



Metro

*Los Angeles County Metropolitan Transportation Authority
One Gateway Plaza
3rd Floor Board Room*

Agenda - Final

Thursday, June 15, 2023

9:00 AM

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Executive Management Committee

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Janice Hahn, Vice Chair

Kathryn Barger

Karen Bass

James Butts

Hilda Solis

Gloria Roberts (Interim), non-voting member

Stephanie Wiggins, Chief Executive Officer

METROPOLITAN TRANSPORTATION AUTHORITY BOARD AGENDA RULES
(ALSO APPLIES TO BOARD COMMITTEES)

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A member of the public may address the Board on agenda items, before or during the Board or Committee's consideration of the item for one (1) minute per item, or at the discretion of the Chair. A request to address the Board must be submitted electronically using the tablets available in the Board Room lobby. Individuals requesting to speak will be allowed to speak for a total of three (3) minutes per meeting on agenda items in one minute increments per item. For individuals requiring translation service, time allowed will be doubled. The Board shall reserve the right to limit redundant or repetitive comment.

The public may also address the Board on non-agenda items within the subject matter jurisdiction of the Board during the public comment period, which will be held at the beginning and/or end of each meeting. Each person will be allowed to speak for one (1) minute during this Public Comment period or at the discretion of the Chair. Speakers will be called according to the order in which their requests are submitted. Elected officials, not their staff or deputies, may be called out of order and prior to the Board's consideration of the relevant item.

Notwithstanding the foregoing, and in accordance with the Brown Act, this agenda does not provide an opportunity for members of the public to address the Board on any Consent Calendar agenda item that has already been considered by a Committee, composed exclusively of members of the Board, at a public meeting wherein all interested members of the public were afforded the opportunity to address the Committee on the item, before or during the Committee's consideration of the item, and which has not been substantially changed since the Committee heard the item.

In accordance with State Law (Brown Act), all matters to be acted on by the MTA Board must be posted at least 72 hours prior to the Board meeting. In case of emergency, or when a subject matter arises subsequent to the posting of the agenda, upon making certain findings, the Board may act on an item that is not on the posted agenda.

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- a. Disorderly behavior toward the Board or any member of the staff thereof, tending to interrupt the due and orderly course of said meeting.
- b. A breach of the peace, boisterous conduct or violent disturbance, tending to interrupt the due and orderly course of said meeting.
- c. Disobedience of any lawful order of the Chair, which shall include an order to be seated or to refrain from addressing the Board; and
- d. Any other unlawful interference with the due and orderly course of said meeting.

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The Committee Meeting begins at 9:00 AM Pacific Time on June 15, 2023; you may join the call 5 minutes prior to the start of the meeting.

Dial-in: 888-251-2949 and enter
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Public comment will be taken as the Board takes up each item. To give public comment on an item, enter #2 (pound-two) when prompted. Please note that the live video feed lags about 30 seconds behind the actual meeting. There is no lag on the public comment dial-in line.

Instrucciones para comentarios publicos en vivo:

Los comentarios publicos en vivo se pueden dar por telefono o en persona.

La Reunion de la Junta comienza a las 9:00 AM, hora del Pacifico, el 15 de Junio de 2023. Puedes unirse a la llamada 5 minutos antes del comienzo de la junta.

Marque: 888-251-2949 y ingrese el codigo
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Los comentarios del público se tomaran cuando se toma cada tema. Para dar un comentario público sobre una tema ingrese # 2 (Tecla de numero y dos) cuando se le solicite. Tenga en cuenta que la transmisión de video en vivo se retrasa unos 30 segundos con respecto a la reunión real. No hay retraso en la línea de acceso telefónico para comentarios públicos.

Written Public Comment Instruction:

Written public comments must be received by 5PM the day before the meeting. Please include the Item # in your comment and your position of "FOR," "AGAINST," "GENERAL COMMENT," or "ITEM NEEDS MORE CONSIDERATION."

Email: BoardClerk@metro.net
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Board Administration
One Gateway Plaza
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Los Angeles, CA 90012

CALL TO ORDER**ROLL CALL**

21. **SUBJECT: IN-HOUSE PUBLIC SAFETY DEPARTMENT FEASIBILITY STUDY** [2023-0286](#)

RECOMMENDATION

RECEIVE AND FILE the In-House Public Safety Department Feasibility Study (Attachment A).

Attachments: [Attachment A - Public Safety Department Feasibility Study Report - Final](#)
[Attachment B - Homeless Feasibility](#)

(ALSO ON OPERATIONS, SAFETY, AND CUSTOMER EXPERIENCE COMMITTEE)

22. **SUBJECT: AMENDMENT TO THE LETTER OF AGREEMENT WITH THE COUNTY DEPARTMENT OF HEALTH SERVICES (DHS) FOR HOMELESS PROGRAM SERVICES** [2023-0303](#)

RECOMMENDATION

AUTHORIZE the Chief Executive Officer (CEO) to execute Amendment Number 8 to the Letter of Agreement for Multidisciplinary Street-based Engagement Services with the County Department of Health Services (DHS) increasing the amount by \$63,934,200 from \$28,920,000 to a new a total amount of \$92,854,200 for the continuation of homeless program services from September 1, 2023 through June 30, 2027 (Attachment A).

Attachments: [Attachment A - Metro LOA - Amendment No. 8 DRAFT Presentation](#)

23. **SUBJECT: STATUS UPDATE - BUS STOP IMPROVEMENT PROGRAM** [2023-0319](#)

RECOMMENDATION

RECEIVE AND FILE Bus Stop Improvement Plan status report.

Attachments: [Attachment A - Motion 20, Bus Stop Shelter Motion](#)
[Attachment B - Priority Stop Locations in the Region](#)
[Presentation](#)

(ALSO ON OPERATIONS, SAFETY, AND CUSTOMER EXPERIENCE COMMITTEE)

24. **SUBJECT: STATE ETHICS LEGISLATION MOTION** [2023-0399](#)

RECOMMENDATION

APPROVE Motion by Director Najarian that the Metro Board direct Metro's Chief Ethics Officer and CEO to work together to incorporate any proposed

changes to the 2024 State Legislative Agenda to address any issues with state legal authorities that may impact Metro activities.

25. SUBJECT: BUS SENSOR TECHNOLOGY [2023-0160](#)

RECOMMENDATION

RECEIVE AND FILE status report on Bus Sensor Technology.

Attachments: [Attachment A - Motion 2023-0102 by Hahn, Horvath, Mitchell, Solis & Krekorian](#)
[Attachment B - "Mobileye Shield V4 W/ Apas" Operator Reference](#)
[Attachment C - SAE J3016 Levels of Driving Automation](#)
[Attachment D - Equity Platform Figures 3 - 5](#)

(ALSO ON OPERATIONS, SAFETY, AND CUSTOMER EXPERIENCE COMMITTEE)

26. SUBJECT: STATE AND FEDERAL REPORT [2023-0381](#)

RECOMMENDATION

RECEIVE AND FILE June 2023 State and Federal Legislative Report.

SUBJECT: GENERAL PUBLIC COMMENT [2023-0369](#)

RECEIVE General Public Comment

Consideration of items not on the posted agenda, including: items to be presented and (if requested) referred to staff; items to be placed on the agenda for action at a future meeting of the Committee or Board; and/or items requiring immediate action because of an emergency situation or where the need to take immediate action came to the attention of the Committee subsequent to the posting of the agenda.

COMMENTS FROM THE PUBLIC ON ITEMS OF PUBLIC INTEREST WITHIN COMMITTEE'S SUBJECT MATTER JURISDICTION

Adjournment

**Board Report**

File #: 2023-0160, **File Type:** Motion / Motion Response**Agenda Number:** 25.

**EXECUTIVE MANAGEMENT COMMITTEE
OPERATIONS, SAFETY AND CUSTOMER EXPERIENCE COMMITTEE
JUNE 15, 2023****SUBJECT: BUS SENSOR TECHNOLOGY****ACTION: RECEIVE AND FILE****RECOMMENDATION**

RECEIVE AND FILE status report on Bus Sensor Technology.

ISSUE

At its February 23, 2023 meeting, the Board approved Item 14, Bus Sensor Technology Motion (Attachment A), by Directors Hahn, Horvath, Mitchell, Solis, and Krekorian. The motion directed the Chief Executive Officer to report back in June 2023 with recommendations on safety features such as Pedestrian Detection technology and the feasibility of (1) incorporating them into new bus procurements, (2) installing them into our existing bus fleets, in order to reduce pedestrian collisions and to ensure that bus operators are alerted in the event of a pedestrian-involved collision, and (3) exploring other emerging collision avoidance technologies, pursuant to Metro's Street Safety Data Sharing and Collaboration Policy and Action Plan.

BACKGROUND

Metro is in the process of concluding two separate passenger collision avoidance studies. In 2017 Metro partnered with New Flyer (NF), and the Center for Transportation and the Environment (CTE) on a Federal Transit Administration (FTA) grant funded study. The study evaluates commercially available collision avoidance systems on 40-foot transit buses operating in revenue service within downtown Los Angeles. The study was recently concluded, and the final report is anticipated in July 2023. Metro is also currently conducting an internal study with BYD to evaluate the effectiveness of MirrorEye electronic rear/side view monitors.

DISCUSSION**Mobileye Study with NF and CTE:**

The intent of the FTA grant funded study with NF and CTE was to identify five (5) commercial collision avoidance options and choose two (2) to install and test on Metro's transit buses. It is also important to note that this study was led by the FTA, and analysis led by CTE. Metro's role was to

provide the vehicles and facilitate the study as a participant. After initial vetting, it was determined that of the five options initially considered there was only one that was viable. Accordingly, the team moved forward in September 2019 to test Mobileye Shield + ADAS (Advanced Driver Assistance System) on 50 of Metro's 40' NF buses. Specifically, the features listed below, offered on Mobileye Shield + ADAS, were tested. (Please see Attachment B):

1. Lane Departure Warning with Display
2. Forward Collision Warning with Display
3. Pedestrian Detection/Pedestrian Warning with Left and Right Displays
4. Pedestrian Blindspot Monitoring

APAS (Advanced Pedestrian Alert System) integrates with Mobileye Shield + and provides an exterior audio alert to pedestrians when a bus is approaching.

Numerous technical challenges arose during the system interface and installation process, compounded by the circumstances brought about by the COVID-19 pandemic. These challenges led to delays in engineering support as Mobileye's engineering team was based in Israel. Additionally, the initial data collection was hindered by a high number of false positive and false negative alerts, hampering progress. Consequently, the system had to remain in stealth mode, collecting data without displaying warnings to operators until the project team could ensure its safety for activation.

By May 2021, the installation of Mobileye systems on all 50 buses was completed, with the system operating in stealth mode. In December 2021, 40 buses transitioned to active mode, enabling continued data collection until its conclusion in June 2022. However, the preliminary findings of the study yielded inconclusive results, lacking sufficient evidence to demonstrate safety improvements compared to transit buses without active systems.

Differentiating performance between the modified and non-modified buses proved challenging, as the observed differences were minor and difficult to attribute solely to the technology. Factors such as operating conditions, environmental variables, limited reliable data collection due to the use of GPS-speed data, assessing operator response, and the limited number of buses and mileage contributed to this difficulty. The project's data gathering and analysis section was not adequately detailed, limiting its ability to provide comprehensive insights.

By the time the project team recognized the necessity of an external data collection methodology to independently evaluate system effectiveness, insufficient budget remained to procure or utilize the required tools, such as wheel speed sensors on each bus. It was initially believed that the existing systems installed on Metro buses would suffice. The final report is expected to be available in July 2023.

MirrorEye study with BYD:

In addition to the Mobileye evaluation, Metro is also conducting a study on MirrorEye electronic rear/side view monitors. The California Highway Patrol (CHP) authorized Metro to test the MirrorEye on the G Line (Orange) buses for a period of five years. Metro and BYD are currently evaluating the effectiveness of MirrorEye electronic rear/side view monitors to provide legally required fields of view. Although the system was initially installed to mimic the rear-view mirrors, it enables useful features such as night vision and marking lanes. The system currently being studied does not provide alerts to

the operator but allows bus network integration, potentially enabling sensor automated functions. The evaluation is presently being conducted on five (5) 60-foot BYD buses and five (5) 40-foot BYD buses. This study is expected to conclude with published results by the Summer of 2024. (See **Figure 2**).

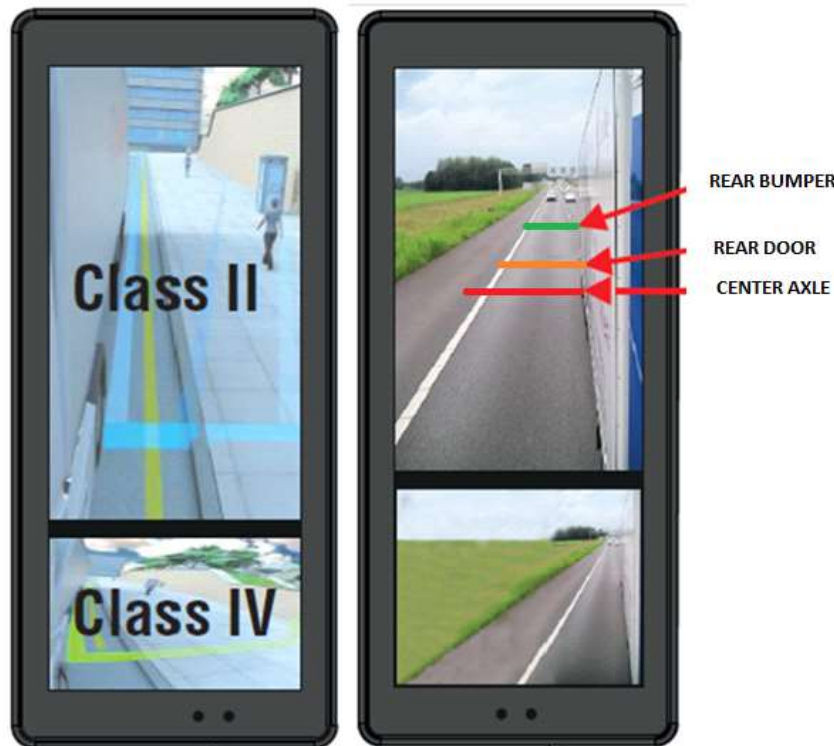


Figure 2

Staff Response to Board Motion Items:

In response to item (1) *incorporating them [Pedestrian Detection safety technology] into new bus procurements*, staff has included language in the Technical Specification for new bus procurements to include vehicle safety technologies such as: pedestrian detection, lane departure warning, and the capability to integrate Advance Driver Assistance from levels 0 to 5 as defined in SAE J3016_021806. A supplemental graphic from SAE International of J3016 is provided in Attachment C, but in summary:

- 0 - provides warnings and momentary assistance. Automatic emergency braking, blind spot warning, lane departure warning
- 1 - Provides steering OR brake/acceleration support, lane centering OR adaptive cruise control
- 2 - Provides steering AND brake/acceleration support, lane centering AND adaptive cruise control at the same time
- 3- Driver is not actively operating the vehicle unless instructed to by features. Technology will drive the vehicle under limited conditions. Example is full driving during a traffic jam

- 4 - Automated features will not require you to take over driving. Examples is a local driverless taxi. Vehicle pedals/steering may or may not be installed
- 5- Vehicle can operate autonomously under all conditions

In response to item (2) *installing them into our existing bus fleets, in order to reduce pedestrian collisions and to ensure that bus operators are alerted in the event of a pedestrian-involved collision*, staff is not recommending the retrofit of Mobileye on the existing system as the operational/system benefits are inconclusive, but will continue to assess technologies for the existing bus fleet as they mature and benefits are demonstrated.

In response to item (3) *exploring other emerging collision avoidance technologies* staff will continue to explore new technologies as they emerge and merit additional evaluation.

EQUITY PLATFORM

The technology is intended to improve traffic safety and reduce disproportionate harm for vulnerable road users. As noted in the Street Safety Policy, traffic violence kills and injures "Black, Latino, Native Hawaiian and other Pacific islander and unhoused residents as well as people walking and cycling at greater rates than other people."

There is great overlap between the project's service areas and areas that Metro defines as Equity Focus Communities. The improvements are targeted to benefit communities with some of the greatest mobility needs in Los Angeles County. The Project's service corridors are composed of 88 percent in Low-Income Communities as identified by AB 1550 (Figure 3 - Attachment D), 73 percent disadvantaged Communities as identified by SB 535 (Figure 4 - Attachment D), and 61% Equity Focus Communities as defined by Metro's EFC definition (Figure 5- Attachment D). The investment brings benefits to the community beyond the transit riders themselves: zero emissions, quieter exterior and interior noise not only attracts riders but provides a benefit to the community as well.

IMPLEMENTATION OF STRATEGIC PLAN GOALS

These recommendations support Goal #2, Deliver outstanding trip experiences for all users of the transportation system, Goal #3, Enhance communities and lives through mobility and access to opportunity, and Goal #5, Provide responsive, accountable, and trustworthy governance within the Metro organization.

NEXT STEPS

Staff will include language in the Technical Specifications for new bus procurements to include Pedestrian Detection safety technology.

Staff will continue to monitor the development of emerging Pedestrian Detection safety technologies and will pilot promising solutions to enhance safety on our bus network.

ATTACHMENTS

Attachment A - Motion # 2023-0102 by Directors Hahn, Horvath, Mitchell, Solis and Krekorian

Attachment B "Mobileye Shield V4 W/ Apas" Operator Reference-

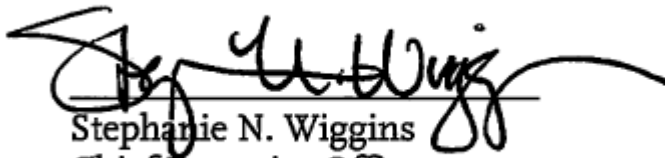
Attachment C - SAE J3016 Levels of Driving Automation

Attachment D - Equity Platform Figures 3 - 5

Prepared by: David Faulk, Deputy Executive Officer, Vehicle Engineering &
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Jesus Montes, Senior Executive Officer, Vehicle Engineering & Acquisition, (213) 418-
3277

Reviewed by: Conan Cheung, Chief Operations Officer, (213) 418-3034



Stephanie N. Wiggins
Chief Executive Officer

Metro

Los Angeles County
Metropolitan Transportation
Authority
One Gateway Plaza
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Los Angeles, CA



Board Report

File #: 2023-0102, File Type: Motion / Motion Response

Agenda Number: 14.

EXECUTIVE MANAGEMENT COMMITTEE FEBRUARY 16, 2023

Motion by:

DIRECTORS HAHN, HORVATH, MITCHELL, SOLIS, AND KREKORIAN

Bus Sensor Technology

The Los Angeles County Metropolitan Transportation Authority (Metro) has a bus fleet of approximately 2,200 buses serving about 800,000 daily passenger boardings. Every day Metro moves hundreds of thousands of Angelenos almost entirely without incident, getting people safely to jobs, to school, and to see family. Metro buses have, on a few rare occasions, struck a pedestrian. In some of those instances, the bus operator was unaware of the collision until sometime later, tragically leaving behind a person who was seriously harmed.

In recent years, vehicle safety technology has become increasingly available, providing drivers with tools such as: pedestrian detection, traffic light detection, and lane marking identification. Integrating safety technology like Pedestrian Detection can help reduce the risk of serious and fatal accidents.

Pedestrian Detection consists of a camera fitted in front of the interior rear-view mirror to identify objects, radar sensor(s) integrated into the vehicle's grille to determine the position of nearby obstacles, and a central control unit to analyze the data collected and coordinate the system functions. When a Pedestrian Detection system identifies a potential collision, the system either provides an alert to the bus operator to apply the brakes or the system can automatically apply the brakes to avoid potential collisions. Emerging technologies that have the potential to complement and enhance commercially available pedestrian detection systems, such as connected vehicle technology, may also soon become available.

While these types of technology may not always be able to help avoid a collision completely, they can help reduce occurrences as well as help minimize injuries if impacts do occur.

SUBJECT: BUS SENSOR TECHNOLOGY MOTION

RECOMMENDATION

APPROVE Motion by Directors Hahn, Horvath, Mitchell, Solis, and Krekorian that the Board direct the Chief Executive Officer to report back in June 2023 with recommendations on these new safety features and the feasibility of (1) incorporating them into new bus procurements, (2) installing them

into our existing bus fleets, in order to reduce pedestrian collisions and to ensure that bus operators are alerted in the event of a pedestrian-involved collision, and (3) exploring other emerging collision avoidance technologies, pursuant to Metro's Street Safety Data Sharing and Collaboration Policy and Action Plan.

"MOBILEYE® SHIELD+™ V4 w/ APAS" OPERATOR REFERENCE



LEFT SIDE DISPLAY w/ APAS*

- OFF**
 - No illumination.
 - No pedestrian or cyclist threat on left side of moving bus.
 - With pedestrian / bicyclist in proximity of moving bus the external audio message is 'Caution Bys Approaching'.
- DETECTION**
 - Yellow solid illumination with no sound.
 - Informs the operator a pedestrian or cyclist has been detected near the left front or left side of bus.
 - Operator should exercise additional caution until verifying that the danger of collision has passed.
- ALERT**
 - Red flashing with beeping sound.
 - Informs the operator a pedestrian or cyclist has been detected in the left front or left side of bus and collision is imminent.
 - Operator should take action to carefully stop bus to avoid collision.

*Advanced Pedestrian Alert System

RIGHT SIDE DISPLAY w/ APAS*

- OFF**
 - No illumination.
 - No pedestrian or cyclist threat on right side of moving bus.
 - With pedestrian / bicyclist in proximity of moving bus the external audio message is 'Caution Bus Approaching'.
- DETECTION**
 - Yellow illumination with no sound.
 - Informs the operator a pedestrian or cyclist has been detected near the right side of bus.
 - Operator should exercise additional caution until verifying that the danger of collision has passed.
- ALERT**
 - Red flash with beeping sound and external audio message of 'Danger Step Back'.
 - Informs the operator a pedestrian or cyclist has been detected on the right side of bus and collision is imminent.
 - Operator should take action to carefully stop bus to avoid collision.

*Advanced Pedestrian Alert System

CENTER DISPLAY & EYEWATCH

- DETECTION**
 - Contains the Pedestrian Display and EyeWatch.
 - The EyeWatch readouts and explanations can be found below on this document.
 - No pedestrian or cyclist threat in front of moving bus.
 - Illuminated green LED indicates system operational.
- DETECTION**
 - Yellow illumination with no sound.
 - Indicates a pedestrian or cyclist is in front of the moving bus or coming towards the moving bus.
 - Operator should exercise additional caution until verifying that the danger of collision has passed.
 - Illuminated green LED indicates system operational.
- ALERT**
 - Red flashing with beeping sound.
 - Indicates a pedestrian or cyclist is in front of the moving bus or coming towards the moving bus and collision is imminent.
 - Operator should take action to carefully stop bus to avoid collision.
 - Illuminated green LED indicates system operational.

EYEWATCH READOUTS FOR VEHICLE DETECTION ONLY

| | | | | | | |
|--|--|---|---|---|--|---|
| | | | | | | |
| <ul style="list-style-type: none"> Solid yellow lines. System is operational with bus at 0 speed. Illuminated green LED in center display indicates system operational (See Center Display and EyeWatch). | <ul style="list-style-type: none"> Speed Limit Indicator (SLI) Appears when the bus is traveling at least 5 MPH (adjustable) over the last posted speed limit sign. Two vertical white hash lines on each side of the EyeWatch will appear with a white number indicating miles over the last posted speed limit. Operator should reduce speed to keep within the speed limit. | <ul style="list-style-type: none"> Headway Monitoring (HMW) Appears as green car. Indicates detection of a vehicle in the path of the bus. No number shown if bus is traveling a safe distance behind the vehicle in front or when bus is traveling below 19 MPH. | <ul style="list-style-type: none"> Headway Monitoring (HMW) Appears as green car and number. Indicates how far the vehicle in front of the bus is in seconds. The 2.5 indicates the seconds until a collision could occur if the front vehicle were to come to a stop. Operator is advised to reduce speed if time to collision falls below preset seconds and car turns red. Has a chime sound (optional). | <ul style="list-style-type: none"> Headway Monitoring Warning (HMW). Appears as a red car with an audible chime. Indicates the distance between bus and vehicle in front has fallen below a safe threshold. Operator is advised to reduce speed to increase distance to a safe level. | <ul style="list-style-type: none"> Urban Forward Collision Warning (UFCW) Virtual bumper set as follows: <ul style="list-style-type: none"> Without bicycle rack - 39" (1m) With bicycle rack - 78" (2m) Visual and audio chime when approaching stopped vehicle. Active at 0.6mph. | <ul style="list-style-type: none"> Forward Collision Warning (FCW) Appears as flashing red car with a high pitched beeping sound. Indicates rear end collision is imminent. Operator must stop the bus immediately. |

T: 718.408.7388

Note: Pedestrian and cyclist detection requires minimum low light of 15 LUX.

WWW.ROSCO-BUS.COM



SAE J3016™ LEVELS OF DRIVING AUTOMATION

| | SAE LEVEL 0 | SAE LEVEL 1 | SAE LEVEL 2 | SAE LEVEL 3 | SAE LEVEL 4 | SAE LEVEL 5 |
|--|---|--|--|--|--|---|
| What does the human in the driver's seat have to do? | You are driving whenever these driver support features are engaged – even if your feet are off the pedals and you are not steering | | | You are not driving when these automated driving features are engaged – even if you are seated in “the driver’s seat” | | |
| | You must constantly supervise these support features; you must steer, brake or accelerate as needed to maintain safety | | | When the feature requests, you must drive | These automated driving features will not require you to take over driving | |
| What do these features do? | These are driver support features | | | These are automated driving features | | |
| | These features are limited to providing warnings and momentary assistance | These features provide steering OR brake/acceleration support to the driver | These features provide steering AND brake/acceleration support to the driver | These features can drive the vehicle under limited conditions and will not operate unless all required conditions are met | This feature can drive the vehicle under all conditions | |
| Example Features | <ul style="list-style-type: none"> • automatic emergency braking • blind spot warning • lane departure warning | <ul style="list-style-type: none"> • lane centering OR • adaptive cruise control | <ul style="list-style-type: none"> • lane centering AND • adaptive cruise control at the same time | <ul style="list-style-type: none"> • traffic jam chauffeur | <ul style="list-style-type: none"> • local driverless taxi • pedals/steering wheel may or may not be installed | <ul style="list-style-type: none"> • same as level 4, but feature can drive everywhere in all conditions |

For a more complete description, please download a free copy of SAE J3016: https://www.sae.org/standards/content/J3016_201806/

EQUITY PLATFORM FIGURES 3 - 5

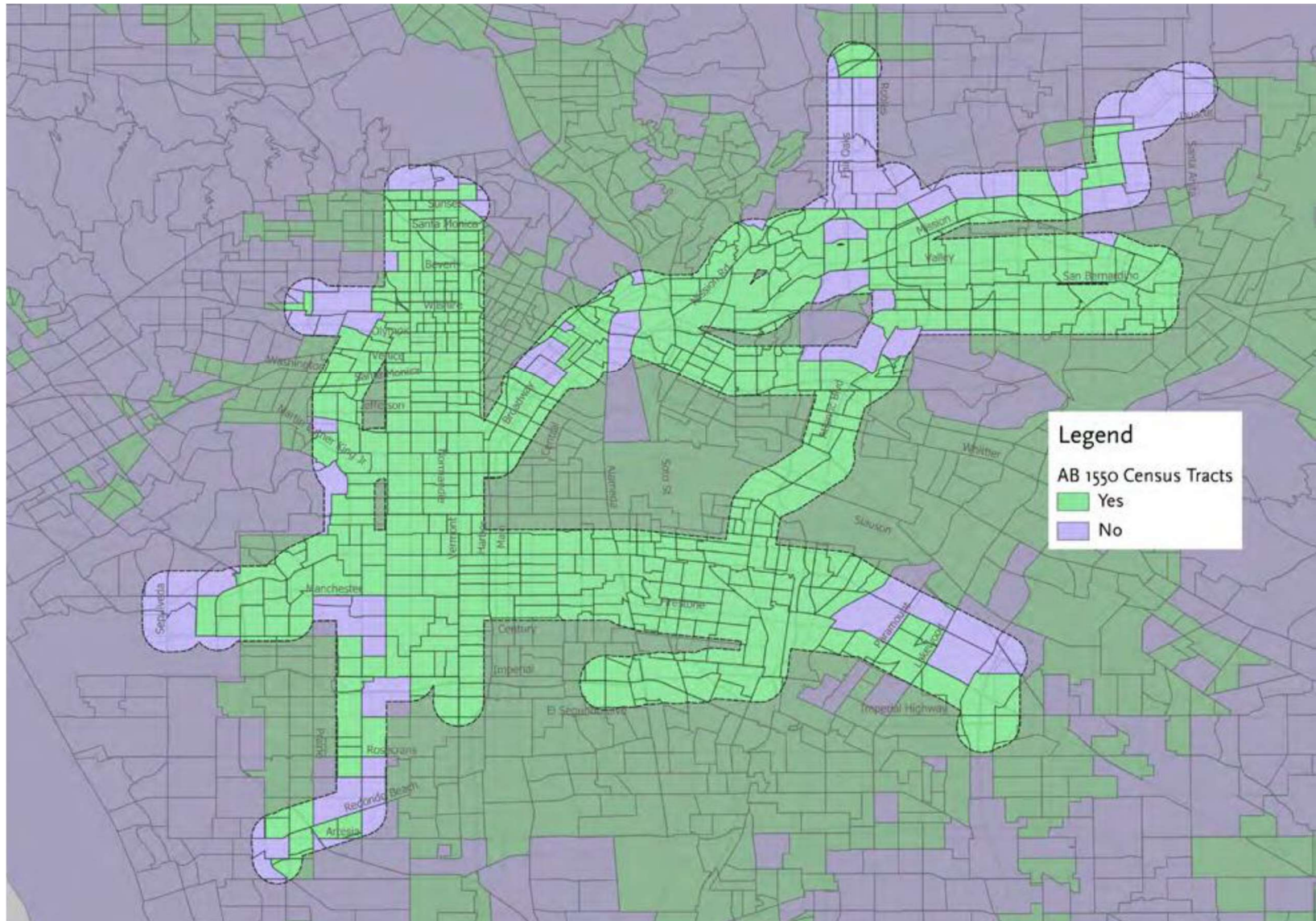


Figure 3: AB 1550 Census Tracts (Green) in the Project Corridors

EQUITY PLATFORM FIGURES 3 - 5

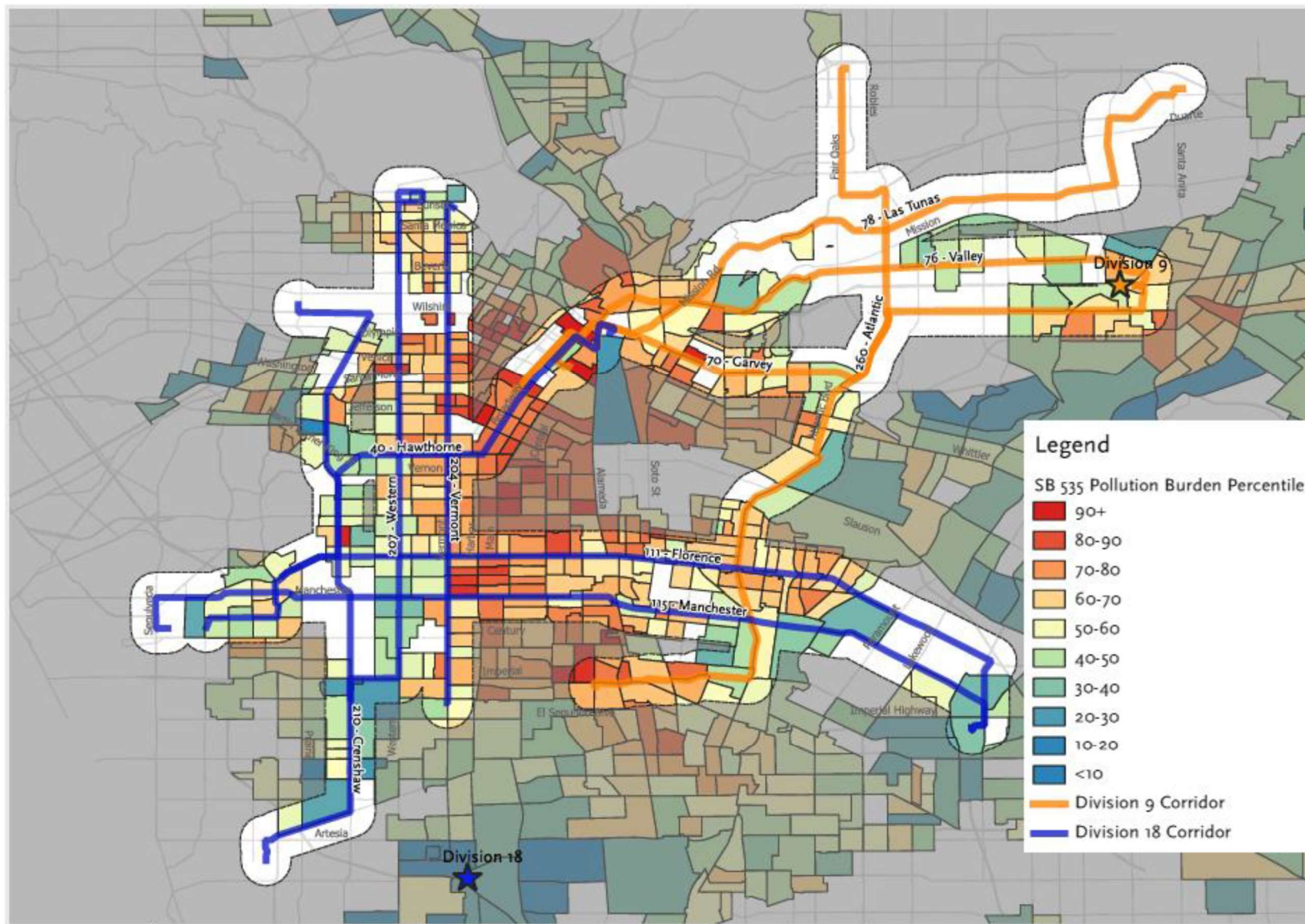


Figure 4: Census Tract Pollution Burden Percentile in the Project Corridors

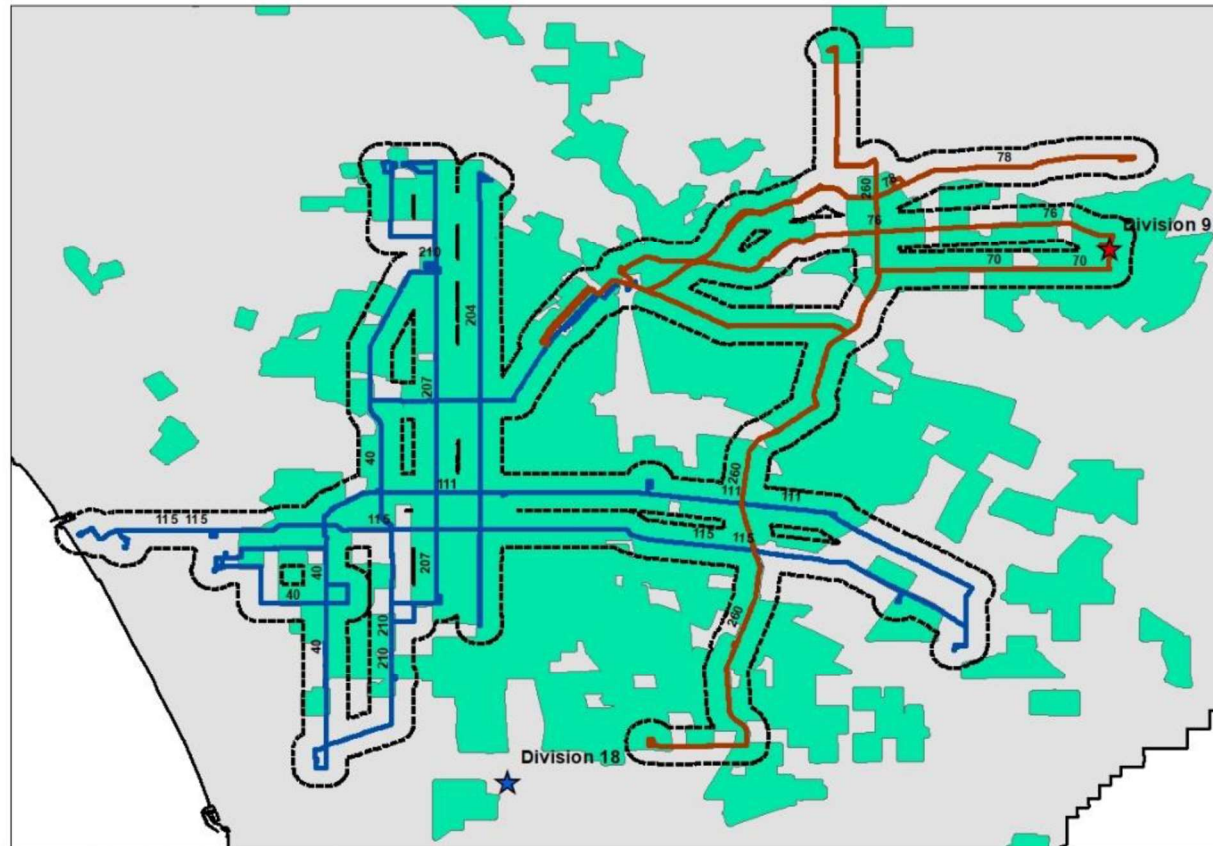
EQUITY PLATFORM FIGURES 3 - 5



Division 9 and 18 Transit Corridors Overlaid with Equity Focused Communities

Legend

- Division 9
- Division 18
- Division 9 Corridors
- Division 18 Corridors
- Division 18 Corridors
- Division 9 and 18 Transit Corridor Service Area
- Equity Focused Communities
- Non Equity Focused Communities



Prepared by Metro Service Planning

December, 2022

Figure 5: EFC Overlay Map

The background features the LA Metro logo, which consists of a stylized 'M' made of white, 3D rectangular blocks on a green circular base. This is set against a larger orange circular shape, which is itself on a dark grey/black background.

LA Metro Bus Sensor Technology

June 2023



Metro

Introduction

Metro Board approved Item 14, Bus Sensor Technology Motion. The motion requested Metro Staff to report recommendations on safety features such as pedestrian detection by June 2023. Specifically, the following responses were requested:

1. Determine feasibility of incorporating additional safety features into new procurement.
2. Determine feasibility of installing additional safety features on our existing bus fleets.
3. Explore other emerging collision avoidance technologies.

Further, Metro is in the process of concluding two separate passenger collision avoidance studies.

Background | MobileEye

FTA Grant Funded study to evaluate commercially available collision avoidance systems. Study evaluated several technologies available in 2017.

1. Selected Mobileye Shield + to test in partnership with NF, CTE, and the FTA on 50 LA Metro buses. Final Report expected to be available July 2023.
2. Preliminary findings are inconclusive, lacking sufficient evidence to demonstrate safety improvements over transit buses without active collision avoidance systems.

“MOBILEYE® SHIELD+™ V4 w/ APAS” OPERATOR REFERENCE



LEFT SIDE DISPLAY w/ APAS*

- No illumination.
- No pedestrian or cyclist threat on left side of moving bus.
- With pedestrian / bicyclist in proximity of moving bus the external audio message is 'Caution Bys Approaching'.

OFF

- Yellow solid illumination with no sound.
- Informs the operator a pedestrian or cyclist has been detected near the left front or left side of bus.
- Operator should exercise additional caution until verifying that the danger of collision has passed.

DETECTION

- Red flashing with beeping sound.
- Informs the operator a pedestrian or cyclist has been detected in the left front or left side of bus and collision is imminent.
- Operator should take action to carefully stop bus to avoid collision.

ALERT

*Advanced Pedestrian Alert System

CENTER DISPLAY & EYEWATCH

- Contains the Pedestrian Display and EyeWatch.
- The EyeWatch readouts and explanations can be found below on this document.
- No pedestrian or cyclist threat in front of moving bus.
- Illuminated green LED indicates system operational.

DETECTION

- Yellow illumination with no sound.
- Indicates a pedestrian or cyclist is in front of the moving bus or coming towards the moving bus.
- Operator should exercise additional caution until verifying that the danger of collision has passed.
- Illuminated green LED indicates system operational.

ALERT

- Red flashing with beeping sound.
- Indicates a pedestrian or cyclist is in front of the moving bus or coming towards the moving bus and collision is imminent.
- Operator should take action to carefully stop bus to avoid collision.
- Illuminated green LED indicates system operational.

RIGHT SIDE DISPLAY w/ APAS*

- No illumination.
- No pedestrian or cyclist threat on right side of moving bus.
- With pedestrian / bicyclist in proximity of moving bus the external audio message is 'Caution Bus Approaching'.

OFF

- Yellow illumination with no sound.
- Informs the operator a pedestrian or cyclist has been detected near the right side of bus.
- Operator should exercise additional caution until verifying that the danger of collision has passed.

DETECTION

- Red flash with beeping sound and external audio message of 'Danger Step Back'.
- Informs the operator a pedestrian or cyclist has been detected on the right side of bus and collision is imminent.
- Operator should take action to carefully stop bus to avoid collision.

ALERT

*Advanced Pedestrian Alert System

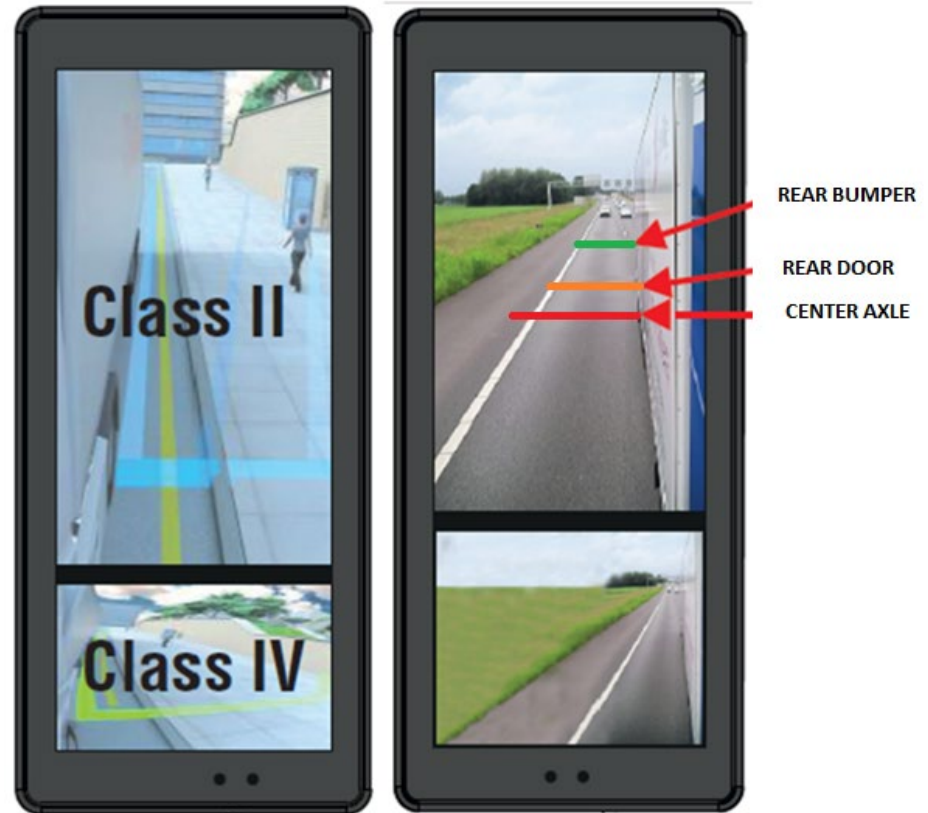


Metro

Background – MirrorEye

MirrorEye Study with BYD

1. Discussions with BYD and MirrorEye began in June 2019.
2. Electronic rear/side view monitors were tested on 5 BYD 60-foot buses and 5 BYD 40-foot buses. Features include night vision & lane marking.
3. Study ongoing, results expected to be published Summer of 2024.



Recommendations to Board Motion Responses (1-3)

1. *Determine feasibility of incorporating additional safety features into new procurement.* Staff has included language in the Technical Specification for new bus procurements to include vehicle safety technologies such as pedestrian detection, lane departure warnings, and Advanced Driver Assistance features.
2. *Determine feasibility of installing additional safety features on our existing bus fleets.* Staff is not recommending the retrofit with MobileEye as benefits were inconclusive, but staff will continue to assess technologies for the existing bus fleet as technologies mature.
3. *Explore other emerging collision avoidance technologies.* Staff will continue to explore new technologies as they emerge and merit additional evaluation.





Thank you.

