City of Arts & Innovation

Transportation Committee

TO: **TRANSPORTATION COMMITTEE MEMBERS** **DATE: APRIL 11, 2019**

FROM: **PUBLIC WORKS DEPARTMENT** **WARDS: ALL**

SUBJECT: **RETROREFLECTIVE YELLOW BORDERS ON TRAFFIC SIGNAL BACKPLATES PILOT PROGRAM – UPDATE**

ISSUE:

Receive post-construction accident analysis data pertaining to the City's pilot program which installed retroreflective yellow borders on traffic signal backplates.

RECOMMENDATION:

That the Transportation Committee receive and file the intermediate update information pertaining to the City's retroreflective yellow borders on traffic signal backplates pilot program.

BACKGROUND:

On April 19, 2016, the City Council approved the award of Bid No. 7355 to JFL Electric, Inc. which included the installation of retroreflective yellow backplate borders at 12 traffic signals throughout the City of Riverside. Although 12 intersections were initially recommended, the project omitted the backplates from the intersections of Fourteenth Street at Orange Street and Indiana Avenue at Buchanan Street. The backplate installation was completed in April of 2017. The Transportation Committee subsequently requested that a pilot program for the reflective yellow borders be brought before the Committee for review.

DISCUSSION:

The Public Works Department selected 10 intersections for the installation of retroreflective yellow backplate borders on traffic signals. The selected intersections were a mix of high incident locations and a few others located on curvilinear alignments experiencing a high percentage of injury incidents. In order to best analyze the retroreflective tape, the project installed new signal indications fitted with a four inch-wide strip of yellow and highly reflective tape (pictured on Page 2 as installed at Van Buren Boulevard & Magnolia Avenue). The Federal Highway Administration (FHWA) has recognized this treatment as an "aging driver" best practice and one of its 'proven safety countermeasures.' Case study FHWA-SA-09-011 cites this countermeasure's effectiveness in the reduction of nighttime collisions. For the purposes of this project, new traffic signal indications were ordered and equipped with the yellow retroreflective tape prior to being placed at pilot program intersections. Pilot location collisions were selected in response to a

variety of factors, including collision rates, roadway speeds, and the horizontal alignment of intersection approaches.

Retroreflective yellow borders installed at Magnolia Avenue at Van Buren Boulevard

Retroreflective yellow borders were installed at the following signalized intersections:

1. Alessandro Blvd at Chicago Ave
2. Alessandro Blvd at Glenhaven Ave
3. Alessandro Blvd at Gloucester Wy
4. Jurupa Ave at Fremont St
5. Mission Inn Ave at Redwood Dr
6. Van Buren Blvd at Arlington Ave
7. Van Buren Blvd at California Ave
8. Van Buren Blvd at Dufferin Ave
9. Van Buren Blvd at Jurupa Ave
10. Van Buren Blvd at Magnolia Ave

Collision rates were monitored at the 10 pilot locations, and at 10 additional 'control' intersections that experience high collision rates but were not equipped with retroreflective yellow backplates. The rate of change in collisions per year, injury collisions per year, and late night / early morning collisions per year was calculated for each location. The statistics shown in Tables 1 and 2 below show a collective increase in collision rates across both the pilot project and control intersections. The pilot intersections were studied for a period of 20 months. During this time period a total of 122 collisions occurred at pilot locations and 166 collisions occurred at control locations. When compared to a 112 month period before the retroreflective borders were installed, collision rates were found to increase more significantly at pilot project locations. This can be attributed to a variety of influencing factors, including increase in traffic volumes, relatively small sample size, and a short-term study period.

For example: in 2018, 3,200 more vehicles traveled on Alessandro Boulevard per day than in 2015, which totals about 1 million more vehicles per year in just a three year span. In 2015, five

injury collisions occurred at the pilot location of Alessandro Boulevard & Chicago Avenue, whereas six injury collisions occurred in 2018. A direct comparison of the two numbers reveals a 20% increase in injury collisions per year. However, by factoring in the higher vehicle counts, the relative percent increase in injury collections drops to 13.7% per year. Because pilot locations are generally located along Alessandro and Van Buren Boulevards, one can expect an increase in traffic volumes to impact collision rates. A consistent history of daily traffic volumes is not available for each pilot and control location.

TABLE 1: PILOT LOCATIONS

Reflective Yellow Pilot Locations	Change in Collisions Per Year		
	All Collision Types	Injury Collisions	Nighttime Collisions
Alessandro Blvd at Chicago Ave	16.8%	-6.3%	75.6%
Alessandro Blvd at Glenhaven Ave	40.5%	-6.3%	-100.0%
Alessandro Blvd at Gloucester Wy	462.0%	NA	NA
Jurupa Ave at Fremont St	-100.0%	-100.0%	NA
Mission Inn Ave at Redwood Dr	69.9%	87.3%	100.7%
Van Buren Blvd at Arlington Ave	81.0%	53.3%	34.4%
Van Buren Blvd at California Ave	9.3%	-9.3%	46.6%
Van Buren Blvd at Dufferin Ave	-64.9%	-19.7%	-100.0%
Van Buren Blvd at Jurupa Ave	28.3%	24.9%	100.7%
Van Buren Blvd at Magnolia Ave	7.8%	-8.5%	18.3%
Total	**32.1%**	**22.3%**	**50.6%**

Table 1: Retroreflective Border Pilot Locations Collisions Summary
Note: Locations with few collisions show high percentage fluctuations

TABLE 2: CONTROL LOCATIONS

Control Locations	Change in Collisions Per Year		
	Total Collisions	Injury Collisions	Nighttime Collisions
Indiana Ave at La Sierra Ave	70.7%	36.3%	44.5%
Inidana Ave at Van Buren Blvd	-86.6%	-35.1%	-100.0%
Indiana Ave at Arlington Ave	-43.0%	-35.1%	-68.8%
Magnolia Ave at Adams St	16.0%	-3.6%	75.6%
Magnolia Ave at Pierce St	3.0%	17.1%	107.1%
Magnolia Ave at La Sierra Ave	-1.6%	5.4%	7.1%
Magnolia Ave at Arlington Ave	-63.7%	-66.9%	-53.2%
Magnolia Ave at Tyler St	64.9%	50.8%	63.5%
Iowa Ave at Blaine St	74.0%	129.9%	81.8%
Market St at Third St	6.6%	40.5%	33.8%
Total	**12.3%**	**12.8%**	**27.5%**

Table 2: 'Control' Intersections Collisions Summary

Pilot locations are more sensitive to percentage changes as they have an overall lower number of collisions when compared to the control intersections. The data is summarized in Attachment

1 in an expanded format that shows the total number of collisions during each study period. At the time of data collection, the retroreflective yellow backplates had been in place for one year and eight months. The Public Works Department will continue to monitor the retroreflective yellow backplate border pilot project locations and will complete a full assessment of the improvements once they have been in place for a four-year period. Assessment results, findings, and recommendations regarding potential expansion or termination of the pilot project will subsequently be presented to the Committee for their review and consideration.

FISCAL IMPACT:

There is no cost associated with this pilot project intermediate update.

Prepared by: Kris Martinez, Public Works Director
Certified as to availability of funds: Edward Enriquez, Chief Financial Officer/Treasurer
Approved by: Rafael Guzman, Assistant City Manager
Approved as to form: Gary G. Geuss, City Attorney

Attachments:
1. Collision Data Table
2. PowerPoint Presentation