jose Avenue.
- Merged the two lanes of the I-280 off-ramp into a single lane south of the existing I-280 tunnel, which then merges with the Monterey Boulevard lane.

For reference, northbound San Jose Avenue, within City limits, has the following advisory speed limits posted: 35 MPH at approximately 150 feet (advisory) and again 450 feet (regulation) north of the tunnel (both locations also have Vehicle Speed Feedback Signs); 25 MPH (when children are present) at approximately 250 feet south of Randall Street; and 30 MPH just north of Randall Street (regulation).

¹ For a project of this nature, speed is measured by observing the 85th percentile speed observed as a benchmark. 85th percentile speed is defined as the speed 85% of drivers are moving at or below during free-flow traffic.

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Additionally, the northbound San Jose Avenue off-ramp from I-280 has a posted advisory speed of 35 MPH.

Northbound San Jose Avenue & I-280 Off-Ramp Road Diet Pilot Project: Key Findings

- ❖ Speeds at the end of the Northbound I-280 Off-Ramp decreased by 24 percent, from 52 to 39 MPH.
- ❖ AM Peak volumes decreased by approximately 20 percent, both on the northbound I-280 off-ramp and Northbound San Jose Avenue.
- ❖ Increased congestion on the off-ramp was observed, including some queuing in the auxiliary lane and occasionally on the freeway mainline for up to 30 minutes during the peak periods.
- ❖ Northbound San Jose Avenue speeds did not experience any significant change with pre-pilot speeds measured at 49 mph and post-pilot speeds at 48 mph.
- ❖ With the new wider bike lane and buffer zone, average daily bike traffic increased by 26 percent on San Jose Avenue, with evening peak bike traffic increasing by 68 percent on northbound San Jose Avenue.
- ❖ Some cross streets experienced increased speeds and volumes, though these changes normalized somewhat through the course of the pilot.
- ❖ Drive time surveys show approximately 5 minutes of traffic delay on northbound San Jose Avenue between the Ocean Avenue exit and Randall Street in the AM and PM peak hours.
- ❖ Seventeen (17) collisions were reported along northbound San Jose Avenue between the I-280 Off-Ramp and Randall Street from 2010 to 2014, resulting in 15 injured persons.²
- ❖ The primary collision factor in this area of northbound San Jose Avenue is unsafe speeding. Unsafe speeding accounts for 59% of the collisions reported.

In summary, though speeds were reduced at the San Jose Avenue I-280 off-ramp, they remain relatively unchanged on the city street portion of northbound San Jose Avenue. Traffic volumes have decreased significantly on both the off-ramp and northbound San Jose Avenue, and bicycle use of San Jose Avenue has increased. Some traffic delays during the morning and evening commute have been observed. As the data demonstrates, the road diet pilot project has produced mixed results. Though the pilot did not achieve its initial goal of reducing measured speeds along the San Jose Avenue corridor, the reduced off-ramp speeds, the decrease in traffic volumes and the installation of the buffered bike lane all may contribute to enhanced safety for roadway users.

Final Recommendations

Through the pilot project, the SFMTA and Caltrans evaluated a considerable amount of data and received substantial community feedback. After careful consideration of all pilot project findings, the SFMTA and Caltrans recommend the following permanent lane configurations and associated traffic engineering measures be implemented in coordination with scheduled repaving in 2016:

² The SFMTA analyzed collision data using police report records from 2010 through 2014. However, 2013-2014 collision data is still being refined and may not include all collisions from that time period.

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City Street Segment

From conversations with the community through the course of the pilot project, we received the following key feedback:

- Concerns about persistent speeding on San Jose Avenue
- Observations of increased cut-through traffic on the side streets off San Jose Avenue
- Congestion at the intersection at San Jose Avenue and Randall Street
- Appreciation of the new bike lane buffer, but interest in even more separation for people riding bikes along San Jose Avenue.

In order to continue to encourage slower speeds on city streets, in coordination with the scheduled repaving of San Jose Avenue, the City recommends:

- Keeping the current lane configuration of two traffic lanes and a buffered bicycle lane, as well as right turn pockets approaching Rousseau Street, St. Marys Avenue and Randall Street
- Installing a raised physical barrier in the bicycle lane buffer, generally between St. Marys Avenue and Randall Street to help increase separation and comfort
- Adding Street Name signs in advance of Rousseau Street and St. Marys Avenue to help inform drivers in advance of turn-offs
- Posting new speed limit signs along the corridor to clarify the legal limits and enable speeding enforcement. The speed-related signs are listed below and a map of all signs and their locations can be found in Attachment B:
 - 35 MPH – Regulatory sign above the existing speed radar signs at the end of the off-ramp, north of the tunnel (2 signs)
 - 45 MPH – Regulatory sign between Milton Street and St. Mary's Avenue, and near the Richland Bridge overpass (2 signs)
 - 35 MPH – Speed advisory sign near the Highland Street overpass (1 sign)
 - 10 MPH – Speed advisory sign before the right turn onto Rousseau Street and the right turn onto St. Marys Avenue (1 sign)
 - 25 MPH When Children Are Present – Regulatory sign near Randall Street (1 sign)

In addition, the City will:

- Pursue traffic calming countermeasures on the side streets to help deter cut-through traffic
- Continue to work towards upgrades to the San Jose and Randall intersection as part of Muni Forward initiatives currently underway.

I-280 Off-Ramp

While the new design of the I-280 off-ramp has helped to control traffic speeds and volumes, the SFMTA and Caltrans received the following key feedback from motorists:

- Awkwardness of the short merge added in Phase 2 of the pilot
- Backups onto the freeway mainline during portions of the the peak periods
- Poor overall condition of pavement on the off-ramp

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The off-ramp is under the jurisdiction of Caltrans. In response to this feedback, the following steps are being taken:

- A repaving project for the off-ramp (separate from the City's repaving of San Jose Avenue) is currently in the design phase, and construction is anticipated in Fall 2016
- Caltrans will continue to evaluate the feasibility of alternative off-ramp lane configurations to help address community concerns. An alternate configuration could be implemented in conjunction with the off-ramp re-paving project.

Next Steps

- The City will implement the recommended configuration for San Jose Avenue in coordination with the San Francisco Public Works repaving project scheduled for Spring 2016.
- The City will connect with residents of the side streets off the Northbound San Jose Avenue project area on next steps for traffic calming.
- The City will continue to work with the community on Muni Forward proposals at the Mission Street-Randall Street-San Jose Avenue intersection. More information about the Muni Forward proposals can be found [online](https://www.sfmta.com/projects-planning/projects/14-mission-rapid-project) at <https://www.sfmta.com/projects-planning/projects/14-mission-rapid-project>.
- Caltrans will evaluate off-ramp alternatives in advance of its off-ramp repaving project scheduled for Fall 2016.

Pre and Post Pilot Analysis

To understand the effects of the pilot on vehicular and bicycle traffic, this evaluation analyzed morning (AM) peak vehicle volumes and 85th percentile vehicular speeds at four different times over the last two years, both before and after the implementation of each phase of the project. Bicycle counts and a drive time analysis were also completed to understand changes in bicycle ridership and traffic delays. Lastly, this report details the collision history for the northbound I-280 off ramp and northbound San Jose Avenue from 2010-2014 to understand primary collision factors and any significant crash trends along the project limits.

SFMTA Data Collection: Vehicular Volumes and Speed Summary

AM peak vehicle volumes and speeds were collected in September and January of both 2014 and 2015. Phase 1 of the pilot was completed in June 2014 and Phase 2 was completed in June 2015. Table 1 below details results of the data collection.

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Table 1: Northbound San Jose Avenue - SFMTA Data Collection Summary

Location	Data Type	Jan-2014	Phase 1 (June 2014) Complete	Sep-2014	Jan-2015	Phase 2 (June 2015) Complete	Sep-2015
NB I-280 off-ramp before merge with NB San Jose Ave	AM Peak Volumes (vehicles/hr)	2038	(June 2014) Phase 1 Complete	2176	1910	(June 2015) Phase 2 Complete	1629
	85 th Percentile Speed (miles/hr)	52		48	47		39
NB San Jose Avenue (between Milton St. and St. Marys Ave.)	AM Peak Volumes (vehicles/hr)	2068		1247 ³	1628		1616
	85 th Percentile Speed (miles/hr)	49		47	46		48

This “pre and post” data demonstrates the individual effect of each phase of the pilot as well as the comprehensive effect of the entire pilot. Volume and speed changes are detailed in Table 2 below.

Table 2: Northbound San Jose Avenue - SFMTA Pre to Post Pilot Vehicular Volume & Speed Changes (AM Peak)

Location	Data Type	Phase 1 Pre to Post (Jan-14, Sept -14)	Phase 2 Pre to Post (Jan-15, Sept -15)	Both Phases Pre to Post (Jan-14, Sept-15)
NB I-280 off-ramp before merge with NB San Jose Ave	AM Peak Volumes (vehicles/hr)	+138 (7%)	-281 (-15%)	-409 (-20%)
	85 th Percentile Speed (miles/hr)	-4 (-8%)	-8 (-16%)*	-13 (-24%)*
NB San Jose Avenue (between Milton St. and St. Marys Ave.)	AM Peak Volumes (vehicles/hr)	-821 (-40%)	-12 (-1%)	-452 (-22%)
	85 th Percentile Speed (miles/hr)	-2 (-4%)	2 (+5%)*	-1 (-2%)

***Note: Percentage change based on unrounded speeds**

As observed from the data collected, speeds on San Jose Avenue were reduced on the I-280 off-ramp and have most recently been measured at 39 MPH (a decrease of 24 percent). Vehicle speeds are now much closer to the posted speed limit of 35 MPH in this location (regulation). Vehicle speeds remain almost unchanged on northbound San Jose. Vehicular volumes have been reduced by the pilot project both on the off-ramp and on northbound San Jose Avenue⁴. AM peak vehicular volumes have decreased

³ After looking at this result in the context of all of the data collected, the project team believes this number is potentially inaccurate, and likely the result of an equipment failure during the collection period. This number was excluded from our analysis.

⁴ Some community members have asked where cars have gone between the first data collection at the foot of the off-ramp and the second collector further downstream, in cases where the latter is smaller than the former. Data shows that some cars turned onto side streets such as Rousseau and St. Marys, but the team would like to note

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by approximately 20 percent at the I-280 off-ramp and by 22 percent further downstream on San Jose Avenue.

Caltrans Data Collection: Vehicular Speeds Summary

In correlation with SFMTA's data collection efforts, Caltrans collected data at the beginning of the northbound I-280 San Jose off-ramp and at the end of the tunnel before the off-ramp merges with northbound San Jose Avenue. Tables 3 and 4 summarize and compare the speed data collected at these locations. Though the Caltrans speed data collected at the I-280 off-ramp before the merge with northbound San Jose shows less of a reduction than similar data collected by SFMTA, both the Caltrans and SFMTA data sets show overall reductions in 85th percentile along the overall route from the I-280 exit onto northbound San Jose Avenue. Differences in recorded speeds may be due to slightly different data collection locations and time periods.

Table 3: Northbound I-280 Off-Ramp - Caltrans Data Collection Summary

Location	Data Type	Feb-2014	Jan-2015	Nov-2015
NB I-280 San Jose off-ramp (entry)	85 th Percentile Speed (miles/hr)	54	50	47
NB I-280 off-ramp before merge with NB San Jose Ave	85 th Percentile Speed (miles/hr)	46	46	43

Table 4: Northbound I-280 Off-Ramp - Caltrans Pre to Post Pilot Vehicular Speed Changes (AM Peak)

Location	Data Type	Phase 1 Pre to Post (Feb-14, Jan -15)	Phase 2 Pre to Post (Jan-15, Nov -15)	Both Phases Pre to Post (Feb-14, Nov-15)
NB I-280 San Jose off-ramp (entry)	85 th Percentile Speed (miles/hr)	-4 (-7%)	-3 (-6%)	-7 (-13%)
NB I-280 off-ramp before merge with NB San Jose Ave	85 th Percentile Speed (miles/hr)	0 (0%)	-3 (-7%)	-3 (-7%)

Bicycle Volumes

The primary purpose of the pilot is to reduce speeds through lane reduction. However, upgrades to the San Jose Avenue bicycle lane to a wider, separated bikeway were made possible because of the additional roadway space. The upgrades have resulted in a measurable increase in bicycle ridership on San Jose Avenue. Bicycle volume counts were taken in January 2014 prior to Phase 1 implementation

that given traffic coming from routes other than I-280 (such as Monterey Boulevard) and small margins of error for data collection equipment, it is impossible to account for every single car.

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and again in September 2015. Evening peak bike traffic on northbound San Jose Avenue rose significantly with an increase of 68 percent, and average daily bike traffic increased 26 percent.

Drive Time Analysis

Some community stakeholders expressed interest in determining whether the pilot project added travel time for drivers using the off-ramp and continuing onto points north of Randall Street. Before the pilot began, queuing at the Randall Street traffic signal was an identified source of traffic delay during peak periods. Staff conducted a drive time survey during high traffic season once both phases of the pilot were implemented to measure the amount of delay during the morning and evening peak periods.

The drive time surveys took place over three days in September of 2015. As shown in Figure 1 below, the survey route began on the northbound I-280 Ocean Avenue on-ramp and stopped at the far side of the Randall Street and San Jose Avenue intersection. Recorded drive times are listed in Table 5. During free-flow traffic, the average drive time is 4 minutes and 36 seconds. When compared to free-flow travel times, the data collected shows approximately 5 minutes of delay in AM and PM peak periods, with most of the delay occurring near the approach of Randall Street. This delay may be contributed to the road diet, but is also due to the left turn lane of San Jose Avenue onto Dolores Street. At this left turn on San Jose, vehicles sometimes have to wait more than one signal cycle to make the left turn onto Dolores Street during peak periods.

Figure 1: Northbound San Jose Avenue - Drive Time Survey Route and Peak Delays



Table 5: Northbound San Jose Avenue - Drive Times

AM Peak	Time	9min 26 sec
	MPH	15.4
PM Peak	Time	9min 23 sec
	MPH	14.4

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Off Peak (Free-Flow)	Time	4min:36 sec
	MPH	28.4

Collision History

The SFMTA has evaluated collision data from 2010 to 2015 to identify any issues and patterns for this portion of San Jose Avenue. ⁵ There were 18 collisions reported along northbound San Jose Avenue between the I-280 Off-Ramp and Randall Street between 2010 and 2015, resulting in 19 injured persons. The primary collision factor was predominately unsafe speeding, accounting for 61 percent of all collisions (see Figure 2). Forty-seven (47) percent of the collisions were rear-end collisions and 41 percent of the collisions involved a single vehicle; all of these single-vehicle collisions were with a fixed object. Collisions peaked in the early morning, midday and in the evenings, mostly during off-peak hours in free flow traffic. Most of the collisions occurred midblock between St. Marys Avenue and Randall Street or at the intersection of San Jose Avenue and Randall Street. (See Figure 3)

Figure 2: Northbound San Jose Avenue - Primary Collision Factors

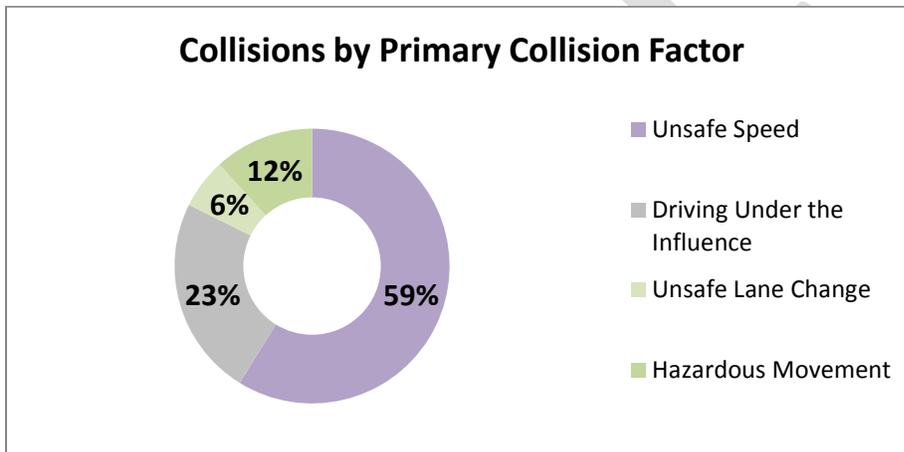
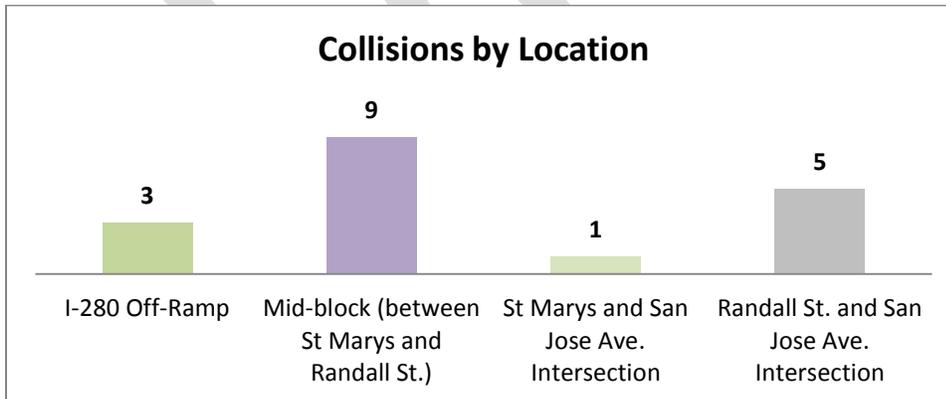


Figure 3: Northbound San Jose Avenue - Collisions by Location



⁵ For the purposes of this analysis 2015 collision data is based on available SFPD Collision Reports. Collision data is maintained by the California Highway Patrol as part of the Statewide Integrated Traffic Records System (SWITRS) and the official data for 2015 is still being collected and validated.

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Northbound San Jose Avenue Cross Streets

After Phase 1 of the pilot was implemented in June 2014, some cross streets, such as St. Marys Avenue, experienced a spike in vehicular volumes and speeds as compared to pre-pilot conditions. After the data was collected again in September 2015, volumes and speeds were shown to have tapered and no significant increases in either volumes or speeds have been observed. The overall changes in AM peak volumes and 85th percentile speeds from January 2014 to September 2015 are detailed in Table 6 below. The most notable change includes increased AM peak vehicle volumes on southbound Rousseau and northbound St Marys Avenue; however the volumes remain within the capacity of both roadways.

Table 6: Northbound San Jose Avenue Cross Streets - Pre to Post Pilot Vehicular Volume & Speed Changes (AM Peak)

Location	Jan-2014 (AM Peak Volumes/Speeds)	Sep-2015 (AM Peak Volumes/Speeds)	AM Peak Vehicular Volume Change	AM Peak 85 th Percentile Speed Change
Rousseau Street Southbound	354/13 MPH	454/14 MPH	+100 (28%)	+1 MPH (9%)
Milton Street Northbound	42/23 MPH	48/21 MPH	+6 (15%)	-2 MPH (-10%)
St. Marys Avenue Southbound	331/23 MPH	311/21 MPH	-20 (-6%)	-2 MPH (-9%)
St. Marys Avenue Northbound	28/16 MPH	49/16 MPH	+20 (72%)	0 MPH (1%)

Evaluation Methodology

Vehicular volume and speed data was collected in January 2014, September 2014, January 2015, and September 2015 for this analysis. During each data collection period, vehicle volumes, peak traffic volumes, vehicular speeds, and bicycle counts were taken on various segments of San Jose Avenue, the I-280 off-ramp, and adjacent streets. With the majority of vehicular traffic taking place in the morning rush hour on northbound I-280 and San Jose Avenue, AM peak hour vehicular data provided the most useful information and was used as the vehicular baseline data for this evaluation.

The drive time surveys took place over three days in September of 2015 using an iPhone GPS app called *myTracks*, which recorded a geotagged data point every second. Three surveys occurred during AM peak hours, three occurred during PM peak hours, and three surveys took place during off peak (midday) hours.

The SFMTA analyzed collision data using police report records from 2010 through 2014. However, approximately 10-20 percent of the 2013-2014 collision data is still being refined and may not include all collisions from that time period. Additionally, the SFMTA is currently refining reported collision data from January to June of 2015.

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Data Collection Details and Assumptions

- Automatic tube vehicle and speed surveys were conducted 24 hours a day over a 72-hr period. AM and PM peak volumes were averaged over the three-day period.
- Automatic tube 24-hour bicycle counts were recorded at the Monterey Boulevard ramp (before the merge with San Jose Avenue) and averaged over a 72-hr period.
- For the purposes of this analysis, pre-pilot data collected in January each year was compared to the post-pilot data collected in September of the same year. Seasonal changes between January and September may have some effect on traffic flow and the data presented in this analysis.

Community Outreach

Neighbors have been engaged extensively throughout the pilot project, from its inception to implementation. This has included a highly participatory visioning process led by the Planning Department, followed by multiple briefings with community groups, open houses, and digital outreach with almost 200 regular subscribers.

Glen Park Community Plan

The road diet pilot project was developed as a follow up from a visioning project led by the Planning department, the Glen Park Community Plan, which included a robust community outreach process including over a dozen meetings. Specifically, the plan explored “rethinking San Jose Avenue,” one of only a handful of 45-mph streets in San Francisco. The idea has been a high priority for the both the Glen Park and College Hill neighborhoods, which are separated by this high-speed, high-injury stretch of roadway fed by freeway traffic. Following up on this process, the SFMTA worked closely with community stakeholders to help communicate the road diet pilot project as a first step towards a longer-term goal of re-envisioning the corridor to safely accommodate all road users. Outreach coincided with several project phases over a couple of years.

Pilot Project Planning Phase – Early 2014

After many conversations between SFMTA, SFCTA, and Caltrans, which has jurisdiction over the freeway exit that feeds into the corridor, the two agencies developed a scope, phasing structure, and Memorandum of Understanding (MOU) for the pilot project. A community meeting was held in January 2014 to brief key neighborhood partners and members of the public on the pilot, which was implemented using reversible materials such as paint and safe-hit posts in advance of a future repaving project by San Francisco Public Works (SFPW).

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Pilot Project Implementation Phase – Mid 2014 through Late 2015



Pictured: Open House meeting at Glen Park School in August 2015

Close communication with key project stakeholders and the public at large has been critical to smooth implementation of the pilot project. The SFMTA used the following means to keep the public up to date on roadway changes and data collection efforts:

- Community group briefings: The SFMTA has been in close communication with several community groups, including but not limited to Glen Park Association, College Hill Neighborhood Association, and Upper Noe Neighbors. Engagement has included multiple briefings and regular communication with leadership to get feedback on how to best reach neighbors and get feedback on the project.
- Open House meetings: After full implementation of the pilot and preliminary data collection, the SFMTA hosted open house meetings to share information and get feedback from community members. The open house format allowed SFMTA planners and engineers to better connect with individuals by making staff available to answer questions and engage in conversation with the community during the evening. Open houses were held:
 - On July 13, 2015 at a residence on St. Mary's Avenue to discuss additional countermeasures such as speed humps to help deter and calm cut-through traffic from San Jose Avenue.
 - On August 25, 2015 at Glen Park School to share some of our preliminary data collection with the broader community. This engagement included a mix of stakeholders from

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various community groups as well as people new to SFMTA's engagement who wanted to learn more. Representatives from Caltrans also attended.

- Email updates: Using an active and growing email list of community stakeholders and interested residents updated after every engagement and encounter (e.g., meetings, 311 requests, Supervisor's office inquiries, and partner agencies), SFMTA has sent out updates at each major project juncture. SFMTA planners and engineers have also responded individually to emails received from the public with questions about the project.
- Web updates (sfmta.com/SanJoseRoadDiet): SFMTA has continually updated the project web page to include the most relevant, current project background, history and updates. This has included adding preliminary evaluation data and FAQs in order to respond to major themes of inquiry coming out of ongoing questions from the community.
- Interagency coordination: the SFMTA has worked closely with Caltrans, SF Planning, SF Public Works, the Board of Supervisors and the Mayor's Office to ensure that the project was coordinated with other initiatives in the same area and share relevant community feedback.

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Concurred by:

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Sustainable Streets Division
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Date

Sean Nozzari
Deputy District Director
Traffic Operations
California Department of Transportation, District 4

Date

Attachments: A – Pilot Project Agreement dated 11/25/2013
 B – Map of Speed Limit Sign Locations

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APPENDIX A

Pilot Project Agreement

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APPENDIX B

Map of Speed Limit Sign Locations

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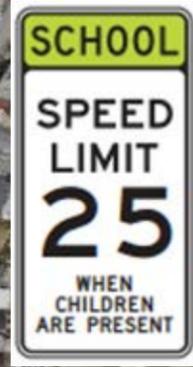
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FINAL REPORT Northbound San Jose Avenue & I-280 Off-Ramp Road Diet Pilot Project – ATTACHMENT B: Map of Traffic Sign Locations



PENDING FINAL
SPEED SURVEY



Excerpts from the 2014 California Manual for Setting Speed Limits (Caltrans)

3.4.3 Variation from the 85th Percentile

Speed limits are established at or near the 85th percentile speed. Speed limits higher than the 85th percentile are not generally considered reasonable and prudent. Speed limits below the 85th percentile do not ordinarily facilitate the orderly movement of traffic and require constant enforcement to maintain compliance. Speed limits established on the basis of the 85th percentile conform to the consensus of motorists of the reasonable and prudent speed, rather than the judgment of one or a few individuals. The majority of drivers comply with the basic speed law. Speed limits set at or near the 85th percentile provide law enforcement officers with a limit to cite drivers who do not conform to what the majority considers reasonable and prudent. Further studies such as FHWA-RD-92-084 and FHWA-RD-98-154 show that establishing a speed limit at less than the 85th percentile generally results in an increase in collision rates.

3.4.4 Applying a 5 Mile Per Hour Reduction

When a speed limit is to be posted, it shall be established at the nearest 5 mph increment to the 85th percentile speed of free-flowing traffic, rounding as standard mathematics directs. Under some circumstances, the posted speed may be reduced by 5 mph from the nearest 5 mph increment of the 85th percentile speed.

If a 5 mph reduction is justified, the E&TS shall document in writing the conditions and justification for the lower speed limit and be approved by a registered Civil or Traffic Engineer. The reasons for the lower speed limit shall be in compliance with CVC Section 22358.

The following examples are provided to explain the application of these speed limit criteria:

1. If the 85th percentile speed in a speed survey for a location was 37 mph, then the speed limit would be established at 35 mph since it is the closest 5 mph increment to the 37 mph speed. The 35 mph established speed limit can be reduced by 5 mph to 30 mph if the conditions and justification for using this lower speed limit are documented in the E&TS and approved by a registered Civil or Traffic Engineer.
2. If the 85th percentile speed in a speed survey for a location was 33 mph, then the speed limit would be established at 35 mph since it is the closest 5 mph increment to the 33 mph speed. The 35 mph established speed limit can be reduced by 5 mph to 30 mph if the conditions and justification for using this lower speed limit are documented in the E&TS and approved by a registered Civil or Traffic Engineer.

CVC 21400 allows for setting the speed limit at the 5 mph increment below the 85th percentile even if mathematical rounding would require the speed to be posted above the 85th percentile. If this option is used, then the additional 5 mph reduction cannot be used. In effect, this law allows an engineer to round down to the nearest increment of the 85th instead of up. The engineer cannot then take a further reduction.

When roadside development results in traffic conflicts and conditions which are not readily apparent to drivers, speed limits somewhat below the 85th percentile may be justified; however, speed limits shall not be lowered more than 5mph less than the nearest increment to the 85th percentile speed. The factors justifying a reduction below the nearest increment to the 85th percentile speed are the same factors mentioned above. Whenever such factors are considered to establish the speed limit, they should be documented on the speed zone survey or the accompanying engineering report. Generally, collision history is the most decisive evidence of conditions not readily apparent to the driver.

Excerpts from the 2015 California Vehicle Code

CVC Section 21400 Uniform Standards

21400. (a) (1) The Department of Transportation shall, after consultation with local agencies and public hearings, adopt rules and regulations prescribing uniform standards and specifications for all official traffic control devices placed pursuant to this code, including, but not limited to, stop signs, yield right-of-way signs, speed restriction signs, railroad warning approach signs, street name signs, lines and markings on the roadway, and stock crossing signs placed pursuant to Section 21364.

(2) The Department of Transportation shall, after notice and public hearing, determine and publicize the specifications for uniform types of warning signs, lights, and devices to be placed highway by a person engaged in performing work that interferes with or endangers the safe movement of traffic upon that highway.

(3) Only those signs, lights, and devices as are provided for in this section shall be placed upon a highway to warn traffic of work that is being performed on the highway.

Control devices or markings installed upon traffic barriers on or after January 1, 1984, shall conform to the uniform standards and specifications required by this section.

(b) The Department of Transportation shall revise the California Manual on Uniform Traffic Control Devices, as it read on January 1, 2012, to require the Department of Transportation or a local authority to round speed limits to the nearest five miles per hour of the 85th percentile of the free-flowing traffic. However, in cases in which the speed limit needs to be rounded up to the nearest five miles per hour increment of the 85th percentile speed, the Department of Transportation or a local authority may decide to instead round down the speed limit to the lower five miles per hour increment, but then the Department of Transportation or a local authority shall not reduce the speed limit any further for any reason.