

Road Diet Feasibility Study

Martin Luther King Jr Way, Embarcadero to 20th Street



Safe Streets Division
February 14, 2020



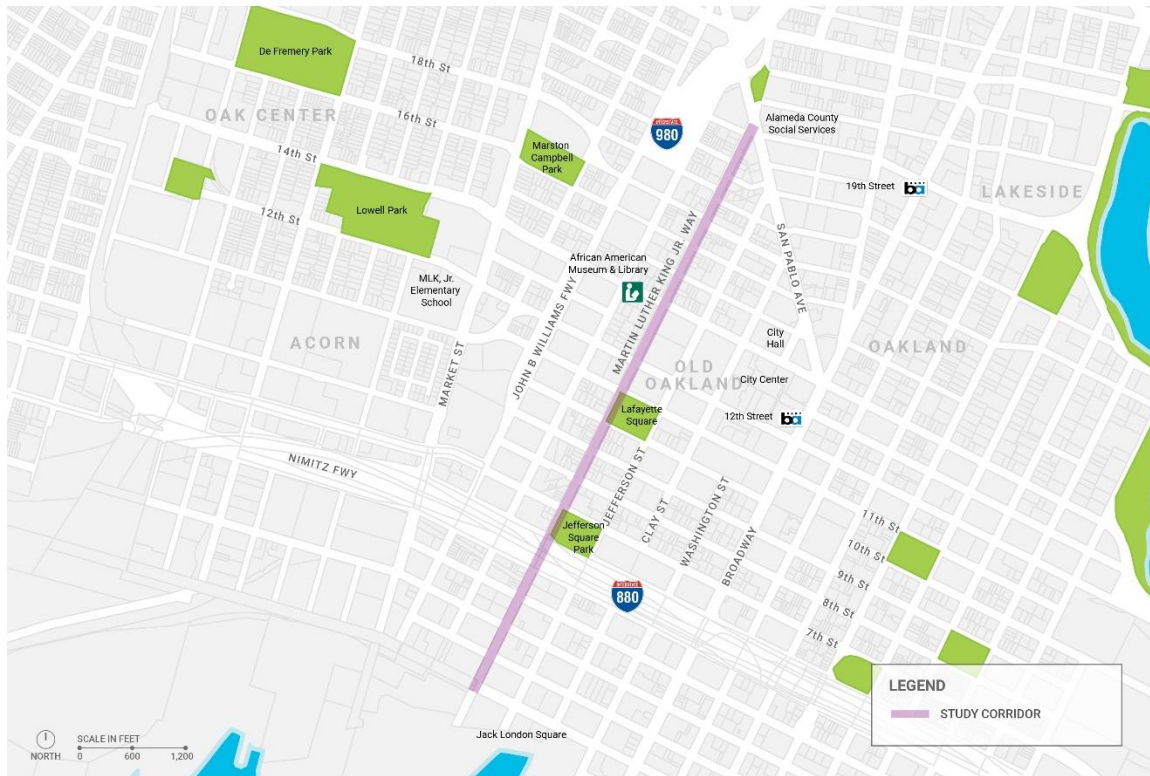
The City of Oakland’s Department of Transportation (OakDOT) completed this study to investigate cost-effective ways to improve safety and access for all roadway users. Specifically, the study addresses speeding; safety for pedestrians, bicyclists, and motorists; and traffic congestion. The study evaluates the feasibility of a “road diet” – reducing the number of travel lanes to match traffic volumes and to improve safety. Reallocating travel lanes to other purposes may create a better match with how a street is designed, how it is used, and how people would like it to be used. National research shows that typical road diet projects reduce the number of crashes by 28 percent. Road diets can be inexpensive to implement, particularly when coordinated with paving, because they can be as simple as re-stripping the roadway. To determine if a road diet would be feasible and beneficial, this study examines the existing conditions at the project location and how the proposed project would affect traffic safety and circulation.

This study was completed by Jennifer Stanley and Jason Patton (OakDOT, Safe Streets Division), and Kittelson and Associates, Inc. The study uses the City’s Methodology for Road Diet Feasibility Studies (2019).

Purpose & Planning Context

Martin Luther King, Jr Way (Embarcadero to 20th Street) is located along the western edge of downtown Oakland, connecting San Pablo Ave to Jack London Square. The adjoining land uses are primarily multi-unit residential with Victorian-era houses at the northern and southern ends. There are two parks along the street: Lafayette Square Park and Jefferson Square Park. The street is included in the City’s Bicycle Plan (2007, 2019). It is currently a designated bike route and it is proposed for bike lanes. The street is classified as a minor arterial in the Federal Highway Administration’s street classification system. AC Transit uses Martin Luther King, Jr Way to for laying over buses along Lafayette Square Park but does not provide through bus service on this portion of Martin Luther King, Jr Way. The proposed road diet is being considered to implement the Bicycle Plan recommendation and because the existing traffic volumes are well below the capacity of the existing four-lane roadway. The excess capacity creates an opportunity to redesign the roadway to improve safety for all users.

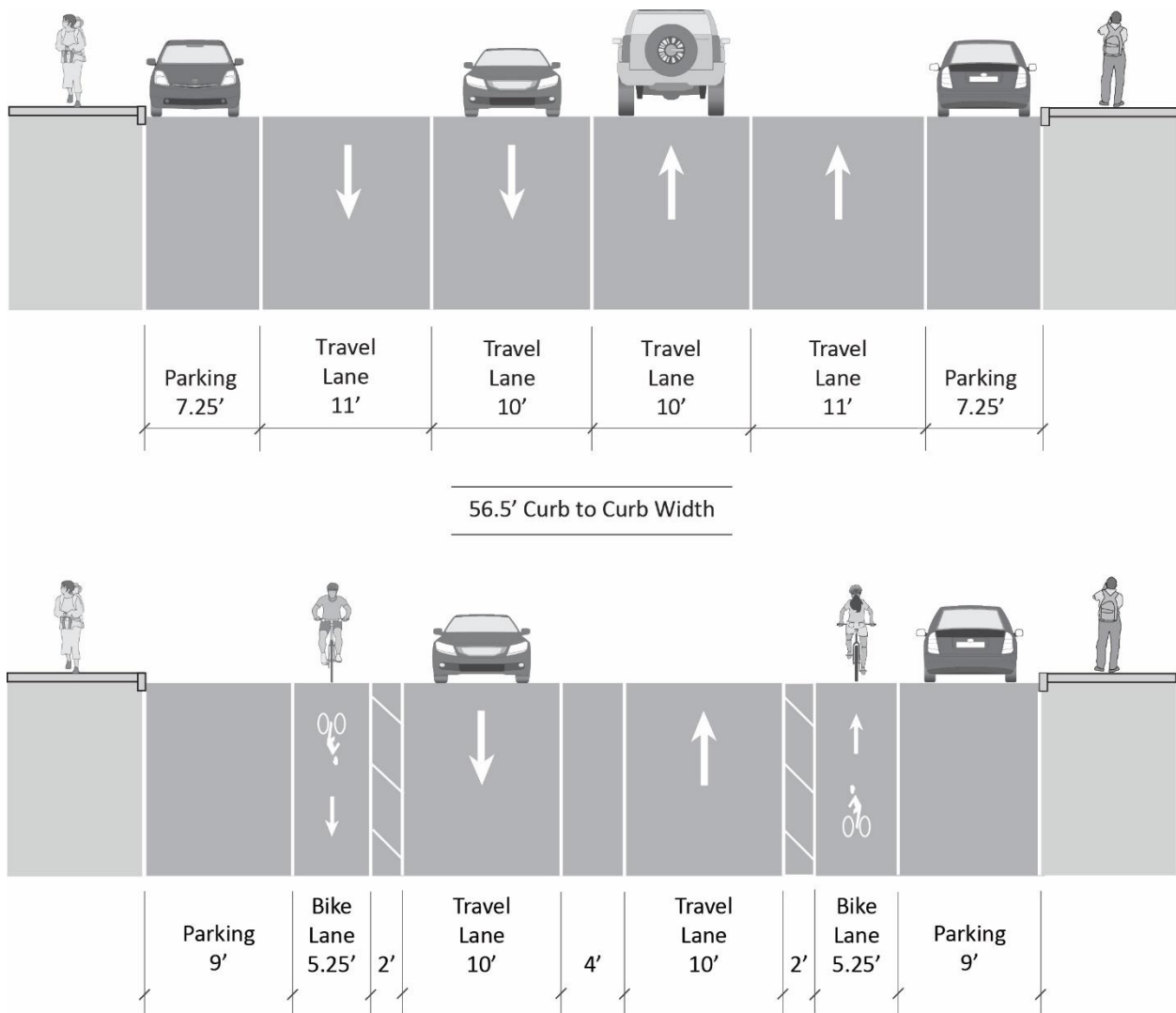
Figure 1: Context Map



Description of Proposed Project

The proposed project would convert the street from two travel lanes in each direction to one travel lane and one buffered bike lane in each direction. New high-visibility crosswalks are proposed at 2nd Street, 3rd Street, 4th Street, and 9th Street. On-street parking would not change, except for the possible addition of ADA-accessible parking spaces to comply with current standards. Martin Luther King, Jr Way is 56.5 feet in width from curb-to-curb. The project is funded by a grant from the State of California's Affordable Housing and Sustainable Communities (AHSC) program. This program funds affordable housing projects paired with sustainable transportation projects. The Martin Luther King, Jr Way project was funded in conjunction with 50 units of senior affordable housing at 3268 San Pablo Ave. **Figure 2** presents the existing cross-section of the street and the proposed project on Martin Luther King, Jr Way between Embarcadero and 20th Street.

Figure 2: Existing and Proposed Cross-sections



Summary & Recommendations

Based on the findings explained below, this study recommends the implementation of the road diet on Martin Luther King, Jr Way from Embarcadero to 20th Street. The key findings are the following:

- There were 75 injury crashes over a five-year period, including five crashes involving pedestrians and four crashes involving bicyclists.
- Approximately seven percent of motorists exceed the speed limit.
- One travel lane per direction can accommodate current motor vehicle traffic.
- The proposed project would improve the pedestrian experience by reducing the amount of time people wait to cross the street and by reducing the potential for multi-lane threats when people cross the street.

- The proposed project would make Martin Luther King, Jr Way suitable for bicycling for all users, including children, whereas currently the street is only suitable for adults comfortable sharing the roadway with automotive traffic.
- In the future, motor vehicle traffic could increase by 186% and still be accommodated by the proposed project.

The proposed project will improve safety for all users by reducing speeding, making crossings safer for pedestrians, and improving conditions for bicyclists.

Study Topics

OakDOT evaluates the feasibility of road diets using methods that respond directly to the lived experiences of people who travel on the roadway and those who live or work along the corridor. This study investigates the following topics:

- **Traffic Crashes:** What traffic crashes were reported in the past five years? Who was injured or killed? What are the causes of these crashes?
- **Traffic Speeds:** How fast are motorists driving? How many motorists are driving faster than the speed limit?
- **Traffic Volumes:** How many motor vehicles use the street? With the current configuration, how many vehicles could use the street? With the proposed configuration, how many vehicles could use the street?
- **Pedestrian Safety:** How challenging is it for pedestrians to cross the street? Would the proposed project make it safer and easier to cross?
- **Bicyclist Safety:** Do people feel safe bicycling on the street? Would the proposed project make more people feel safe bicycling?
- **Future Traffic Growth:** If the project were implemented, could the street accommodate more motor vehicle traffic in the future?
- **Left Turns:** It is not always possible to provide left turn lanes at every intersection. At which locations would left turn lanes provide the greatest benefit?

Study Findings

This section summarizes the findings of the Study Topics listed above. Technical documentation on the findings is provided in the appendices to this study.

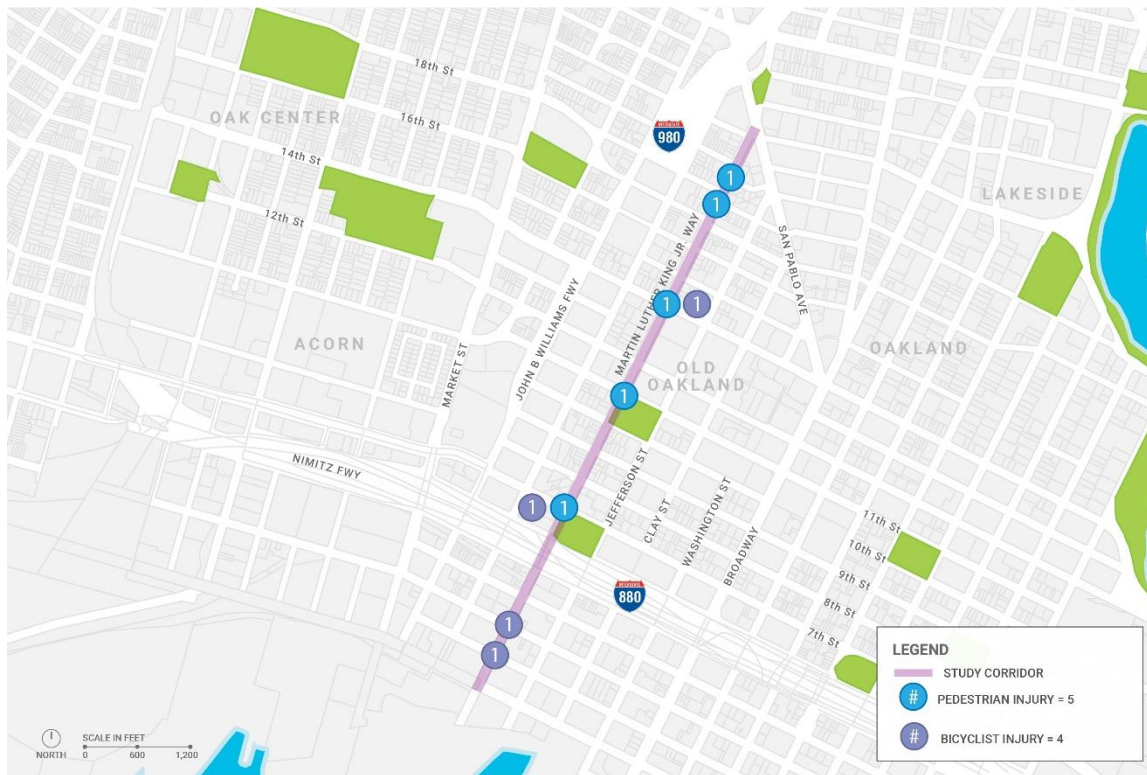
Traffic Crashes

The City of Oakland is seeking to eliminate all fatal and severe traffic crashes. Over the ten-year period from 2007 through 2016, 205 people died in Oakland traffic crashes and over 800 people were severely injured. At a fundamental level, these deaths and injuries are preventable by designing, building, and maintaining safe streets.

On Martin Luther King, Jr Way, traffic crashes were evaluated to determine the number of crashes and who was involved. From 2012-2016, there were 110 crashes. This included five crashes involving

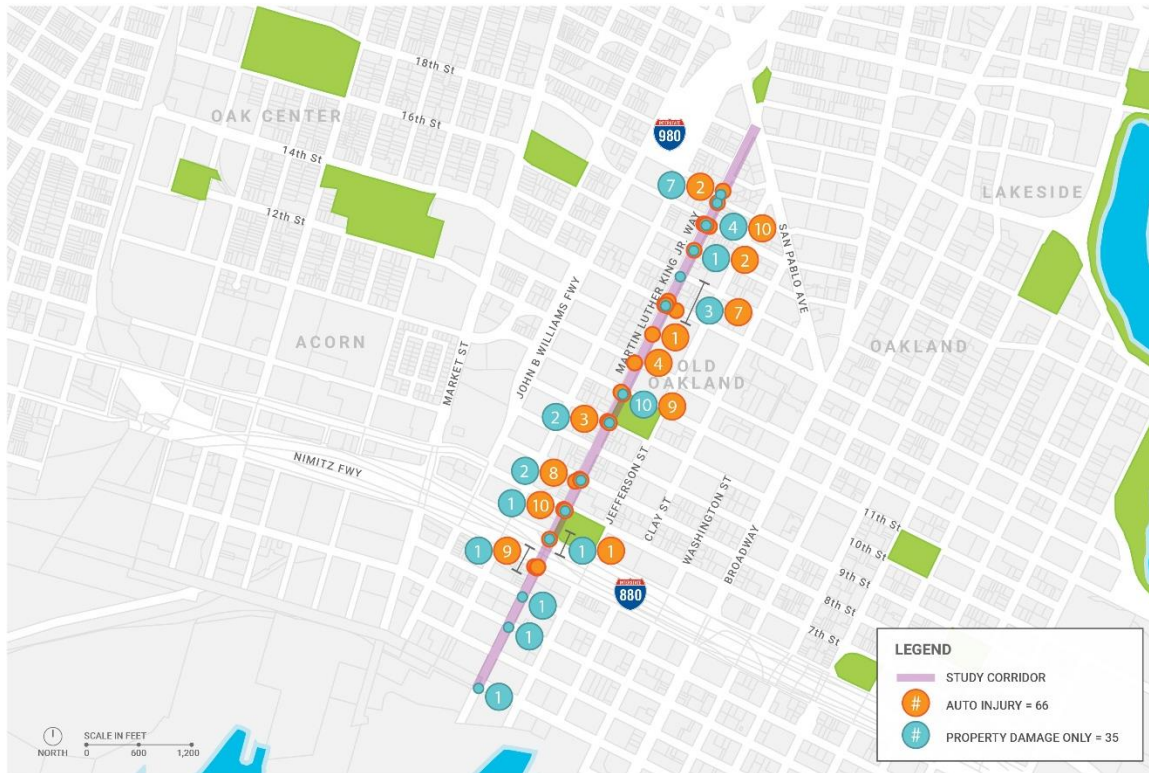
pedestrians and four crashes involving bicyclists, all of which resulted in injuries. **Figure 3** presents the locations and number of crashes involving pedestrians and bicyclists. For crashes involving only motor vehicles, **Figure 4**, 66 crashes resulted in injuries and an additional 35 crashes resulted in damaged property (either to the vehicle, personal property, or both). During the time period evaluated, there were no fatal crashes.

Figure 3: Pedestrian- and Bicyclist-involved Crashes



Source: Transportation Injury Mapping System and Statewide Integrated Traffic Records System, 2018

Figure 4: Auto-only Crashes



Source: Transportation Injury Mapping System and Statewide Integrated Traffic Records System, 2018

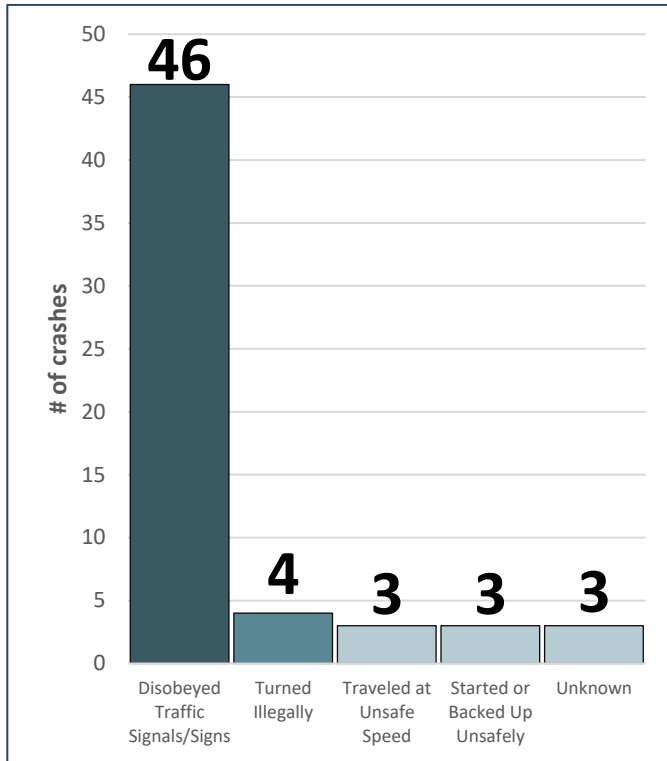
Broadside crashes – collisions with the side of a vehicle – were by far the most common crashes resulting in injuries (57 crashes), followed by sideswipe crashes (5 crashes). (See **Figure 5**.) For both injury and property damage crashes, broadside crashes were the most common crash type (76 crashes, 69% of total crashes), followed by sideswipe crashes (14 crashes, 13% of total crashes).

The most common primary contributing factor (PCF) for crashes resulting in injuries was motorists “not following traffic signals and signs” (63%). (See **Figure 6**.) For both injury and property damage crashes the most common PCF was motorists “not following traffic signals and signs” (62%).

Figure 5: Injury Crashes by Types

Crash Type		# of Injury Crashes
Broadside	→ ↑	57
Sideswipe	→ ↗	5
Rear End	→ →	4
Vehicle/ped	→ ↑	4
Head On	→ ←	2
Other	?	2
Overtaken	⊗	1

Figure 6: Top Five Reasons for Injury Crashes

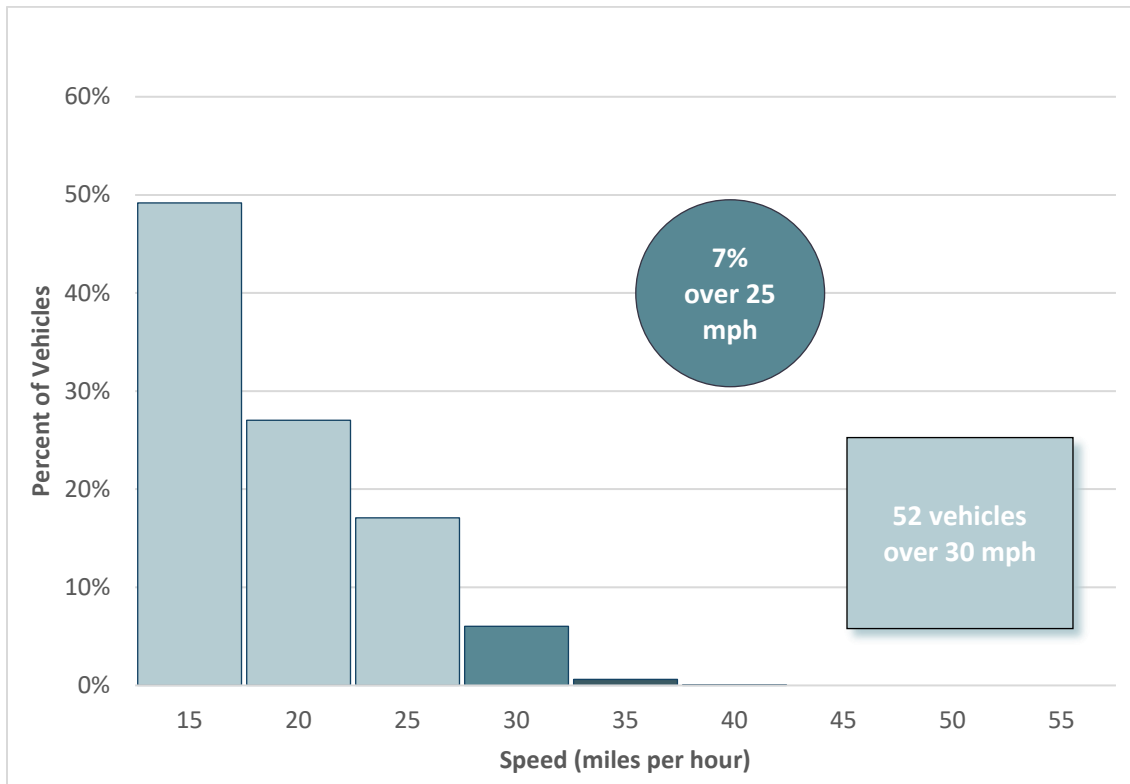


Traffic Speeds

Higher speeds result in more crashes and more severe crashes. Cars traveling faster require longer distances to stop, resulting in a greater risk of crashes. Research by the National Highway Traffic Safety Administration (NHTSA) shows that 5% of pedestrians are killed when struck by a vehicle traveling at 20 miles per hour. In contrast, 40%, 80%, and nearly 100% of pedestrians die when struck by a vehicle going 30, 40, and 50 mph, respectively.

Martin Luther King, Jr Way has a posted speed limit of 25 miles per hour (mph). The City collected 24-hour vehicle speed data along the corridor for three consecutive days from November 15-17, 2016. As shown in **Figure 7**, the average speed of motorists traveling between 16th Street and 17th Street was observed to be 14 mph. About seven percent of motorists were observed to be exceeding the speed limit. Fifteen percent (15%) of motorists were traveling above 22 mph.

Figure 7: Motorist Speeds

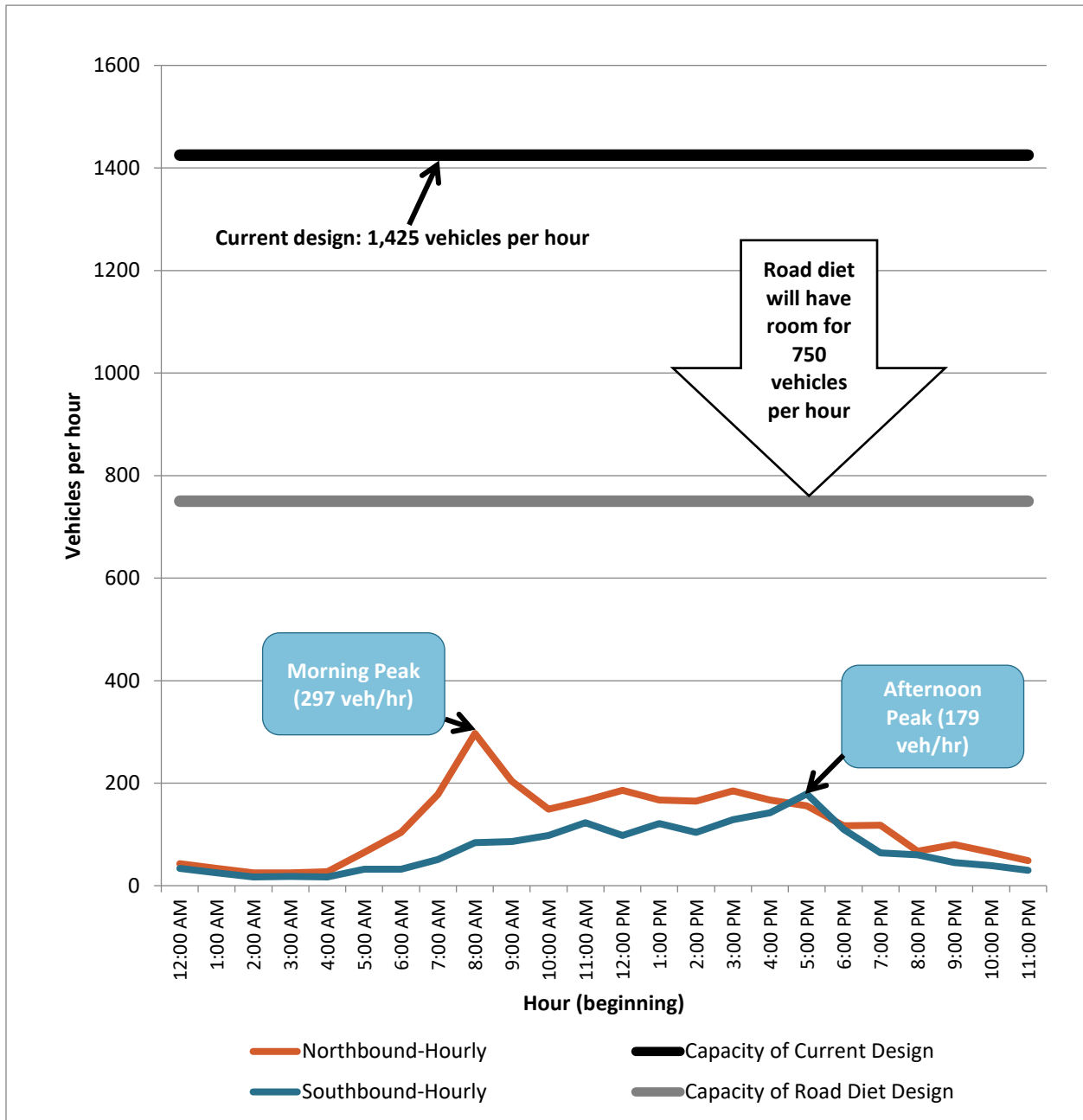


Traffic Volumes

Most streets are the busiest during the morning and evening commutes, with less traffic during the day and little traffic at night. Historically, many streets were designed to accommodate the busiest one hour (or even 15 minutes) of the day, resulting in streets being under-used for the other 23 hours (or 23 hours and 45 minutes). Extra travel lanes may encourage speeding and make it challenging for pedestrians to cross. These are unintended consequences of designing for the busiest time of day. By examining traffic volumes throughout the entire day, a project's benefits and costs can be evaluated more fairly.

Traffic counts were collected on Tuesday through Thursday, November 15-17, 2016 on Martin Luther King, Jr Way between 16th Street and 17th Street. On average, there were 4,577 vehicles per day. The busiest hour was between 8:00 AM and 9:00 AM with 297 vehicles counted in the northbound direction. These data are graphed in in **Figure 8**. The existing cross-section with two travel lanes per direction in the central business district has a capacity of 1,425 vehicles per hour in each direction. The proposed cross-section with one travel lane per direction has a capacity of 750 vehicles per hour in each direction. The roadway capacity of the proposed project is about two-and-one-half times greater than the existing traffic volumes. (See *Future Traffic Growth*, page 12.)

Figure 8: Traffic Volumes



Pedestrian Safety

Pedestrians are especially vulnerable to being hit when crossing streets with more than one travel lane in each direction. A pedestrian crossing a four-lane street needs up to four drivers to yield. If the driver in the first lane yields, that vehicle will likely block the view for the driver in the second lane. This scenario – where the pedestrian and the second driver cannot see each other – is such a severe problem

that it has its own name: a *multiple threat crash*. Additionally, speeds on such streets are higher, and speeding drivers are less likely to yield to pedestrians.

This analysis examines how long pedestrians must wait for a safe opportunity to cross the street at crosswalks without traffic signals or stop signs. This method is useful for understanding pedestrian safety because longer wait times result in people taking risks. Without safe opportunities to cross, pedestrians attempt to force drivers to yield. In California, drivers are required to yield to pedestrians at both marked and unmarked crosswalks, but not all drivers do so. With fewer lanes and lower speeds, drivers are more likely to yield to people crossing the street, improving safety and access for pedestrians.

There are 12 signalized intersections and four side-street stop-controlled intersections with no marked crosswalks (2nd, 3rd, 4th, and 9th Streets). Under existing conditions, pedestrians cross a four-lane undivided road. Crossing Martin Luther King, Jr Way at uncontrolled intersections can be difficult for pedestrians, with an estimated 15% of motorists yielding to pedestrians. During commute hours, pedestrians may need to wait over 40 seconds to find a safe gap to cross. By removing travel lanes and installing high-visibility crosswalks, it is estimated that 80% of motorists will yield to pedestrians, and that the crossing delay would be reduced to about 15 seconds during commute periods.

Bicyclist Safety

The City of Oakland is moving bicycling into the mainstream by making it a safe, enjoyable, and practical means of travel. Bicycling has the most opportunities for growth in the Oakland Flatlands, and in proximity to downtown, BART stations, and the waterfront. Many Oaklanders are interested in bicycling but concerned about riding in traffic. OakDOT groups people who are willing to bicycle into four categories based on their level of comfort and concern with riding in traffic.

- (1) **Youth:** For young people (and their parents) to feel comfortable biking, Youth should be separated from all but the slowest and lightest traffic. Youth are served by bicycle paths, bicycle boulevards, and – in some instances – buffered bike lanes and separated bike lanes.
- (2) **Most Adults:** This is the largest portion of the population who is interested in biking (or biking more) but is often discouraged by motor vehicle traffic. Most Adults will feel comfortable biking on streets with wide, buffered, and/or separated bike lanes and low traffic speeds.
- (3) **Experienced Commuter Bicyclists:** This type of bicyclist has ridden in Oakland for years and is generally comfortable riding on streets with basic bike lanes. While a small percentage of the overall population, this group has an important role in growing the culture of bicycling.
- (4) **Strong & Fearless:** This very small percentage of the population has little to no concern with riding in traffic, and generally little interest in dedicated bikeways.

To attract more people to bicycling, OakDOT is working to create more space for bicyclists on Oakland's streets and thereby serve Most Adults and Youth, while growing the pool of Experienced Commuter Bicyclists.

Due to the presence of four travel lanes and vehicle speeds of 25 mph and higher, Martin Luther King, Jr Way is only suitable for “Experienced Bicycle Commuters” – people who are comfortable sharing the roadway with motorists. The proposed project would have one travel lane per direction, add buffered bike lanes, and discourage speeding. This change would make the facility suitable for all bicyclists. The proposed bike lanes on Martin Luther King, Jr Way would connect to existing buffered bike lanes on 17th Street, existing bike lanes on San Pablo Ave, and proposed bike lanes on 7th Street, 8th Street, 9th Street, and 14th Street, as illustrated in **Figure 8**.

Figure 8: Bicyclist Suitability

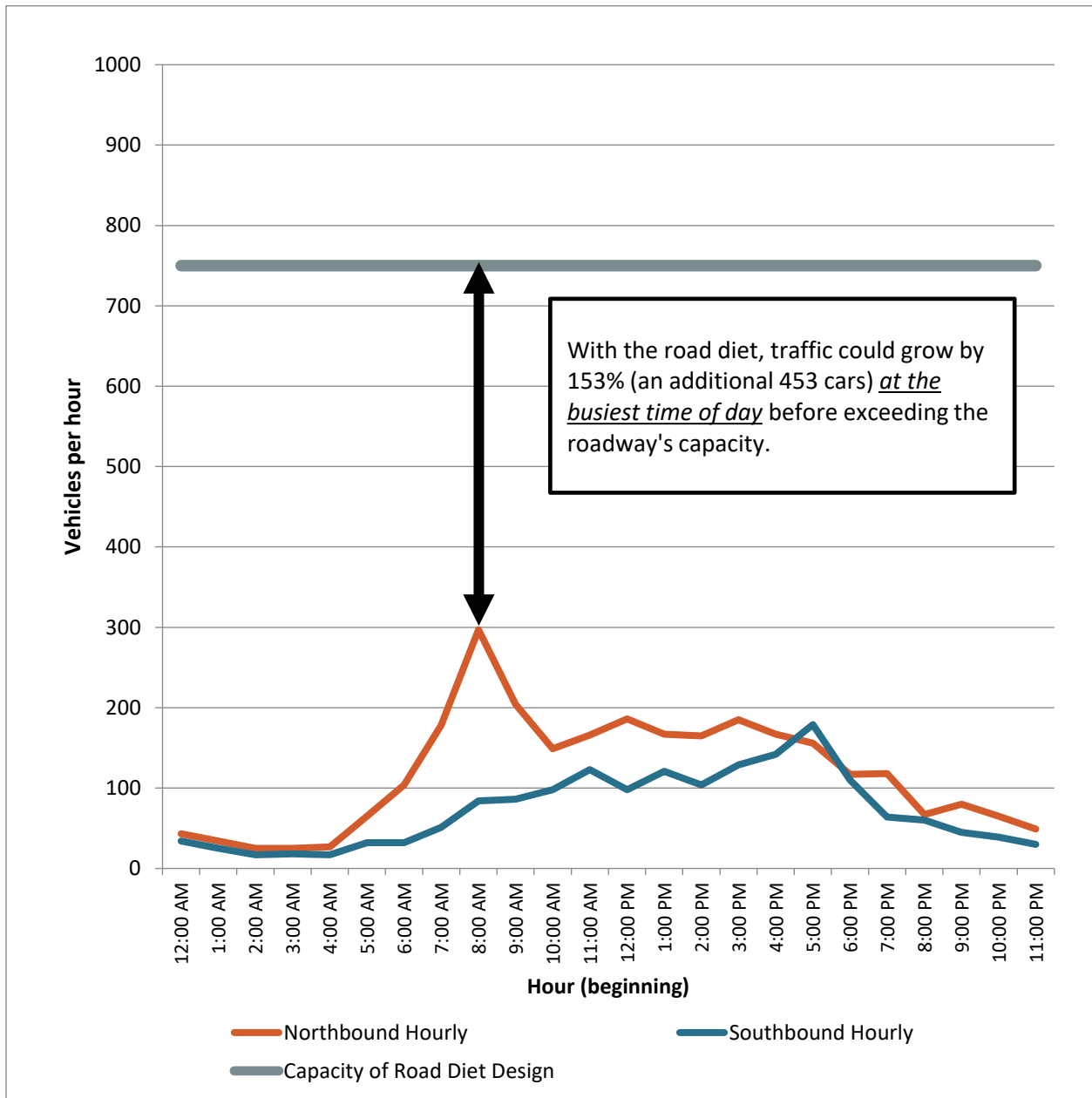


Future Traffic Growth

As Oakland builds housing and creates jobs, more people are using Oakland’s streets. The City of Oakland’s policies seek to shift more people from driving to transit, walking, and biking. These modes make more efficient use of street space and improve public health and the environment. Across the United States, and particularly in metropolitan areas, young people are less interested in driving than their parents’ and grandparents’ generations. Yet traffic congestion remains a concern. If the City reduced the number of travel lanes on this street now, and more people drove in the future, what would happen?

The proposed project, with one lane per direction, could accommodate 750 vehicles per hour. The current peak hour directional volume is 297 vehicles per hour between 8:00 AM and 9:00 AM in the northbound direction. This volume could increase by 153% – an addition of 453 vehicles – before reaching the capacity of the proposed project. This is illustrated in **Figure 9**.

Figure 9: Available Capacity for Future Growth



Left Turns

Left turn lanes are beneficial to motorists and bicyclists by providing a place to wait that is separated from overtaking traffic. Left turn lanes also allow for protected left turn phases at traffic signals. The green arrow for the left turn improves pedestrian safety by having turning motorists and crossing pedestrians go at different times. However, the space for turn pockets could also be used for pedestrian safety islands or to add buffers to bike lanes. The purpose of this analysis is to investigate the locations that would benefit the most from left turn lanes. This benefit can then be weighed against the competing demands of pedestrian safety and bicyclist safety.

There are currently no left turn pockets on Martin Luther King, Jr Way in the project area. Turning drivers need gaps in oncoming traffic to make left turns, and in the current configuration with two travel lanes in each direction, the left-most travel lane is used by drivers waiting to make left turns. To assess the need for gaps in the road diet scenario, the City counted the number of motor vehicles passing through every signalized intersection on Martin Luther King, Jr Way in September 2019 during the peak traffic hours (7-9am and 4-6pm). These intersections are: 5th Street, 6th Street, 7th Street, 8th Street/Gerry Adams Way, 10th Street, 11th Streets, 14th Street, 16th Street, 17th Street, 18th Street, 20th Street, and San Pablo Avenue. These counts recorded motor vehicles passing through an intersection coming from, and going in, all directions, and were analyzed to identify any intersections where the number of left-turning or through-motorists was so high that left-turning motorists wouldn't have the time needed to complete their movement during a typical traffic signal phase. The analysis found no intersection in need of left turn pockets.