



**California Traffic Control Devices Committee (CTCDC)
Agenda Item Report**



<p>Meeting Date: May 2, 2024 Item Number: 24-04</p>	<p>From: Wil Buller, AC Transit; Megan Wier, City of Oakland; Aung Maung, Caltrans</p>
<p>Sponsored By: Virendra Patel, City of Concord</p>	<p>Presented By: Joe Wang, City of Oakland; Wil Buller, AC Transit; Randy Durrenberger, Kimley-Horn</p>
<p>Description: Experiment request for Red Paint Alternatives for Bus Only Lane</p>	

Recommendation:

Motion by the committee to approve experiment request for three red paint treatments for experimentation on International Boulevard in the City of Oakland.

Agency Making Request/Sponsor:

Wil Buller, AC Transit; Megan Wier, City of Oakland; Aung Maung, Caltrans / Virendra Patel, City of Concord

Background:

The Alameda-Contra Costa Transit Authority (AC Transit) and the City of Oakland are requesting approval of three red paint treatments for experimentation on International Boulevard in the City of Oakland.

The TEMPO Bus Rapid Transit (BRT) began operation along International Boulevard in August 2020. This BRT corridor is a center-running service in both directions from 14th Avenue to 107th Avenue. The design and deployment of the TEMPO BRT did not include red paint to delineate the restricted use of the transit lane but did include signage along the route and a solid white lane line between the transit lane and the general-purpose lane.

AC Transit is currently leading an evaluation project to implement surface treatments such as vertical channelizers and red paint to deter illegal use of the transit lane, retain reliable transit service, and enhance safety.

Attachments:

- Attachment A – Request for Experimentation Letter
- Attachment B – CTCDC Meeting Slide Deck



ATTACHMENT A



California Traffic Control Devices Committee (CTCDC)
Agenda Item Report



Attachment A – Request for Experimentation Letter

See Letter on Following Pages

April 10, 2024

Ms. Florencia Allenger
CTCDC Executive Secretary
California Department of Transportation – MS36
1120 N. Street
Sacramento, CA 95814

Subject: Request for Permission to Experiment with Red Paint Alternatives for Bus Only Lane

Dear Ms. Allenger,

In accordance with the California Manual on Uniform Traffic Control Devices (CA MUTCD) Section 1A.10, the Alameda-Contra Costa Transit Authority (AC Transit) and the City of Oakland are requesting approval of three red paint treatments for experimentation on International Boulevard in the City of Oakland.

The TEMPO Bus Rapid Transit (BRT) began operation along International Boulevard in August 2020. This BRT corridor is a center-running service in both directions from 14th Avenue to 107th Avenue. The design and deployment of the TEMPO BRT did not include red paint to delineate the restricted use of the transit lane but did include signage along the route and a solid white lane line between the transit lane and the general-purpose lane.

Since operation began, there has been an increasing misuse of the lane by the traveling public. This includes illegal U-turns, illegal left turns, queue cutting, and speeding. These illegal uses have led to disruptions in reliable transit service; numerous crashes involving transit vehicles; and a notable increase in fatalities and severe pedestrian injuries attributable to improper use of vehicles in the bus only lane. AC Transit is currently leading an evaluation project to implement surface treatments such as vertical channelizers and red paint to deter illegal use of the transit lane, retain reliable transit service, and enhance safety.

Thank you for your consideration of this request. We look forward to receiving a positive response from the Committee. If you have any questions, please contact the AC Transit Project Manager, Wil Buller, at (510) 891-5414.

Sincerely,

Wil Buller
AC Transit, Project Manager

Megan Wier
City of Oakland, Assistant Director

Aung Maung
Caltrans, D4 Chief Safety Officer

Request to Experiment

Requesting Agencies – AC Transit, City of Oakland, Caltrans

California Traffic Control Devices Committee (CTCDC) Sponsor – Virendra Patel, Alternate Member

A. Nature of the Problem / Problem Statement

In August 2020, AC Transit implemented a 6-mile (12 lane mile) center-running bus rapid transit (BRT) service in both directions along International Boulevard from 14th Avenue to 107th Avenue in the City of Oakland. This lane is intended for exclusive use by transit vehicles only. The Interim Approval for Optional Use of Red-Colored Pavement for Transit Lanes (IA-22) requires the use of red paint along the entire width of the transit lane for the entire length of the corridor. Due to the significant cost of installing full lane width red paint along the entire 6-mile (12 lane mile) corridor, red paint was not included in the implementation of the BRT.

The original BRT treatments that were implemented on International Boulevard included a 6” solid white lane line, BUS ONLY pavement legends at some locations along the entire corridor, and median signs indicating LEFT LANE BUS ONLY 24 HOURS. These treatments have not adequately deterred improper use of the restricted transit only lane by general purpose traffic. This has led to disruptions in BRT service, crashes involving transit vehicles, and numerous severe and fatal pedestrian collisions.

B. Proposed Change

AC Transit and the City of Oakland are requesting an experimentation of three alternate red paint treatments along the corridor:

1. Install thermoplastic red paint for the first 75 feet of a block and the full lane width of the BRT lane. For purposes of evaluation, this treatment would be installed for 2 consecutive blocks in one direction. This alternative is currently an accepted standard in the 11th Edition of the MUTCD.
2. Install thermoplastic red paint along the middle 4 feet of the BRT lane. For purposes of evaluation, this treatment would be installed for approximately 500 feet of the corridor in one direction.
3. Install a 12” wide thermoplastic red paint line adjacent to the existing 6” wide white lane line between the bus only lane and the general-purpose lane for approximately 1,000 feet of the corridor in one direction. This alternative was approved by FHWA for experimentation in Indianapolis, IN (2019) and Madison, WI (2023).

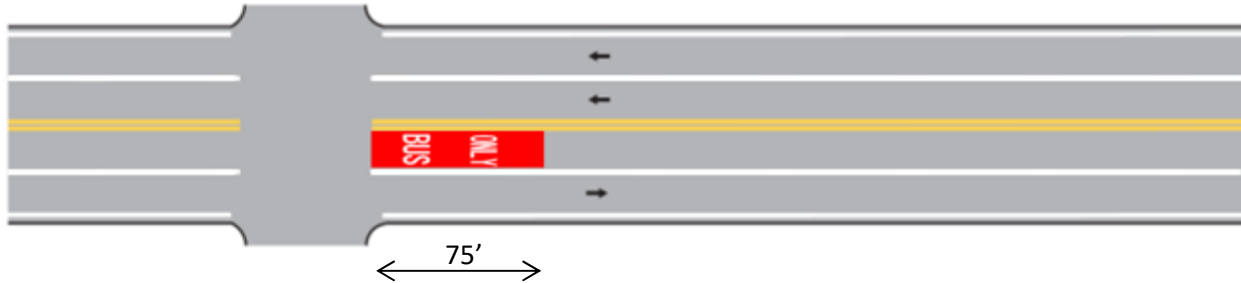
These treatments are expected to be placed in separate locations from each other in locations that will not include vertical delineators and are illustrated in the next section.

This experiment will:

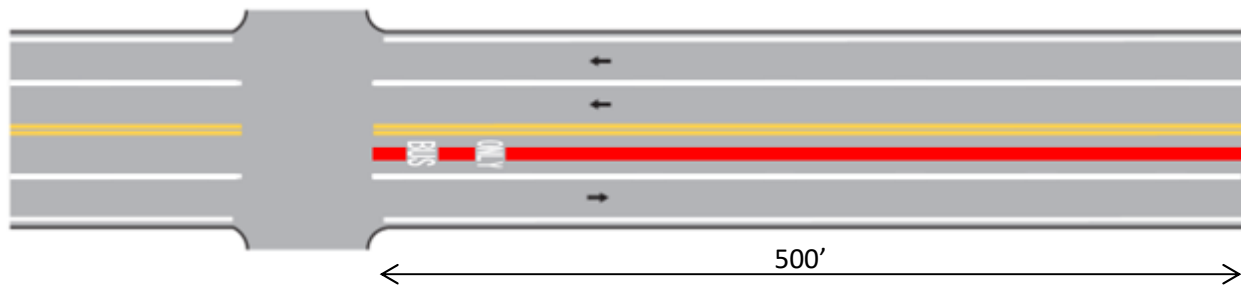
- Demonstrate that red paint at the beginning of a block, in the center of the bus only lane, and/or along the bus only lane line, provides notable deterrence from use by general purpose traffic.
- Demonstrate that thermoplastic red paint on the less-traveled areas of the transit lane provides a durable and cost-effective solution over MMA red paint.

C. Illustrations

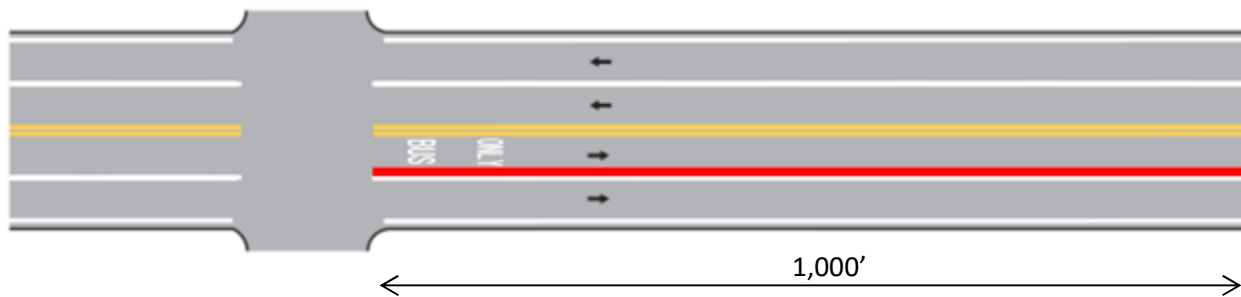
The following illustrations depict the intent of the red paint alternatives.



Alternat 1: Full Width Red Paint for 75' on Two Blocks (example shows one block)



Alternat 2: 4' Red Paint in Center of Lane for 500'



Alternat 3: 12'' Red Lane Line Adjacent to Existing White Lane Line for 1,000'

D. Supporting Information

Current Approvals and Experiments

In the recently published 11th Edition of the MUTCD, Section 3H.07 – Red-Colored Pavement for Public Transit Systems allows the installation of red paint for the full width of the transit lane but may be installed along a portion of the corridor length. The published text is included as an Appendix to this request. This is similar to Alternat 1 described above.

Indianapolis, Indiana and Madison, Wisconsin are currently conducting an approved experiment of a red lane adjacent to the solid white line between the transit only lane and general-purpose lane.

Indianapolis, Indiana is currently conducting an approved experiment of an 8" red lane line adjacent to the solid white line between the transit only lane and general-purpose lane along 7.8 pavement miles of the Red Line BRT, leading to only 1% of reviewed onboard footage revealing noncompliance with bus only lanes. This has been applied to bi-directional, center running, and side running bus lanes.

Madison, Wisconsin is also evaluating multiple configurations of red paint for the bus lane, including an 8" wide red paint line along the existing white lane lines as shown in the photo below. This example is similar to Alternate 3 described above.



High Construction Costs

Many transit agencies are facing funding shortfalls or budgetary challenges with including full width and full-length red paint to delineate a restricted bus only lane. When AC Transit constructed the 6-mile center running BRT in both directions along International Boulevard, 12 lane-miles of full width red paint was impractical to fund as part of the initial deployment. The estimated cost for red pavement marking is estimated to exceed \$12,000,000. In lieu of red paint, AC Transit installed BUS ONLY legends, LEFT LANE BUS ONLY 24 HOURS signs in the median, and a 6" solid white lane line to delineate the bus only lane.

Possible Driver Confusion and Deliberate Lane Misuse

Since the BRT lane began operations in August 2020, there have been numerous observations of illegal U-turns, illegal left turns from and across the transit lane, and queue cutting by drivers using the transit lane throughout the entire corridor. A recent field observation in January 2024 noted an average of 43 illegal maneuvers per hour between 4 locations in the morning peak period and an average of 52 illegal maneuvers per hour at the same locations during the evening peak. Some of these activities may be unintentional due to driver confusion, but it is also highly likely that these actions are deliberate. Based on other input and observations along the corridor, this type of lane misuse occurs throughout the entire corridor. This has been observed and documented by transit drivers, neighborhood groups, Oakland Police Officers, project studies, and even captured on Google aerial images. The Oakland Police Department provides some enforcement but does not have the staffing capacity to provide the elevated

enforcement along this corridor to deter improper transit lane use while patrolling the rest of the City of Oakland. This constant presence of improper use of the transit lane presents a high likelihood for transit service interruptions and an increased possibility of crashes.

Crash Data

As part of the current project design, crash data was reviewed to identify trends in location and incident type along the corridor. This data included:

- CHP SWITRS Collision Records, August 2020 – December 2022
- City of Oakland Traffic Fatalities, August 2020 – December 2022
- Oakland Police Department Traffic Citations, 2020-2022
- AC Transit TEMPO Bus Incident Reports, August 2020 – December 2022

Review of this crash data led to identifying peak intersections or segments that experienced higher than average crashes. These locations are the focus area for various surface treatments including red paint, vertical channelizers, additional pavement legends, and additional signage.

E. Legally binding statement certifying the treatment is not patented by a patent or copyright

There are no patents or copyrights on the proposed surface treatment.

F. Time period and location of experiment

The proposed alternative red paint will be installed as described above for a period of 12 months as part of a current project, beginning on June 1, 2024.

G. Evaluation Plan

AC Transit proposes evaluating the red thermoplastic paint alternatives by collecting before and after data as described below, as well as field observations and discussions with staff closest to the evaluation areas.

Before and After Lane Use Field Observations

Before red paint is placed, we will conduct field observations for two 2-hour periods to visually note the frequency of traffic violations within the evaluation area.

After red paint is placed, we will conduct similar field observations during the same time period (time of day, day of week and duration) as the before period to visually note the frequency of traffic violations within the evaluation area.

We will compare the before and after observations to illustrate if drivers are more compliant after red paint is placed.

The same evaluation will be conducted for each red paint scenario.

Before and After Review of Crash Data

Before data has already been gathered as part of the AC Transit Quick Build project as described above.

After data will be compiled from AC Transit Bus Incident Reports, City of Oakland Fatalities Database, and the Oakland Police Department Traffic Citations Database for a 6-month period starting after the red paint is placed (duration could be extended based on available data).

We will compare the before and after observations to note if crashes decreased in the segment where red paint is placed.

The same evaluation will be conducted for each red paint scenario location.

Anecdotal Input from AC Transit, City of Oakland, and Oakland Police Department Staff

We will contact staff from AC Transit, City of Oakland, Oakland Police Department, and neighborhood representatives to gather anecdotal information about staff or public observations see a noticeable improvement in transit lane compliance.

H. Agreement to restore the site of the experiment to a condition that complies with the provisions of the MUTCD

AC Transit, City of Oakland, and Caltrans agree to restore the experiment sites to conditions that comply with the provisions of the CA MUTCD under the following circumstances:

- Within 3 months following the end of the experimentation time period if the treatment is found to be unacceptable and all parties agree to the removal method.
- At any time that the agencies determine significant safety concerns are directly or indirectly attributable to the experimentation.
- If requested to do so by the CTCDC or FHWA's Office of Transportation Operations.

I. Progress Reports

AC Transit will provide semi-annual progress reports until the experiment is completed. A copy of the final evaluation documentation will be sent to the Executive Secretary of the CTCDC and FHWA's Office of Transportation Operations within 3 months following completion of experimentation.

Appendix

Section 3H.07 – Red-Colored Pavement for Public Transit Systems

Section 3H.07 Red-Colored Pavement for Public Transit Systems

Support:

- 01 Red-colored pavement is used to enhance the conspicuity of locations, station stops, or travel lanes in the roadway exclusively reserved for vehicles of public transit systems or multi-modal facilities where public transit is the primary mode. These public transit vehicles include buses, streetcars, trolleys, light-rail trains, and rapid transit fleets.

Option:

- 02 Red-colored pavement may be used where engineering judgment determines that one or more of the following conditions are expected to result from its application:
- A. Increased travel speeds will be expected by the public transport vehicle after an exclusive lane or facility is provided,
 - B. Reduced overall service time through the corridor will be expected by the public transport vehicle,
 - C. Decreased rates of illegal parking or occupation of the transit or multi-mode lane or facility will be expected.

Standard:

- 03 **If used, red-colored pavement shall be applied only in lanes, areas, or locations where general-purpose traffic is not allowed to use, queue, wait, idle, or otherwise occupy the lane, area, or location where red-colored pavement is used.**
- 04 **Red-colored pavement shall be installed for the full width of the lane.**

Option:

- 05 Red-colored pavement may be used for full-time or part-time operations.
- 06 Red-colored pavement may be installed for the entire length of a restricted lane or for only a portion (or portions) of the restricted lane.
- 07 Red-colored pavement may be installed in a broken pattern where entrance into the transit lane is permitted by general traffic, for example where general traffic is allowed in a transit lane in advance of a turn.

Standard:

- 08 **Regulatory signs (see Sections 2B.02 and 2G.03) shall be used to establish the allowable use of the lane, area, or location. Regulatory signs shall also be used when it is determined that other vehicles will be allowed to enter the lane to turn or bypass queues.**

Guidance:

- 09 *If red-colored pavement is used on public transit facilities separated from the roadway or on facilities on an independent alignment, it should be used only at the entrances to those facilities from roadways open to public travel.*

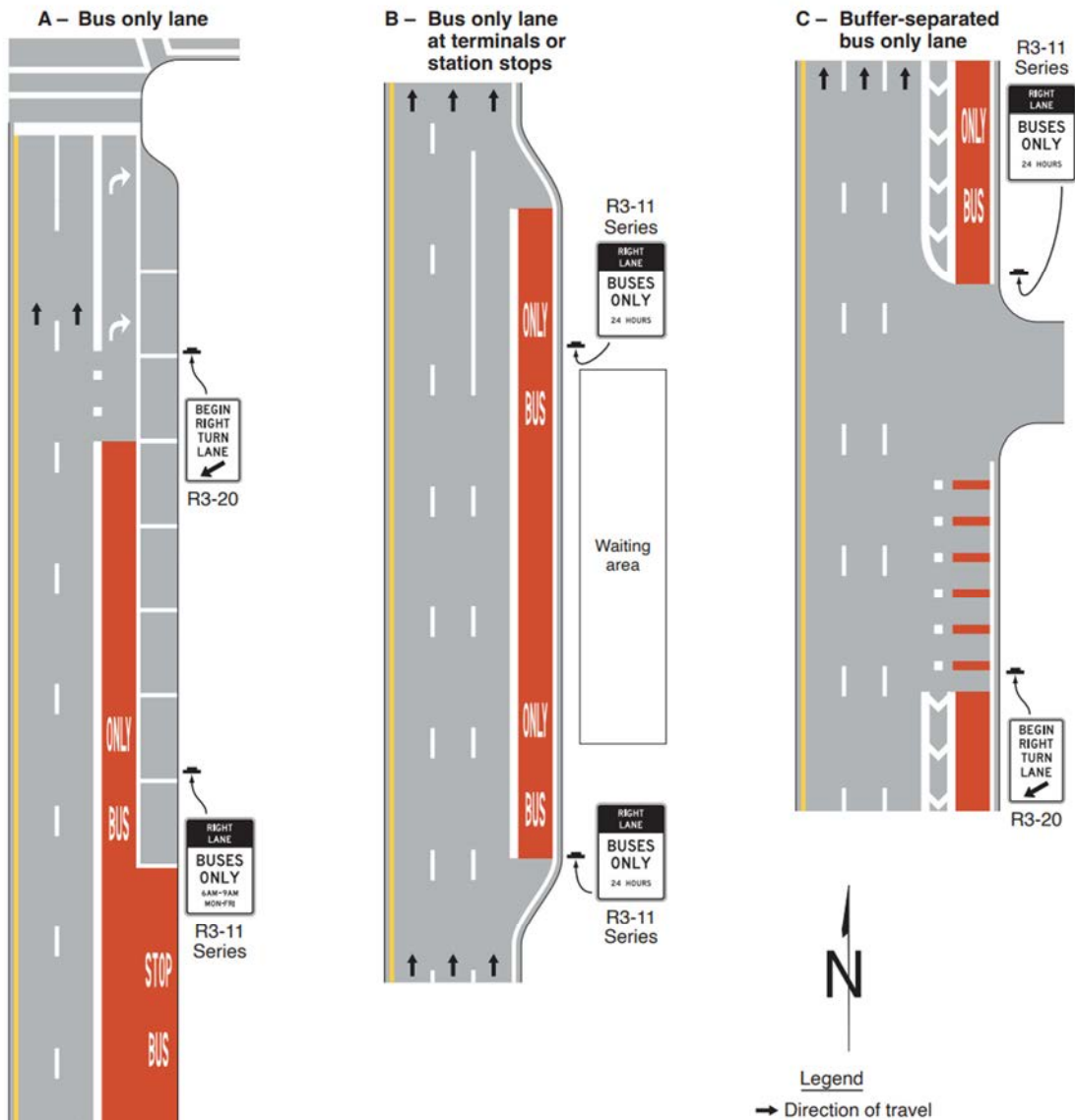
Support:

- 10 Examples of applications of red-colored pavement are shown in Figure 3H-5.

Appendix

Section 3H.07 – Red-Colored Pavement for Public Transit Systems

Figure 3H-5. Examples of Red-Colored Pavement Applications



- Notes:
1. See Chapter 2G for preferential lane signs.
 2. See Chapter 3E for preferential lane markings.
 3. The use of colored pavement is optional.



ATTACHMENT B



California Traffic Control Devices Committee (CTCDC)
Agenda Item Report



Attachment B – CTCDC Meeting Slide Deck

See Slides on Following Pages



INTERNATIONAL BOULEVARD QUICK BUILD PROJECT

EXPERIMENTATION REQUEST

TRANSIT-ONLY LANE RED PAINT ALTERNATIVES

Requesting agencies

City of oakland, caltrans district 4, ac transit

May 2, 2024

California traffic control devices committee

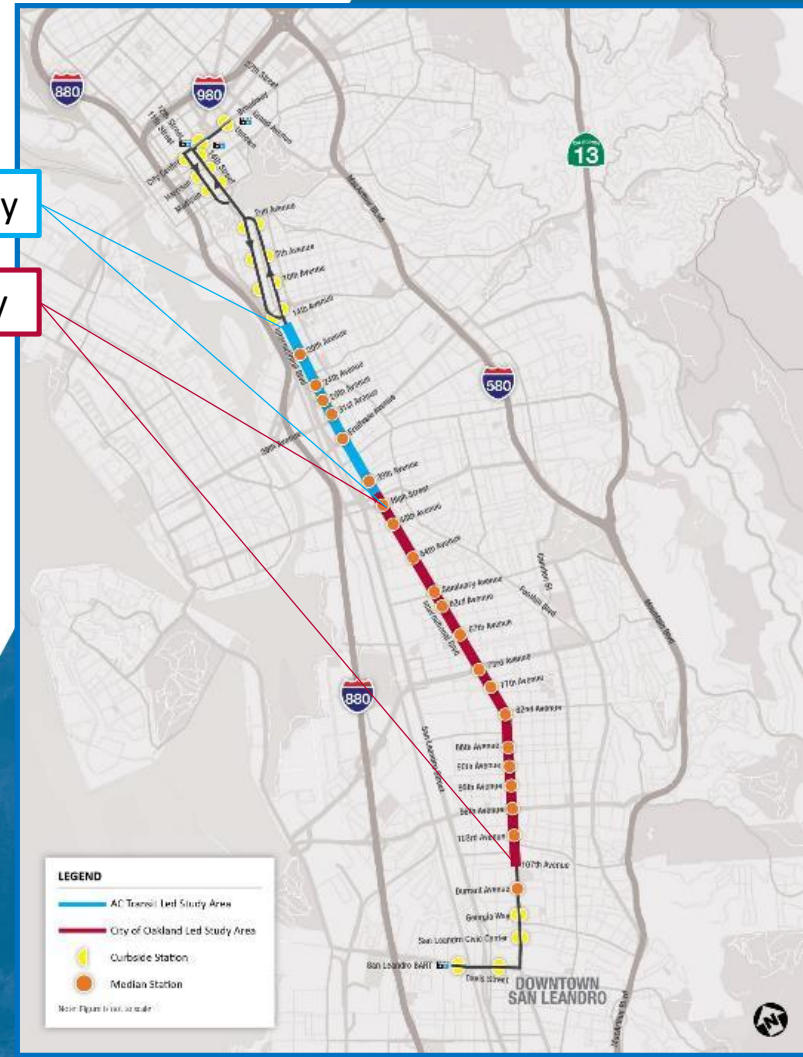
International Boulevard Quick Build Project Background

- TEMPO Bus Rapid Transit is a **center-running transit only lane** along 6 miles of International Boulevard in each direction that went into operation in August 2020
- MUTCD red paint standard (full width and full length) was **cost prohibitive** for the entire 12-mile corridor, so other cost-effective safety measures were implemented instead
- International Boulevard is listed as a **High Injury Corridor** where severe and fatal crashes have persisted
- The BRT lane has enabled **other vehicles to improperly use** the transit only lane, creating an increased safety crisis
- The **International Boulevard Quick Build Project** was established to implement and evaluate treatments at select locations that could discourage improper use of bus only lane

International Boulevard Quick Build Project Background (cont'd.)

City of Oakland Right-of-Way

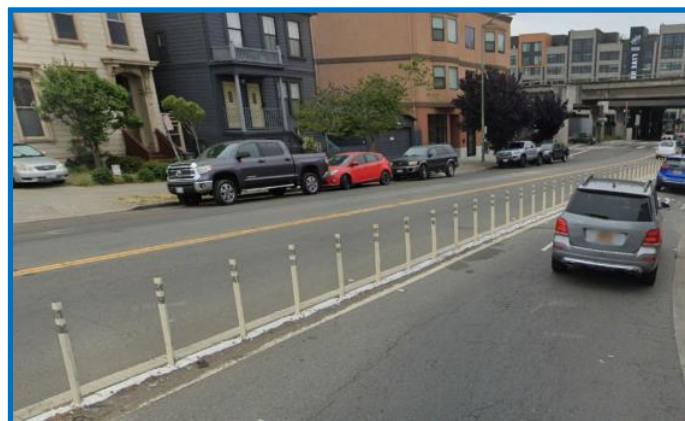
Caltrans Right-of-Way



International Boulevard Quick Build Project Background (cont'd.)

Treatments to be Evaluated

- Pavement Markings (Arrows, BUS ONLY)
- Signage (Speed Limits, Bus Decal, Fines)
- Centerline Channelizers
- Lane Line Channelizers
- Red Paint (current request)



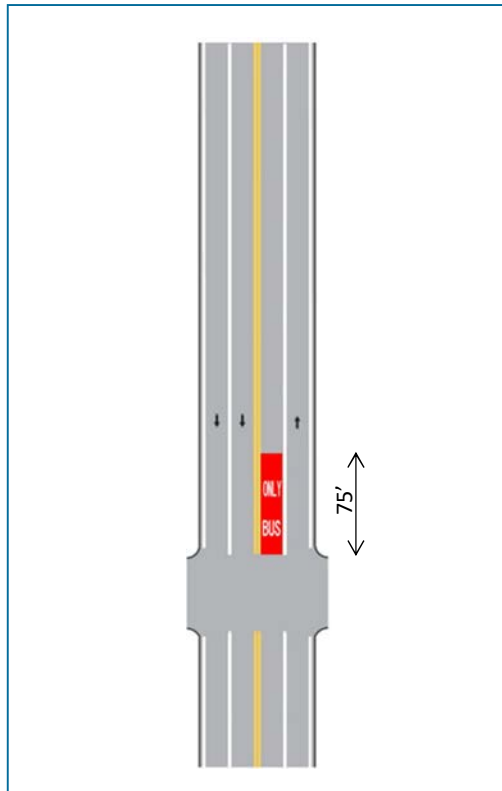
Current Project Status



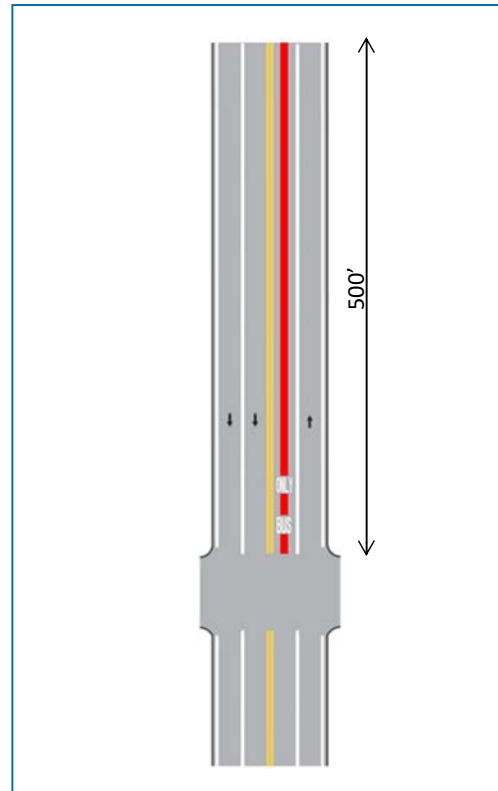
- Design completed in November 2023
- Public outreach
 - Oakland-AC Transit Interagency Liaison Committee Meetings
 - Oakland City Council Briefing
 - Public Meeting on November 30, 2023
- Construction began April 2024
- Construction duration is 6 months
- Before analysis data collected February 2024
- Before/After evaluation scheduled after construction

Request to Experiment (minimum of 2)

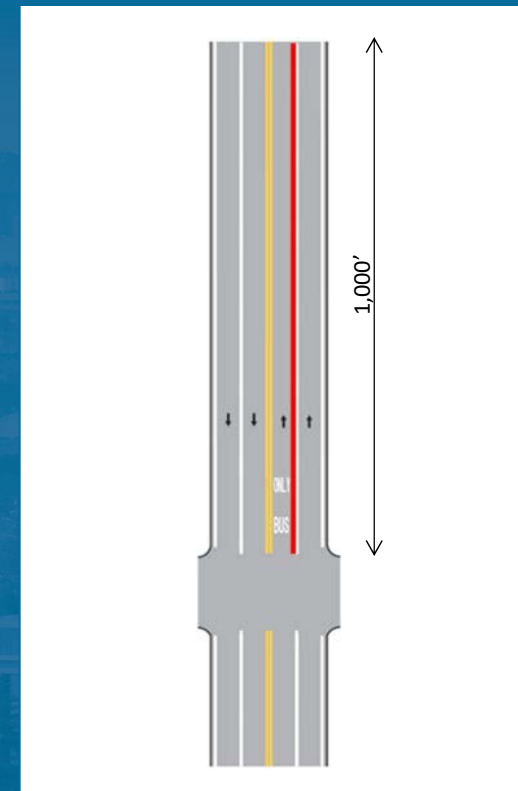
Alternate 1 – Full Width Red Paint for 75-100' on Two Blocks



Alternate 2 – 4-foot Red Paint in Center of Lane for 500'



Alternate 3 – 12" Red Lane Line Adjacent to Existing White Lane Line for 1,000'



***NOTE:** Request memo indicates experimenting with MMA and thermoplastic paint, but we are currently only planning to implement MMA.

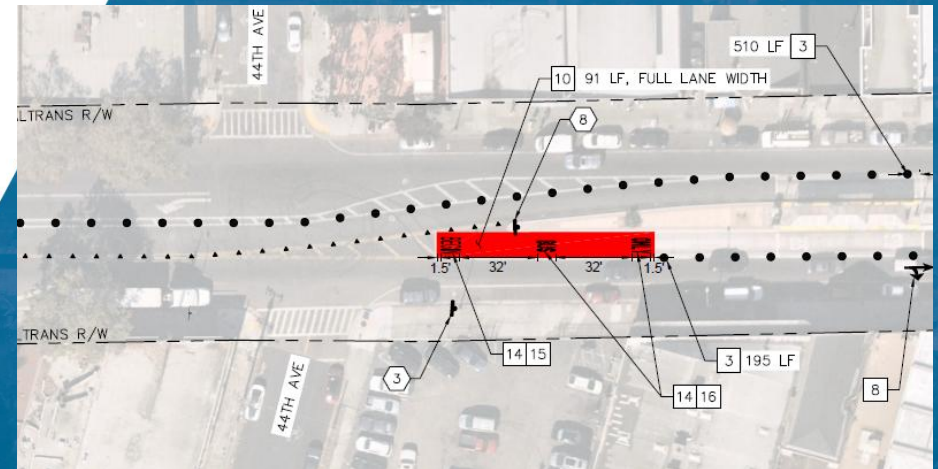
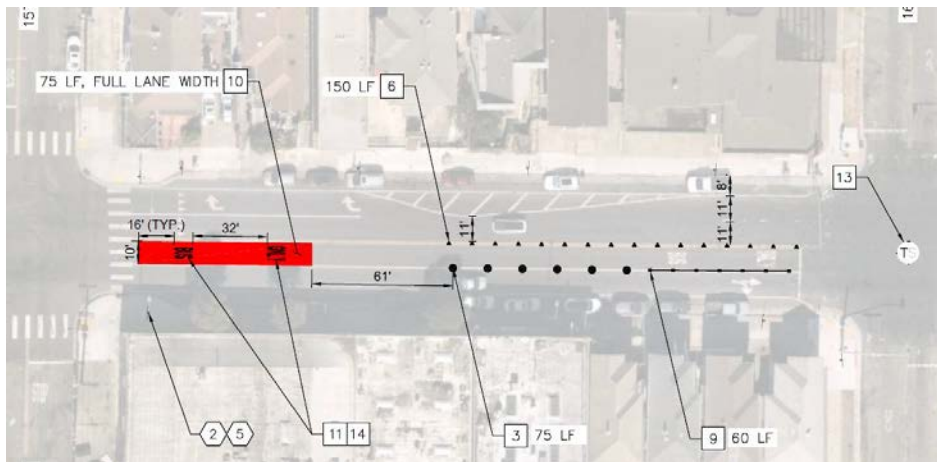
Current MUTCD Allowance



- Section 3H.07 of the MUTCD 11th Edition published in January 2024 includes an allowance to install red-colored pavement for only a portion of the restricted lane length, but it still must be full width
- Alternate 1 would be compliant with this update, but the revision has not been adopted into the CA MUTCD

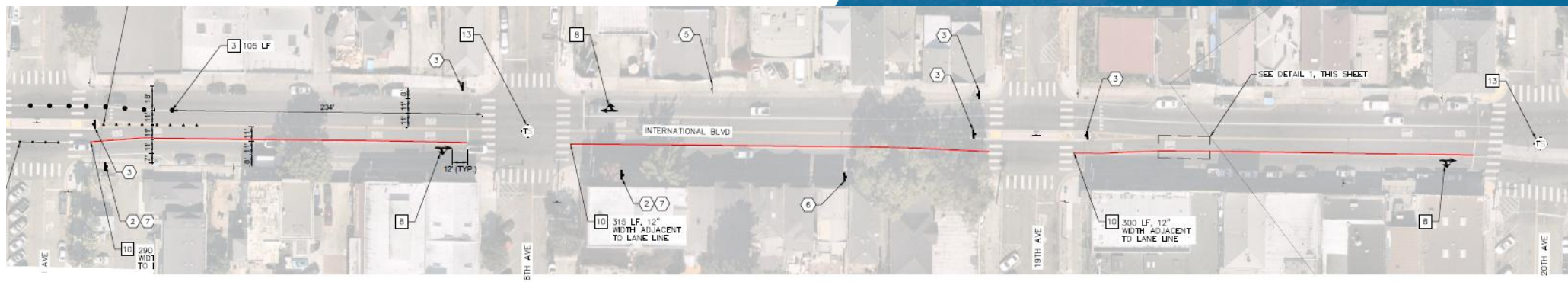
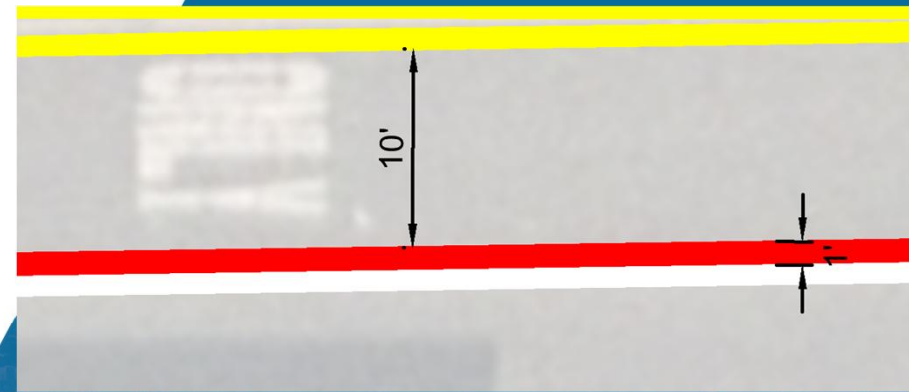
Experimentation Request – Alt. 1

- Full lane width, portion of length
- Locations are at the beginning of 2 blocks to reinforce when the transit only lane begins
 - 15th Avenue is 75' long (Oakland R/W)
 - 44th Avenue is 91' long (Caltrans R/W)



Experimentation Request – Alt. 3

- 12” wide red lane line adjacent to existing 6” white lane line, 900’ long
- 17th-20th Ave (Oakland R/W)
- Approved experiments in Indianapolis (2019) and Madison (2023)
- Reinforce transit only lane; deter improper lane use



Reasons for Requests

- Assess alternate cost-effective red paint solutions that achieve similar benefits as full width, full length applications
- Overall Quick Build project is a demonstration project, with the intent to expand in subsequent phase
- If effective, it may serve as a surface treatment in addition to where vertical channelizers are being installed

Evaluation Plan

A blue graphic element in the top right corner of the slide, featuring a stylized city skyline with various building silhouettes.

- Since the International Boulevard Quick Build project is considered a demonstration project, we are already committed to fully evaluating these experiments through the following:
 - **Before and After Lane Use** – Observe and compare volume and speed count data and field observations at 14 bidirectional locations along the corridor to assess impacts to lane use compliance
 - **Before and After Crash Data Review** – Assess AC Transit Incident Reports, Oakland Fatality Database, and Traffic Citations Database to assess impacts to corridor safety
 - **Anecdotal Input** – Compile feedback from AC Transit, Oakland, Police Department staff, and neighborhood representatives to assess impacts on transit lane compliance

Contact Information



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