CITY OF OAKLAND

MEMO

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SUBJECT: Safety Analysis of Telegraph Avenue from 20th Street to 29th Street (KONO)

DATE: March 11, 2021

The mission of OakDOT is to advance mobility, accessibility, equity, safety and sustainability in our transportation system. Below is a safety assessment of bikeway facility design options along Telegraph Avenue between 20th Street and 29th Street. The team evaluated five design options:

1. Seven Auto Lanes (Pre-Interim Project condition)
2. Interim Protected Bike Lanes (Existing condition)
3. Permanent Protected Bike Lanes (Continuous concrete protected bike lanes, bus boarding islands, and two protected intersections)
4. Enhanced Buffered Bike Lanes (Conventional bike lanes with painted buffers between the bike lane and moving vehicles and between the bike lane and parked cars, concrete bus boarding islands, and two protected intersections)
5. Enhanced Buffered Bike Lanes with Curb Management (Conventional bike lanes with painted buffers between the bike lane and moving vehicles and between the bike lane and parked cars, concrete bus boarding islands, two protected intersections, and demand-responsive parking and loading management in effect days, evenings & weekends)

Existing data are available for Options 1 and 2 and presented in the Agenda Report section titled, Telegraph Complete Streets Interim Project Results.

To score the safety impacts of Options 3 – 5, we rely on evaluation criteria identified in the NACTO Urban Bikeway Design Guide, FHWA Bikeway Selection Guide, and Caltrans Bikeway Facility Selection Guidance, along with peer cities' best practices. These guides are not prescriptive but emphasize the need for engineering judgment and design flexibility in project decision-making. Nevertheless, all guides highlight important bicycle facility safety considerations, including motor vehicle speeds, motor vehicle volumes, number of vehicle travel lanes, and curbside conflicts between buses, bicyclists, commercial loading and on-street parking. Additionally, Caltrans, FHWA and peer cities[1] recommend considering the frequency of unsignalized intersections and driveways, which create more potential conflicts between people driving and people walking and biking.

[1] Parks, Jamie, Paul Ryus, Alison Tanaka, Chris Monsere, Nathan McNeil, Jennifer Dill, & William Schultheiss. "Bicycle Facility Evaluation: Washington, D.C." District Department of Transportation, District of Columbia, Washington, D.C. https://nacto.org/wp-content/uploads/2015/04/bicycle_facility_evaluation_ddot.pdf

Below is a discussion of Options 3 – 5 across these five safety components.

1. *Motor vehicle speed*

When it comes to safety, lower vehicle speed is especially important as speed is the critical factor in the frequency and severity of collisions. When drivers slow down by even a few miles per hour collisions are less likely to occur, and when they do occur they tend to be less severe.

The average speed on Telegraph Avenue between 20th Street and 29th Street since the road diet and bike lane project were installed is 17 mph. Eight-five percent of motorists drive 24 mph or lower. The number and width of vehicle travel lanes is a primary driver of vehicle speeds. Both the permanent protected bike lane (Option 3) and enhanced buffered bike lane options (Options 4 and 5) have the same number and width of travel lanes. Staff anticipate speeds would remain around the posted speed limit of 25 mph under Options 3, 4, and 5.

2. *Motor vehicle volume*

Motor vehicle volume can be associated with traffic-related stress, depending on the level of separation between people biking and people driving. The protected bike lane in Option 3 includes concrete curbs separating the motor vehicle parking/travel lanes and the bike lane. The buffered bike lanes in Options 4 and 5 may include two striped buffers, subject to additional detailed design. The first, a 2'-wide painted buffer between bike lane and parking lane, makes it easier for bicyclists to position themselves outside of the "door zone" of parked vehicles. The second 3'-wide buffer between the bike lane and moving vehicles provides more physical distance between people biking and people driving and creates a more visible boundary between the two modes.

The NACTO Guide recommends protected bike lanes (Class IV) for streets with motor vehicle volumes above 6,000 vehicles a day. The Caltrans guidelines recommend Class II bike lanes on streets with fewer than 20,000 vehicles a day but recommend considering buffered bike lanes on streets with more than 10,000 vehicles a day. Peer cities report substantial collision reduction and safety benefits associated with installing road diets and bike lanes on streets with more than 10,000 vehicles a day.[2] [3] The current daily volume along Telegraph Avenue in KONO is 11,000 motor vehicles a day.

3. *Curbside conflicts*

Conflicts between buses, people biking, commercial loading, people activating the sidewalk, and people accessing on-street parking can lead to unpredictable behavior across road users and create additional safety concerns.

To minimize conflicts between transit and bikes, Options 3, 4, and 5 all utilize bus boarding islands to place the bus stop adjacent to the travel lane and to provide space behind the island for people biking to avoid the transit path of travel.

The protected bike lane in Option 3 uses parked vehicles as protection from passing motor vehicle traffic. The placement of on-street parking adjacent to the travel lanes means that parking movements can be accomplished without vehicles encroaching into the protected bike lane. However, passengers exit parked vehicles into the bike lane and drivers also cross the bike lane to reach the sidewalk. This can be especially impactful to commercial

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[2] Seattle Department of Transportation. "Evaluations (Before and After Reports): Stone Way N Rechannelization; Nickerson Rechannelization; NE 75th St Road Safety Redesign." Seattle, WA. https://www.seattle.gov/transportation/document-library/reports-and-studies

[3] King, Michael. "Bicycle Facility Selection: A Comparison of Approaches." Pedestrian and Bicycle Information Center, Highway Safety Research Center, University of North Carolina, Chapel Hill, N.C. https://nacto.org/wp-content/uploads/2011/03/Bicycle-Facility-Selection-A-Comparison-of-Approaches-2002.pdf

loading activities due to the lack of alleys or off-street loading along Telegraph Avenue. People with disabilities may be disproportionately impacted, as well, depending on the availability and placement of accessible parking.

While buffered bike lanes in Options 4 and 5 can be misused by motorists double-parking (which is illegal), the combined 11' width of the buffered bike facility provides space to allow bicyclists to navigate around these and other obstructions while staying within the buffer zone and avoiding the path of moving vehicles. In Option 4 (buffered bike lanes without active curb management), people may tend to park vehicles in the bike lane more often than today, which could lead to more conflicts with people bicycling. The demand-responsive curb management in Option 5 can help alleviate this unsafe, illegal activity. In both Options 4 and 5, parking adjacent to the curb is more convenient and accessible for people with disabilities and allows motorists of all abilities, including commercial delivery drivers, to exit vehicles and reach the sidewalk without crossing the bike lane.

4. Vehicle travel lanes

Fewer travel lanes may be the operative factor in the increase incidence of drivers yielding to pedestrians and slower motor vehicle speeds after the road diet and interim protected bike lanes. Options 3 —5 include the same number of vehicle travel lanes in each direction: one. In each of these three options, staff anticipate a similar likelihood of motorists yielding to pedestrians as with the interim project.

5. Intersection and driveway frequency

Intersection and driveway frequency are especially relevant on Telegraph Avenue between 20th Street and 29th Street, where there is an intersection every 185' on average, not including driveways. On other segments of Telegraph Avenue through Pill Hill and Temescal, the intersection frequency is 270' - 275' on average. The frequency of intersections and driveways, especially uncontrolled intersections and driveways, creates more opportunities for conflict between people driving and people walking and biking. Design treatments, including signalization, vehicle through- or turn-restrictions, and on-street parking restrictions, can address these conflicts, but require significant community engagement and resources.

Protected bike lanes provide a more separated, protected facility at mid-block locations where intersections and driveways are not present. However, one of the most common safety concerns with the interim protected bike lanes we hear from the KONO community is that turning vehicles do not easily see people bicycling and fail to yield the right-of-way at intersections. Signalization and vehicle restrictions separate these movements. In fall 2020, we proposed eliminating left-turns and vehicle through movements at several uncontrolled intersections to eliminate conflicts between people driving and biking and received substantial push back from stakeholders along the corridor. Signalization requires significant resources and may be infeasible given the offset intersections along this segment of Telegraph.

Buffered bike lanes address the intersection and driveway visibility concerns—concerns unique to the segment of Telegraph Avenue between 20th Street and 29th Street. A person biking in a buffered bike lane is constantly in view of, and can themselves easily view, adjacent moving vehicles. Bicyclists are not obscured from turning motorists' view by parked vehicles by design. People biking may be more likely to be aware of vehicle movements in advance of driveways and intersections and may be less likely to be struck by those motorists.

Typically, protected bike lanes are safer than buffered bike lanes in reducing collisions resulting in severe injury or fatality. Protected bike lanes are especially safe at mid-block locations were people biking and people driving are physically separated. However, the frequency and number

of uncontrolled intersections, including offset intersections, along Telegraph Avenue between 20th Street and 29th Street may compromise some of the safety benefits of protected bike lanes. Therefore, based on an analysis of vehicle speeds, vehicle volumes, vehicle travel lanes, intersection frequency, and curbside conflicts, I consider both Option 3: Permanent protected bike lanes and Option 5: Enhanced buffered bike lanes with curb management to be the safest design options.