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Agenda - Final

Thursday, July 18, 2019

11:30 AM

One Gateway Plaza, Los Angeles, CA 90012,
3rd Floor, Metro Board Room

Executive Management Committee

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Eric Garcetti, Vice Chair
John Fasana
Paul Krekorian
Sheila Kuehl
Hilda Solis
John Bulinski, non-voting member

Phillip A. Washington, Chief Executive Officer

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

PUBLIC INPUT

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.

CONDUCT IN THE BOARD ROOM - The following rules pertain to conduct at Metropolitan Transportation Authority meetings:

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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
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NOTE: ACTION MAY BE TAKEN ON ANY ITEM IDENTIFIED ON THE AGENDA

CALL TO ORDER

ROLL CALL

37. **SUBJECT:** **STATE AND FEDERAL REPORT**   [2019-0510](#)

RECOMMENDATION

RECEIVE AND FILE State and Federal Legislative Report.

31. **SUBJECT:** **TWENTY-EIGHT BY '28 FINANCIAL FORECAST AND CONSTRUCTABILITY ANALYSIS**   [2019-0434](#)

RECOMMENDATION

RECEIVE AND FILE financial forecast and constructability analysis to deliver the Twenty-Eight by '28 Initiative.

Attachments: [Attachment A - Pillar Project Profiles](#)

[Attachment B - Pillar Projects vs. SRFF 10-Year](#)

[Attachment C - Pillar Projects vs. SRFF 20-Year](#)

[Attachment D - Constructability Analysis-Project Information](#)

[Presentation](#)

(ALSO ON CONSTRUCTION COMMITTEE)

38. **SUBJECT:** **OFFICE OF THE INSPECTOR GENERAL REPORT, "IS LA METRO READY FOR CLIMATE CHANGE?"**   [2019-0504](#)

RECOMMENDATION

RECEIVE AND FILE Office of the Inspector General Climate Change Report, "Is LA Metro Ready for Climate Change?"

Attachments: [Attachment A - Final OIG Climate Change Report](#)

[Presentation](#)

26.   SUBJECT: OFFICE OF THE INSPECTOR GENERAL REPORT ON   [2019-0481](#)
                      METRO SECURITY PERFORMANCE REVIEW FISCAL
                      YEAR 2018

       RECOMMENDATION

       RECEIVE AND FILE OIG report on Metro Security Performance Review
       Fiscal Year 2018.

       Attachments: [Attachment A - Metro Security Performance Review Fiscal Year 2018](#)
                                 [Presentation](#)

(ALSO ON OPERATIONS, SAFETY AND CUSTOMER EXPERIENCE COMMITTEE)

27.   SUBJECT: MONTHLY UPDATE ON TRANSIT SAFETY AND SECURITY   [2019-0496](#)
                      PERFORMANCE

       RECOMMENDATION

       RECEIVE AND FILE Transit Safety and Security Report.

       Attachments: [Attachment A - System-Wide Law Enforcement Overview May 2019](#)
                                 [Attachment B - MTA Supporting Data May 2019](#)
                                 [Attachment C - Key Performance Indicators May 2019](#)
                                 [Attachment D - Transit Police Summary May 2019](#)

(ALSO ON OPERATIONS, SAFETY AND CUSTOMER EXPERIENCE COMMITTEE)

39.   SUBJECT: P3 PROGRAM UPDATE   [2019-0529](#)

       RECOMMENDATION

       RECEIVE oral update on P3 Program.

40.   SUBJECT: TRANSPORTATION BUSINESS ADVISORY COUNCIL   [2019-0500](#)
                      APPOINTMENTS

       RECOMMENDATION

       APPOINT the Conference Of Minority Transportation Officials (COMTO) SoCal
       to the Transportation Business Advisory Council.

41.   **SUBJECT:**   **FEDERAL LEGISLATION**   [2019-0511](#)

    RECOMMENDATION

    ADOPT staff recommended position:

    A. House Resolution 2723 (Lowenthal) - Economy in Motion: The National Multimodal and Sustainable Freight Infrastructure Act **SUPPORT**

    Attachments: [Attachment A - H R 2723 (Lowenthal)](#)

42.   **SUBJECT:**   **METRO CLIMATE ACTION AND ADAPTATION PLAN**   [2019-0489](#)

    RECOMMENDATION

    ADOPT the Metro Climate Action and Adaptation Plan.

    Attachments: [Attachment A - Draft Final 2019 CAAP](#)

                  [Attachment B - Sustainability Council Comments and Responses Log](#)

                  [Presentation](#)

    SUBJECT: **GENERAL PUBLIC COMMENT**   [2019-0542](#)

    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

Metro

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

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Board Report

File #: 2019-0434, **File Type:** Informational Report

Agenda Number: 31.

CONSTRUCTION COMMITTEE
EXECUTIVE MANAGEMENT COMMITTEE
JULY 18, 2019

SUBJECT: TWENTY-EIGHT BY '28 FINANCIAL FORECAST AND CONSTRUCTABILITY
            ANALYSIS

ACTION: RECEIVE AND FILE

RECOMMENDATION

RECEIVE AND FILE financial forecast and constructability analysis to deliver the Twenty-Eight by '28
Initiative.

ISSUE

This item is a response to a Board request (Motion 32.4, #2019-0108) during the Board meeting on
February 2019 to prepare a detailed year-by-year financial forecast to deliver Twenty-Eight by '28,
prioritizing four "pillar projects," and to conduct a constructability analysis for the pillar projects.
Responses to other components of the motion were provided by Metro staff in a May 2019 status
report to the Board.

BACKGROUND

Motion 32.4 requests a detailed year-by-year potential financial forecast that prioritizes the four pillar
projects listed below; assumes public private partnership (P3) efficiencies but not use of local return
revenues; public and private financing not in Metro's existing "toolbox"; and a constructability analysis
of the four pillar projects that includes scope, costs, risks, use of alternative modes, and timelines.

   Pillar Projects (Measure M Opening Date)
- Gold Line Eastside Extension Phase 2 (FY 2035)
- Green Line Extension to Torrance (FY 2030)
- Sepulveda Transit Corridor (FY 2033)
- West Santa Ana Branch to Downtown LA (FY 2028, FY 2041)

DISCUSSION

Metro staff has developed a Pillar Projects Financial Forecast that attempts to identify a viable
funding plan for the four projects. The Pillar Projects Financial Forecast is an alternative to the
baseline Metro system-wide, or Long Range Transportation Plan (LRTP) financial forecast, which is

the multiyear funding plan for all Metro projects, programs, and services.

Key assumptions made include: all pillar projects are completed by FY 2028, the cost of each of the pillar projects is the same as initially estimated in the Measure M Expenditure Plan (Metro staff is aware that the preliminary cost estimate for certain project alternatives is higher than the Expenditure Plan, but any such alternative has not yet been approved by the Board), local sales tax funding is limited by the respective Expenditure Plan, the use of funds is consistent with Metro Board policy, and state and federal funding are limited to existing grant programs and estimated availability to Metro.

Potential Financial Forecast Results
The acceleration of the pillar projects reduces estimated inflation cost of the projects (assuming the project costs are the same as the Measure M Expenditure Plan), but also reduces state and federal grant funding, Measure M allowable funding for inflation, and availability of other Metro sales tax. This results in a construction funding gap as the reduction in project costs is much less than the reduction in funding. The estimated funding gap for the accelerated construction of the pillar projects is $3.3 billion. The funding gap, or shortfall, by pillar project is shown in the accompanying table.

Estimated Accelerated Capital Cost and Available Funding "Pillar Projects" ($ in millions)				
Pillar Projects	Total Capital Cost	Metro Local Funding	State and Federal Funding	Funding Surplus/ (Shortfall)
Gold Line Eastside Extension Phase 2	$ 3,637.7	$ 2,179.8	$ 385.7	$ (1,072.2)
Green Line Extension to Torrance	1,086.0	854.7	231.3	-
Sepulveda Transit Corridor	8,572.6	3,448.6	3,748.1	(1,376.0)
West Santa Ana Branch to Downtown LA	5,565.6	2,513.4	2,155.5	(896.7)
Total	$18,862.0	$ 8,996.5	$ 6,520.7	$ (3,344.8)

In addition to the construction funding gap, the acceleration of the opening of the pillar projects in FY 2028 will result in higher operating costs of $300 million per year. A portion of the higher operating costs can be funded from local revenues freed-up from the acceleration of the pillar projects, but there remains a projected shortfall of $1.2 billion over the 10-year period FY 2029 to FY 2038. The operating shortfall could be partially addressed if Metro transferred capital funds to operations, through an amendment of the Measure M Expenditure Plan that is allowable in FY 2027.

The year-by-year cash flows that show the construction costs, revenues, and funding gap (for the 10-year period FY 2019 to FY 2028) for each pillar project are included in Attachment A. The funding gap is delineated by the row "Required New Revenue." The Metro system-wide revenues and expenditures under the Pillar Projects Financial Forecast (for the 10-year period FY 2019 to FY 2028), as well as a comparison to the baseline Short Range Financial Forecast are included in Attachment B. Metro 20-year system-wide expenditures are included in Attachment C to show the impact of the accelerated operations of the pillar projects.

Reduction in Funding From Acceleration
The maximum amount of grant funding available to Metro is expected to be relatively stable over time, in approximately the same amounts each year or multiyear period. This is because the state and federal grants are funded with tax and fee revenue, which are paid to the grantors annually or periodically, and the grantors in turn allocate the funding they receive. It is not typically possible for the grantors to accelerate funding, as the grantors have not yet received the underlying funds nor have they offered to award these future funds early to Metro.

As an example, the following table shows the estimated total statewide grant funding available over the next twenty years for the state's Transit and Intercity Rail and Capital Program, and the amounts expected to be granted to Metro under the baseline (the Short Range Financial Forecast, September 2018) and the Pillar Projects Financial Forecast. This grant program is well-suited to Metro's new rail projects as it supports investments that reduce greenhouse gas emissions. The state predicts that total grant funding for this program will grow steadily over time at a rate similar to inflation. Under the baseline forecast, Metro expects to receive about one-half of the state allocation. However, under the Pillar Projects Financial Forecast, Metro would receive about $1.6 billion less, as twenty years of Metro's demand is condensed into the ten year period FY 2019-2028, but the supply of funding from this grant program cannot be advanced, as the amount available statewide is dependent on fuel taxes and cap-and-trade proceeds that are received incrementally by the state over time.

Transit and Intercity Rail and Capital Program
Statewide Funding Estimate and Projected Metro Allocations
($ in millions)

Period	(1) Statewide Estimate	(2) Short Range Financial Forecast	(3) Pillar Projects Financial Forecast	(3)-(2) Difference
FY 2019-2028	$ 2,931.1	$ 1,724.5	$ 1,994.0	$ 269.5
FY 2029-2038	3,459.9	1,850.0	-	(1,850.0)
Total	$ 6,391.0	$ 3,574.5	$ 1,994.0	$ (1,580.5)

The amount of local funding is also reduced if the funding is accelerated. The Measure M funding for the pillar projects can be increased for inflation, but if the project is accelerated the Measure M inflation funding will decrease. Other Metro sales tax revenues are difficult to accelerate because these funds are received incrementally over time and are currently allocated or programmed to the pillar projects ten to twenty years in the future. Metro cannot accelerate this sales tax because Metro has not yet received these funds. Debt financing is an option to leverage future sales tax, but there are limits to the amount of debt financing that can be used, and the debt comes at an interest cost.

Increased Debt Financing
The amount of debt financing in the Pillar Projects Financial Forecast is much greater than the baseline Short Range Financial Forecast. The increased debt financing is needed because Metro would require the local funds (e.g., Measure M and Measure R) for construction sooner than Metro

receives them. Metro receives about $850 million per year (in current dollars) from each of the four local sales tax measures, and this funding cannot be accelerated given Metro receives the sales tax revenue as a percent of taxable sales in Los Angeles County. Metro can borrow against future revenues and incur interest expense, subject to the Metro Debt Policy limits on the amount of sales tax that can be used for debt service each year, and any constraints in existing debt covenants (i.e., contractual provisions relating to outstanding debt that has already been sold to investors). As shown in the following table, in order to fund the accelerated project costs, the Pillar Projects Financial Forecast has $18.8 billion of debt financing over 10 years, compared to $8.8 billion in the Short Range Financial Forecast - a $10.0 billion increase. The higher debt issuance and related interest cost requires that subordinate debt (i.e., debt repaid after Metro's existing senior lien sales tax bonds) is needed, as there is insufficient debt capacity from the existing senior lien sales tax bonds after the debt issuance. The Pillar Projects Financial Forecast includes $3.5 billion of subordinate debt, including $658 million of outstanding Measure R TIFIA loans.

10-Year Comparison of Debt Issuance (FY19-FY28)
Baseline vs. Pillar Projects Financial Forecast
($ in millions)

Type of Debt	Short Range Financial Forecast	Pillar Projects Financial Forecast	Difference
Measure R	$ 1,822.5	$ 3,225.9	$ 1,403.4
Measure M	3,479.3	9,121.6	5,642.3
Other Sales Tax	2,397.2	2,670.3	273.1
Toll Revenue	104.2	643.6	539.4
Grant Anticipation	989.6	3,104.0	2,114.4
Total	$ 8,792.8	$ 18,765.4	$ 9,972.6

Another factor that may require additional debt financing is the restriction on the beginning year that Measure R and Measure M can be used on certain pillar projects. The Measure R and Measure M ordinances include beginning dates as a way to sequence the funding of projects and ensure that the sales tax is available at various points in time. The Measure R and Measure M Expenditure Plans restrict spending prior to FY 2028 on the pillar projects listed below.

Pillar Projects Affected by Beginning Dates
- Gold Line Eastside Extension Phase 2: Measure M, FY 2029
- Green Line Extension to Torrance: Measure R, FY 2028
- Sepulveda Transit Corridor: Measure R, FY 2030

This restriction may be addressed by debt financing all expenditures prior to the beginning date, and deferring payment of all principal and interest until the beginning date. This is assumed in the Pillar Projects Financial Forecast. However, this approach may require Board approval or acknowledgement of the approach, or possibly amendments to the Measure R and Measure M

ordinances. Should Metro attempt to expend Measure R and Measure M prior to the identified start date (pre-construction expenditures are allowed for Measure M), a workaround will need to be determined.

In addition to sales tax debt, the Pillar Projects Financial Forecast includes a significant amount of New Starts "grant anticipation debt." This type of debt is needed because New Starts is expected to be paid to Metro in $100 million annual payments per project. This payment plan could result in as many as thirteen total annual payments, several of which would be received after the project is constructed. As funds are needed for construction costs, the grant anticipation debt provides funding during construction, at an interest cost.

Fiscal Responsibility Policy
The Board-adopted Fiscal Responsibility Policy requires that the marginal amount of interest from debt issued for a Measure R project that is accelerated in comparison to its April 2010 LRTP schedule is allocated to the project as a cost. The interest cost reduces the amount available for capital spending as the Measure R funding amount for each project in the Expenditure Plan is capped and the allocation of interest takes away from this amount. This policy affects the Gold Line Eastside Extension Phase 2, Green Line Extension to Torrance, and Sepulveda Transit Corridor. The policy requires that $635.6 million of interest cost is allocated to the pillar projects.

New Public and Private Financing; P3 Efficiencies
In our May 2019 status report (#2019-0224) to the Board on the financial forecast and constructability analysis of the Twenty-Eight by '28 Initiative, Metro staff recommended against the assumption of new revenues that do not currently exist or have not yet been enacted, as this would subject Metro to risks that the revenues are not realized and the projects cannot be completed. These types of new revenues are not included in the Pillar Projects Financial Forecast. However, Metro can facilitate the creation of the new funding sources that could ultimately accelerate the pillar projects, and may be able to incorporate these new revenues in our future funding plans should the new revenues come to fruition.

The May 2019 status report also discussed the reasonableness of including P3 cost saving efficiencies. At the current stage of development of the pillar projects, there is not sufficient project definition to apply technical concepts that would result in relative savings or efficiencies, and they are not included in the Pillar Projects Financial Forecast.

Constructability Analysis
Metro staff has been advancing constructability of the four pillar projects per item D of the February Board Motion. The project teams are developing scopes, schedules, cost estimates, risk analyses, and P3 status for the respective projects. Staff has identified a number of opportunities to accelerate these projects to support an opening for revenue service by the end of FY2028.

All four pillar projects are in the planning and environmental phase and scheduled to be environmentally cleared over the next four years and transition into engineering, design and construction. In order for some of these projects to have a chance of completion and revenue operations by 2028, the environmental and engineering work must be accelerated for construction to begin no later than calendar year 2023. Any additional requirement imposed on these projects will

have a material effect on realizing this goal. During the construction phase interactions with third parties such as multiple cities along the alignment and a shared corridor with other governmental and private entities may also impact the schedule.

Project scopes, schedules, cost estimates and risk analyses are being compiled and will continue as the project development advances for the pillar projects. Attachment D details each of these items.

Critical path for achieving construction start is the environmental clearance, preliminary engineering and procurement processes that lead to award of construction contracts. The Board can help accelerate these initial phases as they are highly dependent on local, state and federal stakeholders to provide timely review and approval of environmental documents, conceptual design, cost estimates and preliminary engineering. Three key items that will help accelerate project schedules are: reducing the duration and number of iterations for regulatory agency reviews and approvals, expediting third party permits/design reviews and reaching the Record of Decision as quickly as possible.

Metro staff is currently working with the Federal Transit Administration (FTA) to provide support staff that will help expedite reviews. Additionally, working with FTA partners such as State Historic Preservation Offices (SHPO) and permitting agencies such as U.S. Army Corps of Engineers to reduce the standard review turnaround times could improve project environmental and engineering timelines by several months.

West Santa Ana Branch is an example of time savings through expeditious review cycles. During the FTA review, Metro staff was able to work directly with FTA and SHPO to resolve questions.   The resulting time savings was a minimum 3 months. This type of collaboration and partnership must be applied to each of the applicable pillar projects to improve the schedules.

Assistance from the Board is critical to encourage our federal, state and local partners to reduce review cycle times and work collaboratively with Metro staff to resolve questions or concerns as they arise. Staff is evaluating the current pillar project schedules to identify potential efficiencies in the design and construction phases. Opportunities to reduce overall duration by working on multiple project phases concurrently will be another key strategy for accelerating projects. Where possible, engineering must be pursued in parallel with the environmental process to enable construction to begin by 2023. Risks and additional costs associated with this approach are evident as engineering must be applied at an earlier phase in the environmental process to multiple alternatives. Early engineering will identify utility relocations, geotechnical unknowns, freight relocations, and tunneling segments that will also be key to completing on time and within budget.

Current market conditions are increasing project bid prices which, in turn, is impacting available funding. As provided to the Board in the May 2018 Los Angeles Construction Market Analysis, over the next 5 to 10 year period projections indicate there will be more construction work than workers and firms available to do the work at a reasonable cost. Given the higher bids and the complexity of the pillar projects, applying the Metro Cost Management policy will be required.

Potential Operating Segment Analysis
In line with Metro's approved Cost Management Policy and consistent with past Metro construction

efforts, accelerated delivery may require each of the pillar projects to be evaluated for a phased construction approach through Operating Segments in order to build as much of the project as possible to maximize mobility benefits in time for the 2028 Olympics.

In order to achieve revenue service within current funding and schedule constraints, Operating Segments may be identified as part of the environmental phase to be analyzed for public and stakeholder consideration, in addition to the full project scope. The OS options under consideration will be developed based on physical infrastructure limits and barriers, major origin/destinations, market trends, service to high activity areas, and operational feasibility. The EIS/EIR will environmentally clear the entire project and the OS options.

As project definition advances and capital construction costs are better understood for each potential operating segment, alternative funding strategy options are also being developed iteratively based on (a) the amount of funding allocated from Measure M, (b) the amount of other local, state, and federal funds that can be made available by FY 2028, (c) current cost estimates for the end-to-end project and potential minimum operating segments, and (d) the extent of accelerated delivery. The funding strategy to deliver the most project scope by 2028 will likely involve more aggressive debt and grant assumptions, as well as the reallocation of funding from other Metro purposes.

For the pillar projects where Operating Segments are considered, Board decision will be required for authorization of a segmented approach and associated funding strategies.

Actions That Metro Can Take
This report identifies a significant funding gap to construct and operate the pillar projects, and significant challenges to complete the environmental process and construction on a Twenty-Eight by '28 accelerated schedule. In order to increase the likelihood that the pillar projects can be delivered by FY 2028, Metro can take the following steps to pursue new revenues that will address the projected funding gap, reevaluate Board policy that could increase resources for the pillar projects, and change Metro's project delivery process.

Pursue new revenues:

- Evaluate and consider congestion pricing
- Evaluate and consider transportation network company fees
- Evaluate and consider surplus toll revenue from new Express Lanes
- Advocate for creation of state tax credit bonds
- Advocate for implementation of new federal transportation funding opportunities

Reevaluate Board policy:

- Evaluate and consider changes to Fiscal Responsibility Policy
- Evaluate and consider changes to Early Project Delivery Strategy Policy
- Evaluate and consider changes to Measure M funds availability date
- Decide which projects are most strategic for Metro and only federalize those
- Simplify Metro procurement rules

- Adopt a policy requiring the Board to maintain focus on the primary project objectives, avoiding "ornaments" and making findings for significant additions to projects

Changes to project delivery process:

- Work with local, state, and federal stakeholders to provide timely review
- Support local partner officials in being leaders in their community and the region in managing and guiding significant change
- Metro to work on multiple phases concurrently
- Identify when to initiate preparatory steps to be ready for the next milestone and similarly plan ahead to segment project delivery for early wins
- Employ standards, processes and procedures guidance to support this complex, large program
- Proactively identify potential issues to address early in the process and retrospectively apply lessons learned from prior projects
- Provide for ongoing professional development and hands-on project experience

Changes to regulatory process:

- Adopt reforms to greatly reduce the ease and frivolity of litigation
- Clearly establish deference to the lead agency's environmental document and preclude judicial invalidation of a project approval for procedural remedies or additional analysis
- Take a programmatic approach to permitting and require the issuance of permits by partner agencies within a specified timeframe
- Pilot regulatory reforms to facilitate preparedness for the 2028 Olympic Games

FINANCIAL IMPACT

This is an information item and does not have a direct financial impact on Metro. The implementation of accelerated funding for major capital projects would have a financial impact on Metro, and these impacts will be identified in the event the Board considers approval of the funding plans.

Impact to Budget

This is an information item and does not impact the FY 2020 budget.

IMPLEMENTATION OF STRATEGIC PLAN GOALS

This item helps ensure fiscal responsibility in how funding determinations are made and transparency in the agency's investment decisions (Goal #5).

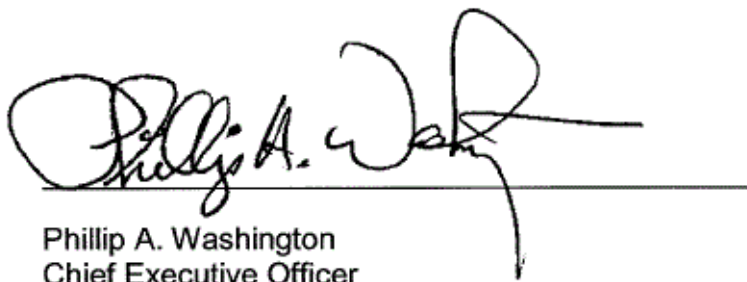## ATTACHMENTS

Attachment A - Project Profiles, Pillar Projects
Attachment B - 10-Year Revenue and Expenditure Comparison
Attachment C - 20-Year Operating Expenses

Attachment D - Constructability Analysis - Project Information

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Phillip A. Washington
Chief Executive Officer

Gold Line Eastside Extension Phase 2

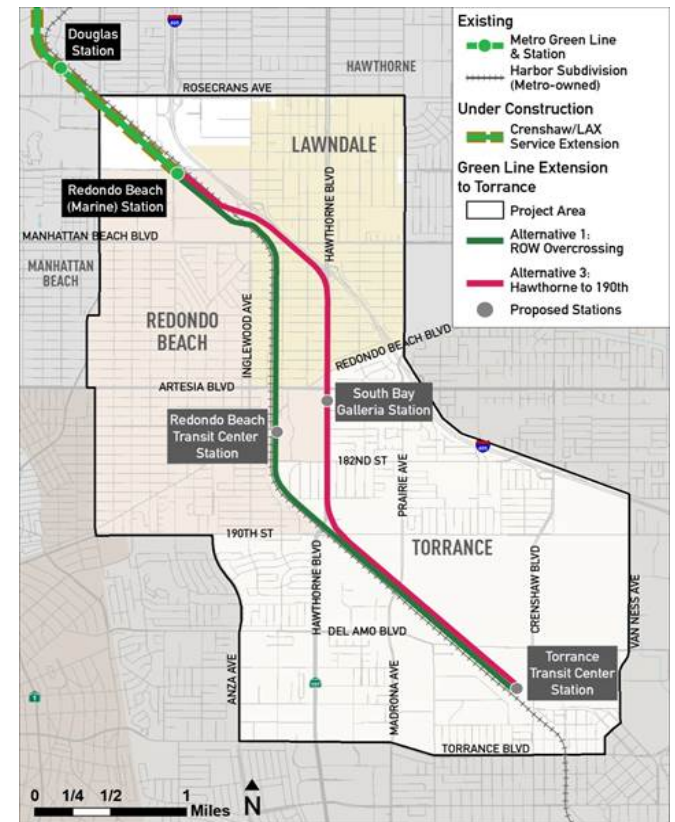| 10-YEAR CASH FLOW ($ in millions)	Years Prior-'28	Prior Years	2018 2019	2019 2020	2020 2021	2021 2022	2022 2023	2023 2024	2024 2025	2025 2026	2026 2027	2027 2028
USES OF FUNDS												
Construction	$ 3,315.6	-	-	-	-	118.0	182.3	313.0	483.6	664.1	1,026.1	528.4
Preconstruction costs	$ 322.1	28.3	6.9	27.3	84.3	115.7	59.6	-	-	-	-	-
TOTAL USES	$ 3,637.7	$ 28.3	$ 6.9	$ 27.3	$ 84.3	$ 233.8	$ 241.9	$ 313.0	$ 483.6	$ 664.1	$ 1,026.1	$ 528.4
SOURCES OF FUNDS												
Federal Revenue												
Surface Transportation Block Grant Program (STBGP) formerly RSTP	$ 11.2	-	-	-	-	11.2	-	-	-	-	-	-
Congestion Mitigation & Air Quality Program (CMAQ)	$ 13.0	-	-	-	-	13.0	-	-	-	-	-	-
Federal Revenue Subtotal	$ 24.3	$ -	$ -	$ -	$ -	$ 24.3	$ -	$ -	$ -	$ -	$ -	$ -
Local Revenue												
Prop A - Rail Development Account (35%)	$ 3.5	3.5	-	-	-	-	-	-	-	-	-	-
Measure R - Transit Capital (35%)	$ 635.4	0.7	-	-	-	209.5	212.1	213.1	-	-	-	-
Prop C - Discretionary (40%)	$ 3.4	3.4	-	-	-	-	-	-	-	-	-	-
Prop C - Transit-Related Highway (25%)	$ 315.6	0.8	-	-	-	-	29.8	29.8	27.1	4.6	169.6	53.8
Local Agency Transit Project Contributions	$ 109.1	-	-	-	-	-	-	-	69.6	39.6	-	-
Repayment of Capital Project Loans (Fund 3562)	$ 26.8	19.8	6.9	-	-	-	-	-	-	-	-	-
Measure M -Transit Construction (35%)	$ 1,086.0	-	-	27.3	84.3	-	-	-	-	388.4	191.4	394.6
Local Revenue Subtotal	$ 2,179.8	$ 28.3	$ 6.9	$ 27.3	$ 84.3	$ 209.5	$ 241.9	$ 242.9	$ 96.7	$ 432.6	$ 361.0	$ 448.4
State Revenue												
Transit and Intercity Rail Capital Program (TIRCP)	$ 80.0	-	-	-	-	-	-	-	-	-	-	80.0
Regional Improvement Program Funds (RIP)	$ 136.4	-	-	-	-	-	-	-	36.1	50.0	50.3	-
SB1 - Solutions for Congested Corridors Program	$ 145.0	-	-	-	-	-	-	-	75.0	70.0	-	-
SB1 - Local Partnership Program	$ -	-	-	-	-	-	-	-	-	-	-	-
State Revenue Subtotal	$ 361.4	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 111.1	$ 120.0	$ 50.3	$ 80.0
Required New Revenue	$ 1,072.2	$ -	$ -	$ -	$ -	$ -	$ -	$ 70.1	$ 275.8	$ 111.6	$ 614.7	$ -
TOTAL SOURCES	$ 3,637.7	$ 28.3	$ 6.9	$ 27.3	$ 84.3	$ 233.8	$ 241.9	$ 313.0	$ 483.6	$ 664.1	$ 1,026.1	$ 528.4

Total Project Cost:	"One Alignment" project with $3,000 million cost per Measure M (2015$). Life of Project budget pending.
Description:	Extends Gold Line Rail east from Atlantic Station. Two alignments are being studies - one along SR-60 to South El Monte, and the other along Washington Bl to Whittier.
Funding Status:	Funding for this project is part of the Measure M Expenditure Plan, with $1,086 million (2015$) allocated, beginning FY2029 for construction, and Measure R Expenditure Plan with $1,271 million beginning FY2022. Grant funded has yet to be awarded.
Subregion:	Gateway Cities/ San Gabriel Valley
Metro Project Number:	#460232
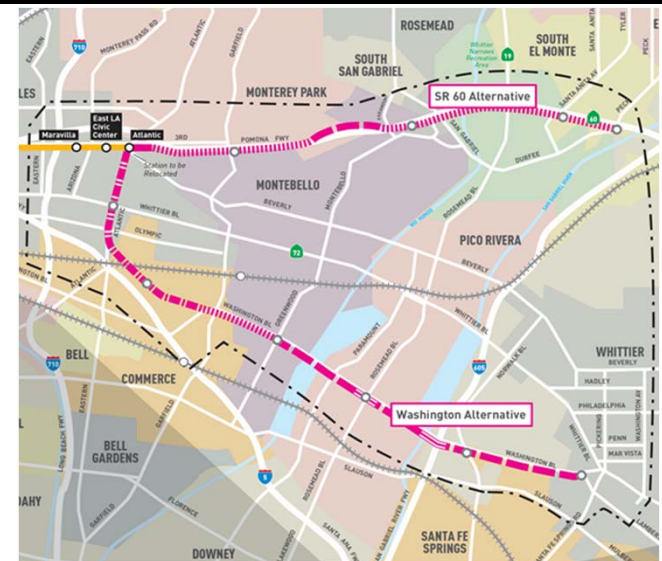
Green Line Extension to Torrance

10-YEAR CASH FLOW ($ in millions)	Years Prior-'28	Prior Years	2018 2019	2019 2020	2020 2021	2021 2022	2022 2023	2023 2024	2024 2025	2025 2026	2026 2027	2027 2028
USES OF FUNDS												
Construction costs	$ 999.9	-	-	-	-	-	-	46.5	143.6	246.6	406.3	156.9
Preconstruction costs	$ 86.1	13.7	0.7	1.2	0.9	2.0	2.1	20.0	32.9	12.7	-	-
TOTAL USES	$ 1,086.0	$ 13.7	$ 0.7	$ 1.2	$ 0.9	$ 2.0	$ 2.1	$ 66.4	$ 176.5	$ 259.3	$ 406.3	$ 156.9
SOURCES OF FUNDS												
Local Revenue												
Measure R - Transit Capital (35%)	$ 38.5	-	-	-	-	-	-	-	38.5	-	-	-
Prop C - Transit-Related Highway (25%)	$ 5.2	5.2	-	-	-	-	-	-	-	-	-	-
Local Agency Transit Project Contributions	$ 32.6	-	-	-	-	-	-	-	-	-	32.6	-
Repayment of Capital Project Loans (Fund 3562)	$ 10.7	8.5	0.7	1.2	0.3	-	-	-	-	-	-	-
Measure M -Transit Construction (35%)	$ 767.8	-	-	-	0.6	2.0	2.1	20.0	32.9	146.9	406.3	156.9
Local Revenue Subtotal	$ 854.7	$ 13.7	$ 0.7	$ 1.2	$ 0.9	$ 2.0	$ 2.1	$ 20.0	$ 71.4	$ 179.5	$ 406.3	$ 156.9
State Revenue												
Transit and Intercity Rail Capital Program (TIRCP)	$ 231.3	-	-	-	-	-	-	46.4	105.1	$ 79.8	-	-
State Revenue Subtotal	$ 231.3	$ -	$ -	$ -	$ -	$ -	$ -	$ 46.4	$ 105.1	$ 79.8	$ -	$ -
TOTAL SOURCES	$ 1,086.0	$ 13.7	$ 0.7	$ 1.2	$ 0.9	$ 2.0	$ 2.1	$ 66.4	$ 176.5	$ 259.3	$ 406.3	$ 156.9

Total Project Cost:	Life of Project budget still to be established. Measure M estimate is $891 million (2015$).
Description:	This extension will provide congestion relief along the I-405 corridor. It will also improve mobility in southwestern LA County by accessing the regional rail network through connections to the Metro Blue, Expo, and Crenshaw Lines.
Funding Status:	Per Measure M, the Project has a $619 million (2015$) allocation, plus inflation adjustments, beginning in FY2026 for construction, and Measure R allocation of $272 million beginning FY2028. Received award of $231.3 million TIRCP grant and $19.7 million of SB1 LPP in Feb, 2018.
Subregion:	South Bay
Metro Project Number:	#460304

Sepulveda Transit Corridor

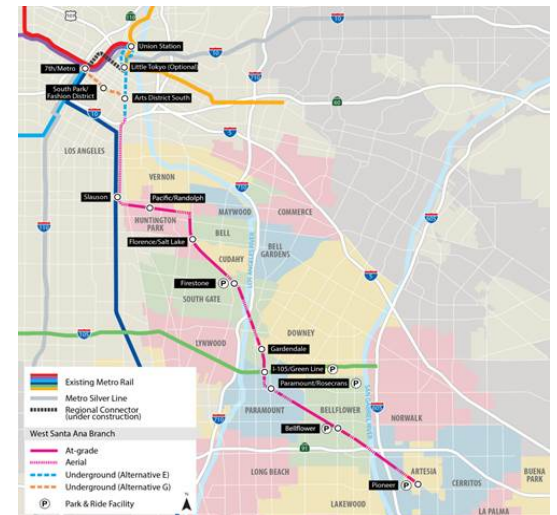| 10-YEAR CASH FLOW ($ in millions)	Years Prior-'28	Prior Years	2018 2019	2019 2020	2020 2021	2021 2022	2022 2023	2023 2024	2024 2025	2025 2026	2026 2027	2027 2028
USES OF FUNDS												
Construction costs	$ 6,270.9	-	-	-	-	223.2	344.9	592.0	914.6	1,256.1	1,940.7	999.4
Preconstruction costs	$ 601.8	1.8	4.3	192.7	198.5	204.5	-	-	-	-	-	-
Grant Anticipation Debt Service	$ 200.0	-	-	-	-	-	-	-	-	-	100.0	100.0
TOTAL USES	$ 7,072.6	$ 1.8	$ 4.3	$ 192.7	$ 198.5	$ 427.7	$ 344.9	$ 592.0	$ 914.6	$ 1,256.1	$ 2,040.7	$ 1,099.4
SOURCES OF FUNDS												
Federal Revenue												
Section 5309 New Starts	$ 215.0	-	-	-	-	-	-	-	-	15.0	100.0	100.0
Capital Grant Receipt Revenue Bonds	$ 1,367.1	-	-	-	-	-	-	-	-	-	700.0	667.1
Federal Revenue Subtotal	$ 1,582.1	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15.0	$ 800.0	$ 767.1
Local Revenue												
Prop A - Rail Development Account (35%)	$ 18.0	-	-	-	-	-	6.0	6.0	6.0	-	-	-
Measure R - Transit Capital (35%)	$ 39.8	-	-	-	-	-	-	-	-	-	39.8	-
Prop C - Discretionary (40%)	$ 67.0	-	-	-	-	-	14.7	34.0	18.3	-	-	-
Local Agency Transit Project Contributions	$ 206.2	-	-	-	-	-	-	-	206.2	-	-	-
Measure M -Transit Construction (35%)	$ 2,540.0	-	-	187.7	193.5	204.5	-	402.0	684.1	356.3	344.6	167.3
Toll Revenue - Sepulveda Pass	$ 547.4	-	-	-	-	-	-	-	-	197.9	349.5	-
Transportation Development Act (TDA) - Admin	$ 0.5	0.5	-	-	-	-	-	-	-	-	-	-
Measure R - Admin (1.5%)	$ 24.0	0.3	4.3	4.3	5.0	5.0	5.0	-	-	-	-	-
Prop C - Admin (1.5%)	$ 5.7	-	-	0.7	-	-	5.0	-	-	-	-	-
Local Revenue Subtotal	$ 3,448.6	$ 0.8	$ 4.3	$ 192.7	$ 198.5	$ 209.5	$ 30.7	$ 442.0	$ 914.6	$ 554.2	$ 733.9	$ 167.3
State Revenue												
Transit and Intercity Rail Capital Program (TIRCP)	$ 150.0	-	-	-	-	-	-	150.0	-	-	-	-
Regional Improvement Program Funds (RIP)	$ 141.0	1.0	-	-	-	-	-	-	-	50.0	50.0	40.0
SB1 - Solutions for Congested Corridors Program	$ 375.0	-	-	-	-	-	-	-	-	125.0	125.0	125.0
State Revenue Subtotal	$ 666.0	$ 1.0	$ -	$ -	$ -	$ -	$ -	$ 150.0	$ -	$ 175.0	$ 175.0	$ 165.0
Required New Revenue	$ 1,376.0	$ -	$ -	$ -	$ -	$ 218.2	$ 314.1	$ -	$ -	$ 511.9	$ 331.7	$ -
TOTAL SOURCES	$ 7,072.6	$ 1.8	$ 4.3	$ 192.7	$ 198.5	$ 427.7	$ 344.9	$ 592.0	$ 914.6	$ 1,256.1	$ 2,040.7	$ 1,099.4

Total Project Cost:	Phase 2 project with $5,674 million cost per Measure M (2015$). Life of Project budget pending.
Description:	Phase 2 from San Fernando Valley to Westwood with connections to existing and planned Metro bus and rail lines, including the Orange, Purple and Expo Lines. A feasibility study to identify rail alternatives is underway with work concluding in Summer/ Fall 2019.
Funding Status:	Funding limit of $1,000 million in Measure R for "San Fernando Valley I-405 Corridor Connection" beginning FY2030; $3,134 million in LRTP revenue, and $2,540 million in Measure M plus inflation for "Sepulveda Pass Transit Corridor (Ph 2)" beginning FY2024 for construction; $6.7 million feasibility study grant awarded Nov 2017.
Subregion:	San Fernando Valley, Westside
Metro Project Number:	#460305

West Santa Ana Branch to Downtown LA

10-YEAR CASH FLOW ($ in millions)	Years Prior-'28	Prior Years	2018 2019	2019 2020	2020 2021	2021 2022	2022 2023	2023 2024	2024 2025	2025 2026	2026 2027	2027 2028
USES OF FUNDS												
Construction costs	$ 4,420.8	-	-	-	-	157.4	243.1	417.3	644.8	885.5	1,368.1	704.6
Preconstruction costs	$ 426.0	8.8	24.8	36.0	194.4	162.0	-	-	-	-	-	-
Grant Anticipation Debt Service	$ 200.0	-	-	-	-	-	-	-	-	-	100.0	100.0
TOTAL USES	$ 5,046.7	$ 8.8	$ 24.8	$ 36.0	$ 194.4	$ 319.3	$ 243.1	$ 417.3	$ 644.8	$ 885.5	$ 1,468.1	$ 804.6
SOURCES OF FUNDS												
Federal Revenue												
Section 5309 New Starts	$ 681.1		-	-	-	81.1	100.0	100.0	100.0	100.0	100.0	100.0
Capital Grant Receipt Revenue Bonds	$ 630.4		-	-	-	-	-	-	-	-	425.0	205.3
Other Federal Funds	$ 1.3	-	1.3	-	-	-	-	-	-	-	-	-
Federal Revenue Subtotal	$ 1,312.7	$ -	$ 1.3	$ -	$ -	$ 81.1	$ 100.0	$ 100.0	$ 100.0	$ 100.0	$ 525.0	$ 305.3
Local Revenue												
Measure R - Transit Capital (35%)	$ 240.0	7.4	-	24.5	19.5	-	-	-	79.2	108.4	1.0	-
Measure R - Highway Projects (20%)	$ 108.4	-	-	-	-	-	-	1.3	10.5	38.0	54.0	4.7
Prop C - Discretionary (40%)	$ 234.8	-	-	-	-	-	-	-	-	62.0	72.8	100.0
Prop C - Transit-Related Highway (25%)	$ 3.9	1.4	-	-	2.6	-	-	-	-	-	-	-
Local Agency Transit Project Contributions	$ 145.4	-	-	-	-	-	-	-	145.4	-	-	-
Measure M -Transit Construction (35%)	$ 1,780.3	-	10.6	-	15.0	40.7	62.9	6.7	223.7	352.5	673.5	394.6
Measure R - Admin (1.5%)	$ 0.5	-	0.5	-	-	-	-	-	-	-	-	-
Local Revenue Subtotal	$ 2,513.4	$ 8.8	$ 11.1	$ 24.5	$ 37.1	$ 40.7	$ 62.9	$ 8.0	$ 458.8	$ 560.9	$ 801.3	$ 499.2
State Revenue												
Transit and Intercity Rail Capital Program (TIRCP)	$ 300.0	-	-	-	-	-	-	100.0	10.3	$ 100.0	89.7	-
SB1 - Local Partnership Program	$ 23.9	-	12.4	11.6	-	-	-	-	-	$ -	-	-
State Revenue Subtotal	$ 323.9	$ -	$ 12.4	$ 11.6	$ -	$ -	$ -	$ 100.0	$ 10.3	$ 100.0	$ 89.7	$ -
Required New Revenue	$ 896.7	$ -	$ -	$ -	$ 157.3	$ 197.5	$ 80.2	$ 209.4	$ 75.7	$ 233.0	$ 52.1	$ -
TOTAL SOURCES	$ 5,046.7	$ 8.8	$ 24.8	$ 36.0	$ 194.4	$ 319.3	$ 243.1	$ 417.3	$ 644.8	$ 993.9	$ 1,468.1	$ 804.5

Total Project Cost (First Phase):	Combination of FY 2028 and FY 2041 segments totaling $4 billion (2015$) per Ordinance. Life of Project budget pending.
Description:	New light rail transit line that would connect downtown Los Angeles to southeast LA County on 20-mile corridor. There are two segments identified in Measure M.
Funding Status:	Measure M funding of $1,435 million (2015$) for both segments, plus inflation adjustments. Measure R funding of $240 million, plus $108 million that was not used on the I-5 South HOV Lanes from I-605 to Orange County Line. Awarded TIRCP funding of $300 million in April 2018; allocated $24 million from Local Partnership Program
Subregion:	Central City, Gateway Cities
Metro Project Number:	#460201

Revenues by Major Category
Pillar Projects Financial Forecast

($ in millions)	TOTAL (FY19-FY28)	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
SALES TAX, TDA, STA REVENUES											
Proposition A	$ 7,640.5	643.6	666.3	692.9	718.5	744.9	773.2	802.9	834.2	865.4	898.6
Proposition C	$ 8,086.8	701.3	701.7	730.4	756.8	785.1	815.6	848.0	881.5	914.2	952.2
Measure R	$ 8,557.8	737.3	744.7	774.4	803.1	832.6	864.2	897.4	932.4	967.2	1,004.4
Measure M	$ 8,441.1	711.0	736.1	765.5	793.8	823.0	854.2	887.1	921.6	956.0	992.8
Transportation Development Act(TDA)	$ 4,598.2	386.3	401.2	417.2	432.6	448.5	465.4	483.3	502.1	520.8	540.8
State Transit Assistance (STA)	$ 1,899.5	167.2	169.7	179.6	186.2	189.3	193.4	198.3	202.7	206.9	206.3
Subtotal, Sales Tax, TDA, STA Revenues	$ 39,224.0	$ 3,346.6	$ 3,419.6	$ 3,560.1	$ 3,691.0	$ 3,823.5	$ 3,966.1	$ 4,117.0	$ 4,274.5	$ 4,430.6	$ 4,595.1
OPERATING & OTHER REVENUE											
Passenger Fares	$ 3,984.9	301.2	311.3	338.6	356.0	377.4	410.3	424.1	450.9	472.0	543.1
ExpressLanes Tolls	$ 657.0	62.8	63.4	64.1	64.7	65.3	66.0	66.7	67.3	68.0	68.7
Advertising	$ 304.1	24.7	25.5	26.5	27.1	28.7	34.2	34.2	34.3	34.3	34.4
Other Revenue	$ 1,761.6	$ 155.6	$ 102.2	$ 89.6	$ 128.3	$ 157.3	$ 237.3	$ 525.8	$ 175.1	$ 96.1	$ 94.3
Subtotal, Operating & Other Revenue	$ 6,707.6	$ 544.4	$ 502.5	$ 518.7	$ 576.2	$ 628.7	$ 747.8	$ 1,050.8	$ 727.6	$ 670.4	$ 740.5
CAPITAL & DEBT FINANCING RESOURCES											
Grant Receipts	$ 21,484.3	1,862.0	1,848.7	2,161.1	1,846.0	1,951.5	1,917.5	2,051.1	2,183.1	3,059.0	2,604.2
Bond Proceeds and TIFIA	$ 15,695.3	506.2	2,013.6	1,134.4	1,114.0	936.8	1,855.4	2,175.8	2,852.5	2,292.7	813.9
Prior Year Carryover	$ 261.0	446.5	(337.0)	355.7	227.4	152.6	(10.6)	(202.6)	(723.0)	83.0	269.0
Subtotal, Capital & Debt Financing Resources	$ 37,440.6	$ 2,814.7	$ 3,525.4	$ 3,651.2	$ 3,187.4	$ 3,041.0	$ 3,762.3	$ 4,024.3	$ 4,312.6	$ 5,434.7	$ 3,687.1
Required New Revenue [1]	$ 3,562.6	$ -	$ -	$ 157.3	$ 415.7	$ 394.3	$ 279.4	$ 393.3	$ 755.3	$ 1,048.6	$ 118.8
TOTAL REVENUES	$ 86,934.8	$ 6,705.7	$ 7,447.5	$ 7,887.2	$ 7,870.3	$ 7,887.5	$ 8,755.6	$ 9,585.4	$ 10,070.0	$ 11,584.3	$ 9,141.4

Notes:

1. Unidentied funding required for Pillar Projects and other impacted Metro projects.

Revenues by Major Category
Short Range Financial Forecast

($ in millions)	TOTAL (FY19-FY28)	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
SALES TAX, TDA, STA REVENUES											
Proposition A	$ 7,640.5	643.6	666.3	692.9	718.5	744.9	773.2	802.9	834.2	865.4	898.6
Proposition C	$ 8,086.8	701.3	701.7	730.4	756.8	785.1	815.6	848.0	881.5	914.2	952.2
Measure R	$ 8,557.8	737.3	744.7	774.4	803.1	832.6	864.2	897.4	932.4	967.2	1,004.4
Measure M	$ 8,441.1	711.0	736.1	765.5	793.8	823.0	854.2	887.1	921.6	956.0	992.8
Transportation Development Act (TDA)	$ 4,598.2	386.3	401.2	417.2	432.6	448.5	465.4	483.3	502.1	520.8	540.8
State Transit Assistance (STA)	$ 1,899.5	167.2	169.7	179.6	186.2	189.3	193.4	198.3	202.7	206.9	206.3
Subtotal, Sales Tax, TDA, STA Revenues	$ 39,224.0	$ 3,346.6	$ 3,419.6	$ 3,560.1	$ 3,691.0	$ 3,823.5	$ 3,966.1	$ 4,117.0	$ 4,274.5	$ 4,430.6	$ 4,595.1
OPERATING & OTHER REVENUE											
Passenger Fares	$ 3,973.2	302.6	320.7	340.8	361.3	377.4	413.2	425.1	451.6	474.4	506.2
ExpressLanes Tolls	$ 657.0	62.8	63.4	64.1	64.7	65.3	66.0	66.7	67.3	68.0	68.7
Advertising	$ 304.1	24.7	25.5	26.5	27.1	28.7	34.2	34.2	34.3	34.3	34.4
Other Revenue	$ 1,217.3	147.9	109.3	81.6	117.7	144.4	222.0	124.6	88.5	72.8	108.5
Subtotal, Operating & Other Revenue	$ 6,151.5	$ 538.0	$ 519.0	$ 512.9	$ 570.8	$ 615.9	$ 735.3	$ 650.6	$ 641.7	$ 649.5	$ 717.8
CAPITAL & DEBT FINANCING RESOURCES											
Grant Receipts	$ 17,380.1	1,799.2	1,827.7	2,246.2	1,655.8	1,581.5	1,483.6	1,863.7	1,878.3	1,681.7	1,362.4
Bond Proceeds and TIFIA	$ 7,834.1	759.1	1,504.5	855.6	684.9	504.6	1,022.0	971.6	792.0	613.7	126.0
Prior Year Carryover	$ 480.7	322.1	221.7	197.8	87.8	17.3	(42.3)	(75.0)	(77.7)	(147.6)	(23.4)
Subtotal, Capital & Debt Financing Resources	$ 25,694.9	$ 2,880.4	$ 3,553.9	$ 3,299.6	$ 2,428.5	$ 2,103.4	$ 2,463.4	$ 2,760.4	$ 2,592.5	$ 2,147.8	$ 1,465.0
TOTAL REVENUES	$ 71,070.4	$ 6,765.1	$ 7,492.5	$ 7,372.7	$ 6,690.3	$ 6,542.7	$ 7,164.8	$ 7,527.9	$ 7,508.7	$ 7,227.9	$ 6,777.9

Revenues by Major Category
Comparison: SRFF vs. Pillar Projects Financial Forecast

($ in millions)	TOTAL (FY19-FY28)	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
SALES TAX, TDA, STA REVENUES											
Proposition A	$ -	-	-	-	-	-	-	-	-	-	-
Proposition C	$ -	-	-	-	-	-	-	-	-	-	-
Measure R	$ -	-	-	-	-	-	-	-	-	-	-
Measure M	$ -	-	-	-	-	-	-	-	-	-	-
Transportation Development Act(TDA)	$ -	-	-	-	-	-	-	-	-	-	-
State Transit Assistance (STA)	$ -	-	-	-	-	-	-	-	-	-	-
Subtotal, Sales Tax, TDA, STA Revenues	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
OPERATING & OTHER REVENUE	$ -	-	-	-	-	-	-	-	-	-	-
Passenger Fares	$ 11.7	(1.4)	(9.4)	(2.2)	(5.3)	-	(2.9)	(1.0)	(0.6)	(2.4)	36.9
ExpressLanes Tolls	$ -	-	-	-	-	-	-	-	-	-	-
Advertising	$ -	-	-	-	-	-	-	-	-	-	-
Other Revenue[1]	$ 544.3	$ 7.8	$ (7.1)	$ 8.0	$ 10.7	$ 12.9	$ 15.3	$ 401.2	$ 86.6	$ 23.3	$ (14.2)
Subtotal, Operating & Other Revenue	$ 556.0	$ 6.4	$ (16.4)	$ 5.7	$ 5.3	$ 12.9	$ 12.4	$ 400.2	$ 85.9	$ 20.9	$ 22.7
CAPITAL & DEBT FINANCING RESOURCES	$ -	-	-	-	-	-	-	-	-	-	-
Grant Receipts	$ 4,104.2	62.7	21.0	(85.1)	190.2	370.0	433.9	187.4	304.9	1,377.3	1,241.9
Bond Proceeds and TIFIA	$ 7,861.2	(252.9)	509.0	278.8	429.1	432.3	833.4	1,204.2	2,060.5	1,678.9	687.8
Prior Year Carryover	$ (219.7)	124.4	(558.6)	157.9	139.6	135.3	31.7	(127.6)	(645.3)	230.6	292.4
Subtotal, Capital & Debt Financing Resources	$ 11,745.7	$ (65.8)	$ (28.6)	$ 351.5	$ 758.9	$ 937.7	$ 1,299.0	$ 1,264.0	$ 1,720.1	$ 3,286.9	$ 2,222.1
Required New Revenue	$ 3,562.6	$ -	$ -	$ 157.3	$ 415.7	$ 394.3	$ 279.4	$ 393.3	$ 755.3	$ 1,048.6	$ 118.8
TOTAL REVENUES	$ 15,864.4	$ (59.4)	$ (45.0)	$ 514.5	$ 1,179.9	$ 1,344.9	$ 1,590.9	$ 2,057.4	$ 2,561.3	$ 4,356.4	$ 2,363.5

Notes:

1. Includes 3% Local Agency Contributions.

Expenditures by Major Category
Pillar Projects Financial Forecast

($ in millions)	TOTAL (FY19-FY28)	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
METRO OPERATIONS											
Bus	$ 14,225.2	1,225.3	1,263.5	1,325.9	1,400.2	1,429.8	1,459.4	1,487.5	1,515.1	1,544.3	1,574.1
Rail	$ 8,011.9	568.5	559.5	666.5	692.6	728.6	802.9	848.6	889.4	976.2	1,279.2
Regional Rail	$ 850.2	78.0	74.6	78.7	81.4	84.7	86.7	88.6	90.6	92.5	94.4
Subtotal-Metro Operations	$ 23,087.3	$ 1,871.9	$ 1,897.6	$ 2,071.1	$ 2,174.2	$ 2,243.0	$ 2,349.0	$ 2,424.8	$ 2,495.1	$ 2,613.0	$ 2,947.7
METRO CAPITAL											
Bus Capital	$ 3,429.0	217.6	387.2	368.9	253.4	223.7	324.1	476.9	344.1	461.5	371.7
Rail Capital	$ 31,766.5	2,127.6	2,615.7	2,633.0	2,750.6	2,605.0	2,954.0	3,431.0	4,188.2	5,606.1	2,855.3
Regional Rail	$ 435.9	18.3	26.1	90.0	30.2	31.3	40.6	43.6	47.0	52.6	56.2
Highway	$ 5,849.3	499.9	521.9	619.1	541.1	650.3	907.8	887.5	630.1	346.7	245.0
Subtotal-Metro Capital	$ 41,480.7	$ 2,863.3	$ 3,550.9	$ 3,711.0	$ 3,575.3	$ 3,510.3	$ 4,226.4	$ 4,838.9	$ 5,209.5	$ 6,466.8	$ 3,528.2
SUBSIDY FUNDING PROGRAMS											
Bus Operations	$ 6,318.5	541.9	570.1	588.8	605.1	622.6	640.6	658.8	677.9	696.8	715.8
Bus Capital	$ 1,253.6	111.7	132.7	132.0	136.6	117.5	122.1	121.5	125.7	124.7	129.0
Rail Capital	$ 160.0	12.2	14.8	18.8	27.5	15.7	9.8	12.5	10.2	10.3	28.2
Highway	$ 3,455.6	340.0	356.5	377.8	332.1	332.8	340.3	342.3	320.0	334.6	379.3
Call for Projects	$ 713.6	74.5	90.1	98.6	103.7	71.4	108.1	107.2	20.0	20.0	20.0
Subtotal-Subsidy Funding Programs	$ 11,901.3	$ 1,080.4	$ 1,164.1	$ 1,215.9	$ 1,205.0	$ 1,160.1	$ 1,220.9	$ 1,242.3	$ 1,153.8	$ 1,186.5	$ 1,272.3
AGENCY WIDE											
Administration	$ 1,486.3	231.1	124.5	119.5	129.5	127.6	142.0	146.3	150.7	155.1	159.8
Capital	$ 474.1	97.0	54.1	37.7	22.7	26.3	25.2	45.2	45.2	75.2	45.2
Subtotal-Agency Wide	$ 1,960.4	$ 328.2	$ 178.6	$ 157.3	$ 152.3	$ 153.8	$ 167.2	$ 191.6	$ 196.0	$ 230.4	$ 205.0
OTHER PROGRAMS/EXPENDITURE											
Congestion Management	$ 732.8	90.4	67.4	68.3	69.4	70.4	71.4	72.4	73.4	74.4	75.4
Other	$ 55.7	2.8	-	3.6	3.7	5.1	6.3	7.4	8.0	7.9	10.9
Debt Service	$ 7,716.6	468.7	588.9	659.9	690.4	744.9	714.3	808.0	934.2	1,005.3	1,101.9
Subtotal-Other Programs/Expenditure	$ 8,505.2	561.9	656.3	731.9	763.5	820.4	792.0	887.8	1,015.6	1,087.6	1,188.2
TOTAL EXPENDITURES	$ 86,934.8	$ 6,705.7	$ 7,447.5	$ 7,887.2	$ 7,870.3	$ 7,887.5	$ 8,755.6	$ 9,585.4	$ 10,070.0	$ 11,584.3	$ 9,141.4

Expenditures by Major Category
Short Range Financial Forecast

($ in millions)	TOTAL (FY19-FY28)		2019		2020		2021		2022		2023		2024		2025		2026		2027		2028
METRO OPERATIONS																					
Bus	$	14,225.2	1,225.3		1,263.5		1,325.9		1,400.2		1,429.8		1,459.4		1,487.5		1,515.1		1,544.3		1,574.1
Rail	$	7,967.1	568.5		631.8		683.6		733.4		728.6		816.0		855.7		892.2		991.6		1,065.9
Regional Rail	$	846.1	78.0		73.7		77.8		81.1		84.3		86.4		88.3		90.2		92.1		94.1
Subtotal, Metro Operations	$	23,038.4	$	1,871.9	$	1,969.0	$	2,087.4	$	2,214.6	$	2,242.7	$	2,361.7	$	2,431.4	$	2,497.5	$	2,628.1	$ 2,734.0
METRO CAPITAL																					
Bus Capital	$	3,431.4	217.8		387.4		369.1		253.5		223.8		324.1		476.9		344.1		461.5		373.1
Rail Capital	$	17,736.0	2,198.0		2,703.7		2,238.1		1,654.0		1,528.1		1,665.5		1,579.3		1,883.8		1,412.0		873.5
Regional Rail	$	435.9	18.3		26.1		90.0		30.2		31.3		40.6		43.6		47.0		52.6		56.2
Highway	$	5,325.2	494.4		469.5		573.0		529.4		496.9		725.0		852.2		541.2		366.2		277.5
Subtotal, Metro Capital	$	26,928.5	$	2,928.6	$	3,586.6	$	3,270.3	$	2,467.1	$	2,280.1	$	2,755.2	$	2,952.0	$	2,816.0	$	2,292.2	$ 1,580.3
SUBSIDY FUNDING PROGRAMS																					
Bus Operations	$	6,301.5	541.9		567.0		585.7		603.6		621.0		639.0		657.3		676.4		695.3		714.3
Bus Capital	$	1,253.6	111.7		132.7		132.0		136.6		117.5		122.1		121.5		125.7		124.7		129.0
Rail Capital	$	170.9	13.6		16.0		20.1		27.8		17.2		9.8		11.5		10.3		10.5		34.1
Highway	$	3,388.6	331.5		299.5		338.9		329.9		333.5		340.3		342.2		320.0		334.5		418.2
Call for Projects	$	452.9	79.1		82.7		71.3		46.7		20.7		51.5		40.9		20.0		20.0		20.0
Subtotal, Subsidy Funding Programs	$	11,567.6	$	1,077.8	$	1,097.8	$	1,147.9	$	1,144.7	$	1,109.9	$	1,162.8	$	1,173.5	$	1,152.4	$	1,185.1	$ 1,315.6
AGENCY WIDE																					
Administration	$	1,486.5	231.1		124.5		119.7		129.5		127.6		142.0		146.3		150.7		155.1		159.8
Capital	$	386.1	97.0		41.1		24.7		9.7		13.3		12.2		32.2		40.2		70.2		45.2
Subtotal, Agency-wide	$	1,872.6	$	328.2	$	165.6	$	144.5	$	139.3	$	140.8	$	154.2	$	178.6	$	191.0	$	225.4	$ 205.0
OTHER PROGRAMS/EXPENDITURE																					
Congestion Management	$	732.8	90.4		67.4		68.3		69.4		70.4		71.4		72.4		73.4		74.4		75.4
Other	$	19.7	2.8		-		0.8		0.1		0.6		1.3		2.4		3.0		2.9		5.9
Debt Service	$	6,910.9	465.4		606.0		653.5		655.1		698.2		658.1		717.6		775.4		819.8		861.7
Subtotal-Other Programs/Expenditure	$	-																			
TOTAL EXPENDITURES	$	71,070.4	$	6,765.1	$	7,492.5	$	7,372.7	$	6,690.3	$	6,542.7	$	7,164.8	$	7,527.9	$	7,508.7	$	7,227.9	$ 6,777.9

Expenditures by Major Category
Comparison: SRFF vs. Pillar Projects Financial Forecast

($ in millions)	TOTAL (FY19-FY28)	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
METRO OPERATIONS	$ -	-	-	-	-	-	-	-	-	-	-
Bus	$ -	-	-	-	-	-	-	-	-	-	-
Rail	$ 44.8	-	(72.3)	(17.2)	(40.8)	-	(13.0)	(7.0)	(2.8)	(15.4)	213.3
Regional Rail	$ 4.1	-	0.9	0.9	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Subtotal-Metro Operations	$ 48.9	$ -	$ (71.4)	$ (16.3)	$ (40.4)	$ 0.3	$ (12.7)	$ (6.7)	$ (2.5)	$ (15.1)	$ 213.6
METRO CAPITAL	$ -	-	-	-	-	-	-	-	-	-	-
Bus Capital	$ (2.3)	(0.2)	(0.2)	(0.2)	(0.1)	(0.1)	(0.0)	(0.1)	0.0	0.0	(1.4)
Rail Capital	$ 14,030.5	(70.4)	(88.0)	394.8	1,096.6	1,076.9	1,288.5	1,851.7	2,304.5	4,194.1	1,981.9
Regional Rail	$ -	-	-	-	-	-	-	-	-	-	-
Highway	$ 524.1	5.4	52.5	46.1	11.7	153.4	182.7	35.3	88.9	(19.5)	(32.5)
Subtotal-Metro Capital	$ 14,552.2	$ (65.2)	$ (35.7)	$ 440.7	$ 1,108.2	$ 1,230.2	$ 1,471.2	$ 1,886.9	$ 2,393.5	$ 4,174.6	$ 1,948.0
SUBSIDY FUNDING PROGRAMS	$ -	-	-	-	-	-	-	-	-	-	-
Bus Operations	$ 17.0	-	3.1	3.1	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Bus Capital	$ -	-	-	-	-	-	-	-	-	-	-
Rail Capital	$ (10.9)	(1.4)	(1.2)	(1.3)	(0.4)	(1.4)	0.0	0.9	(0.1)	(0.2)	(5.9)
Highway	$ 67.0	8.5	57.0	38.9	2.2	(0.7)	(0.0)	0.0	0.0	0.1	(38.9)
Call for Projects	$ 260.7	(4.6)	7.4	27.3	56.9	50.7	56.6	66.3	-	-	-
Subtotal-Subsidy Funding Programs	$ 333.7	$ 2.5	$ 66.2	$ 68.0	$ 60.3	$ 50.1	$ 58.2	$ 68.8	$ 1.4	$ 1.4	$ (43.3)
AGENCY WIDE	$ -	-	-	-	-	-	-	-	-	-	-
Administration	$ (0.2)	-	-	(0.2)	-	-	-	-	-	-	-
Capital	$ 88.0	-	13.0	13.0	13.0	13.0	13.0	13.0	5.0	5.0	-
Subtotal-Agency Wide	$ 87.8	$ -	$ 13.0	$ 12.8	$ 13.0	$ 13.0	$ 13.0	$ 13.0	$ 5.0	$ 5.0	$ -
OTHER PROGRAMS/EXPENDITURE	$ -	-	-	-	-	-	-	-	-	-	-
Congestion Management	$ -	-	-	-	-	-	-	-	-	-	-
Other	$ 36.0	-	-	2.9	3.6	4.5	5.0	5.0	5.0	5.0	5.0
Debt Service	$ 805.8	3.3	(17.2)	6.4	35.3	46.8	56.2	90.4	158.8	185.5	240.2
Subtotal-Other Programs/Expenditure	$ 8,505.2	561.9	656.3	731.9	763.5	820.4	792.0	887.8	1,015.6	1,087.6	1,188.2
TOTAL EXPENDITURES	$ 15,864.4	$ (59.4)	$ (45.0)	$ 514.5	$ 1,179.9	$ 1,344.9	$ 1,590.9	$ 2,057.4	$ 2,561.3	$ 4,356.4	$ 2,363.5

Expenditures by Major Category
Pillar Projects Financial Forecast

($ in millions)	TOTAL (FY19-FY28)		TOTAL (FY29-FY38)	2029		2030		2031		2032		2033		2034		2035		2036		2037		2038
METRO OPERATIONS																						
Bus	$	14,225.2	17,797.1	1,630.8		1,662.2		1,694.2		1,726.9		1,760.2		1,794.1		1,828.6		1,863.9		1,899.8		1,936.4
Rail	$	8,011.9	15,130.2	1,397.8		1,423.7		1,444.0		1,504.5		1,497.9		1,525.6		1,553.8		1,566.6		1,593.4		1,622.9
Regional Rail	$	850.2	1,068.3	96.4		98.6		100.8		103.1		105.4		107.8		110.3		112.8		115.3		117.9
Subtotal-Metro Operations	$	23,087.3	$ 33,995.6	$ 3,125.0	$	3,184.4	$	3,239.0	$	3,334.5	$	3,363.5	$	3,427.5	$	3,492.8	$	3,543.2	$	3,608.5	$	3,677.2
METRO CAPITAL																						
Bus Capital	$	3,429.0	2,761.4	431.9		352.5		219.9		234.4		180.3		317.3		87.4		134.9		272.8		530.0
Rail Capital	$	31,766.5	5,873.2	406.3		362.7		371.4		537.4		617.5		650.0		918.1		489.7		940.1		580.0
Regional Rail	$	435.9	829.2	60.3		65.8		70.2		75.2		80.4		85.7		91.1		95.9		100.1		104.6
Highway	$	5,849.3	5,033.6	283.2		399.8		612.8		460.2		375.8		568.2		604.3		730.5		521.5		477.2
Subtotal-Metro Capital	$	41,480.7	$ 14,497.4	$ 1,181.6	$	1,180.8	$	1,274.3	$	1,307.2	$	1,254.0	$	1,621.2	$	1,700.9	$	1,451.1	$	1,834.4	$	1,691.7
SUBSIDY FUNDING PROGRAMS																						
Bus Operations	$	6,318.5	8,436.2	736.3		758.2		780.7		804.8		829.5		854.9		880.8		906.0		930.0		955.0
Bus Capital	$	1,253.6	1,439.1	128.0		155.3		155.1		160.1		134.8		139.1		138.3		142.6		141.9		143.9
Rail Capital	$	160.0	386.2	31.3		33.0		36.3		34.5		38.3		41.6		39.9		40.7		46.1		44.5
Highway	$	3,455.6	4,163.7	405.9		413.0		405.6		447.6		408.1		430.1		373.8		433.8		417.7		427.9
Call for Projects	$	713.6	295.4	-		-		-		-		25.0		50.0		50.0		50.0		61.9		58.4
Subtotal-Subsidy Funding Programs	$	11,901.3	$ 14,720.6	$ 1,301.6	$	1,359.6	$	1,377.7	$	1,447.1	$	1,435.6	$	1,515.7	$	1,482.8	$	1,573.2	$	1,597.7	$	1,629.7
AGENCY WIDE																						
Administration	$	1,486.3	1,968.6	164.8		172.6		183.1		189.1		195.2		201.6		208.0		209.0		219.6		225.5
Capital	$	474.1	1,119.9	75.2		47.7		102.7		127.7		127.7		127.7		127.7		127.7		127.7		127.7
Subtotal-Agency Wide	$	1,960.4	$ 3,088.4	$ 240.0	$	220.4	$	285.9	$	316.8	$	323.0	$	329.3	$	335.7	$	336.8	$	347.4	$	353.3
OTHER PROGRAMS/EXPENDITURE																						
Congestion Management	$	732.8	815.9	76.5		77.5		78.6		79.8		80.9		82.1		83.3		84.5		85.7		87.0
Other	$	55.7	109.9	11.6		12.2		12.1		13.3		13.5		13.7		13.5		7.9		5.7		6.5
Debt Service	$	7,716.6	13,994.6	1,146.6		1,207.3		1,249.9		1,272.4		1,304.4		1,497.8		1,680.3		1,585.0		1,554.1		1,496.7
Subtotal-Other Programs/Expenditure	$	8,505.2	$ 14,920.4	$ 1,234.6	$	1,297.1	$	1,340.7	$	1,365.4	$	1,398.8	$	1,593.6	$	1,777.1	$	1,677.4	$	1,645.5	$	1,590.2
TOTAL EXPENDITURES	$	86,934.8	$ 81,222.4	$ 7,082.9	$	7,242.3	$	7,517.5	$	7,771.0	$	7,774.9	$	8,487.3	$	8,789.3	$	8,581.8	$	9,033.5	$	8,942.1

Expenditures by Major Category
Short Range Financial Forecast

	TOTAL (FY19-FY28)	TOTAL (FY29-FY38)	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
METRO OPERATIONS												
Bus	$ 14,225.2	17,797.1	1,630.8	1,662.2	1,694.2	1,726.9	1,760.2	1,794.1	1,828.6	1,863.9	1,899.8	1,936.4
Rail	$ 7,967.1	12,388.0	1,067.7	1,115.0	1,125.1	1,179.7	1,167.1	1,188.7	1,328.4	1,314.0	1,377.0	1,525.4
Regional Rail	$ 846.1	1,065.0	96.1	98.2	100.4	102.7	105.1	107.5	109.9	112.4	115.0	117.6
Subtotal, Metro Operations	$ 23,038.4	$ 31,250.0	$ 2,794.5	$ 2,875.4	$ 2,919.7	$ 3,009.3	$ 3,032.3	$ 3,090.2	$ 3,267.0	$ 3,290.3	$ 3,391.8	$ 3,579.3
METRO CAPITAL		-										
Bus Capital	$ 3,431.4	2,640.8	333.3	323.7	221.2	235.8	181.8	317.9	88.0	135.6	273.5	529.8
Rail Capital	$ 17,736.0	18,572.4	1,135.1	1,185.1	1,279.7	1,621.2	2,259.5	2,992.0	2,721.7	2,169.4	1,926.6	1,281.9
Regional Rail	$ 435.9	829.2	60.3	65.8	70.2	75.2	80.4	85.7	91.1	95.9	100.1	104.6
Highway	$ 5,325.2	4,925.6	282.9	367.9	561.0	388.3	390.8	537.0	773.5	733.9	490.8	399.4
Subtotal, Metro Capital	$ 26,928.5	$ 26,968.0	$ 1,811.7	$ 1,942.5	$ 2,132.2	$ 2,320.6	$ 2,912.5	$ 3,932.6	$ 3,674.3	$ 3,134.8	$ 2,791.0	$ 2,315.7
SUBSIDY FUNDING PROGRAMS												
Bus Operations	$ 6,301.5	8,420.8	734.7	756.7	779.2	803.3	827.9	853.3	879.3	904.5	928.5	953.5
Bus Capital	$ 1,253.6	1,439.1	128.0	155.3	155.1	160.1	134.8	139.1	138.3	142.6	141.9	143.9
Rail Capital	$ 170.9	389.2	33.6	34.6	37.1	36.7	37.8	40.4	40.1	41.3	44.0	43.8
Highway	$ 3,841.5	4,406.1	405.7	412.8	405.3	447.4	445.7	468.9	413.7	474.9	460.1	471.5
Call for Projects	$ -	-	-	-	-	-	-	25.0	50.0	50.0	61.9	58.4
Subtotal, Subsidy Funding Programs	$ 11,567.6	$ 14,655.2	$ 1,302.0	$ 1,359.3	$ 1,376.7	$ 1,447.5	$ 1,471.2	$ 1,551.7	$ 1,521.3	$ 1,613.3	$ 1,636.4	$ 1,671.1
AGENCY WIDE		-										
Administration	$ 1,486.5	1,968.6	164.8	172.6	183.1	189.1	195.2	201.6	208.0	209.0	219.6	225.5
Capital	$ 386.1	909.9	75.2	47.7	102.7	97.7	97.7	97.7	97.7	97.7	97.7	97.7
Subtotal, Agency-wide	$ 1,872.6	$ 2,878.4	$ 240.0	$ 220.4	$ 285.9	$ 286.8	$ 293.0	$ 299.3	$ 305.7	$ 306.8	$ 317.4	$ 323.3
OTHER PROGRAMS/EXPENDITURE												
Congestion Management	$ 732.8	815.9	76.5	77.5	78.6	79.8	80.9	82.1	83.3	84.5	85.7	87.0
Other	$ 19.7	74.9	6.6	7.2	7.1	8.3	8.5	8.7	8.5	7.9	5.7	6.5
Debt Service	$ 6,910.9	10,901.7	870.2	912.3	961.7	990.3	1,061.7	1,118.6	1,156.6	1,292.6	1,286.7	1,250.9
Subtotal-Other Programs/Expenditure	$ 7,663.4	$ 11,792.5	$ 953.2	$ 997.0	$ 1,047.5	$ 1,078.4	$ 1,151.2	$ 1,209.4	$ 1,248.4	$ 1,385.1	$ 1,378.1	$ 1,344.3
TOTAL EXPENDITURES	$ 71,070.4	$ 87,544.1	$ 7,101.5	$ 7,394.6	$ 7,762.0	$ 8,142.6	$ 8,860.2	$ 10,083.2	$ 10,016.8	$ 9,730.3	$ 9,514.6	$ 9,233.7

Expenditures by Major Category
20 Year Comparison: SRFF vs. Pillar Projects Financial Forecast

($ in millions)	TOTAL (FY19-FY28)	TOTAL (FY29-FY38)	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
METRO OPERATIONS	$	-	-	-	-	-	-	-	-	-	-	-
Bus	$ -	-	-	-	-	-	-	-	-	-	-	-
Rail	$ 44.8	2,742.2	330.1	308.7	318.9	324.8	330.8	336.9	225.4	252.6	216.4	97.5
Regional Rail	$ 4.1	3.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Subtotal-Metro Operations	$ 48.9	$ 2,745.6	$ 330.5	$ 309.0	$ 319.2	$ 325.1	$ 331.2	$ 337.3	$ 225.8	$ 252.9	$ 216.7	$ 97.9
METRO CAPITAL	$ -	-	-	-	-	-	-	-	-	-	-	-
Bus Capital	$ (2.3)	120.7	98.5	28.8	(1.3)	(1.4)	(1.5)	(0.5)	(0.6)	(0.7)	(0.8)	0.2
Rail Capital	$ 14,030.5	(12,699.2)	(728.8)	(822.4)	(908.3)	(1,083.9)	(1,642.0)	(2,342.0)	(1,803.6)	(1,679.7)	(986.5)	(701.9)
Regional Rail	$ -	-	-	-	-	-	-	-	-	-	-	-
Highway	$ 524.1	108.0	0.2	32.0	51.7	71.9	(15.0)	31.2	(169.2)	(3.3)	30.7	77.7
Subtotal-Metro Capital	$ 14,552.2	$ (12,470.5)	$ (630.1)	$ (761.7)	$ (857.9)	$ (1,013.4)	$ (1,658.5)	$ (2,311.3)	$ (1,973.4)	$ (1,683.8)	$ (956.6)	$ (624.0)
SUBSIDY FUNDING PROGRAMS	$ -	-	-	-	-	-	-	-	-	-	-	-
Bus Operations	$ 17.0	15.4	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Bus Capital	$ -	-	-	-	-	-	-	-	-	-	-	-
Rail Capital	$ (10.9)	(3.0)	(2.2)	(1.5)	(0.8)	(2.2)	0.5	1.2	(0.2)	(0.6)	2.1	0.7
Highway	$ (385.9)	(242.4)	0.2	0.2	0.2	0.2	(37.6)	(38.7)	(39.9)	(41.1)	(42.3)	(43.6)
Call for Projects	$ 713.6	295.4	-	-	-	-	-	-	-	-	-	-
Subtotal-Subsidy Funding Programs	$ 333.7	$ 65.4	$ (0.5)	$ 0.2	$ 0.9	$ (0.4)	$ (35.6)	$ (36.0)	$ (38.5)	$ (40.1)	$ (38.7)	$ (41.4)
AGENCY WIDE	$ -	-	-	-	-	-	-	-	-	-	-	-
Administration	$ (0.2)	-	-	-	-	-	-	-	-	-	-	-
Capital	$ 88.0	210.0	-	-	-	30.0	30.0	30.0	30.0	30.0	30.0	30.0
Subtotal-Agency Wide	$ 87.8	$ 210.0	$ -	$ -	$ -	$ 30.0	$ 30.0	$ 30.0	$ 30.0	$ 30.0	$ 30.0	$ 30.0
OTHER PROGRAMS/EXPENDITURE	$ -	-	-	-	-	-	-	-	-	-	-	-
Congestion Management	$ -	-	-	-	-	-	-	-	-	-	-	-
Other	$ 36.0	35.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	-	-	-
Debt Service	$ 805.8	3,092.8	276.4	295.0	288.2	282.0	242.6	379.2	523.7	292.4	267.5	245.9
Subtotal-Other Programs/Expenditure	$ 841.8	$ 3,127.8	$ 281.4	$ 300.0	$ 293.2	$ 287.0	$ 247.6	$ 384.2	$ 528.7	$ 292.4	$ 267.5	$ 245.9
TOTAL EXPENDITURES	15,864.4	$ (6,321.7)	$ (18.6)	$ (152.4)	$ (244.5)	$ (371.6)	$ (1,085.3)	$ (1,595.9)	$ (1,227.5)	$ (1,148.6)	$ (481.1)	$ (291.6)

CONSTRUCTABILITY ANALYSIS - PROJECT INFORMATION

Project	Scope	P3 Status	Schedules	Cost Estimate	Major Risks	Acceleration strategies
Eastside Extension	1) SR 60 LRT Alternative: SR 60 would extend the existing Metro Gold Line Eastside Extension from the Atlantic/Pomona Station, approximately 6.9 miles to Peck Rd. in the City of South El Monte. 2) Washington LRT Alternative: Washington Alternative extends the existing Metro Gold Line Eastside Extension from the Atlantic/Pomona Station, approximately 9.5 miles to Lambert Rd. in the City of Whittier. 3) Combined Alternative: The Combined Alternative is the full build out of both the SR 60 and Washington Alternatives.	P3 not being considered for this project	Planning/Environmental Complete: 2023 Preliminary Engineering Complete: 2024 Construction Substantial Completion: 2029-2030 Anticipated Revenue Operation Date (One Alignment): 2029-2031	1) SR 60 LRT Alternative: The capital cost in 2015 dollars is estimated at $3B billion. 2) Washington LRT Alternative: The capital cost in 2015 dollars is estimated at $3B	1) Increase in labor and material costs due to market forces 2) Coordination with multiple cooperating agencies including FTA, Environmental Protection Agency, US Army Core of Engineer, and Caltrans 3) Define and analyze tunneling methods, portals, and construction staging areas 4) Third Party Permits and Approvals	1) Advance PE to begin shortly after the LPA 2) Advance utility design to procure and perform advanced utility relocation
Green Line Extension	The Green Line Extension to Torrance Supplemental Alternatives Analysis (AA) encompasses a 4.6-mile-long study area presumed to be LRT. It extends from the existing Redondo Beach Marine Station toward the Torrance Regional Transit Center (RTC) using the Metro owned Harbor Subdivision Railroad Corridor.	P3 not being considered for this project	Planning/Environmental Complete: 2022 Preliminary Engineering Complete: 2023 Construction Substantial Completion: 2028-2029 Anticipated Revenue Operation Date: 2028-2030	Project Cost in 2015 dollars $893M to $1.2Billion	1) Increase in labor and material costs due to market forces 2) Coordination with BNSF on Metro ROW 3) Adjacent communities are not supportive of the Metro ROW alignment 4) Pressure to study underground alternatives 5) Third Party Permits and Approvals	1) Shorten the environmental phase by clearing via CEQA process only as opposed to both CEQA & NEPA 2) Advance PE shortly after the LPA 3) Advance utility design to procure and perform advanced utility relocation 4) Advance railroad track design to procure and perform advanced track relocation
West Santa Ana Branch	The West Santa Ana Branch Project (WSAB) is identified in Measure M as a proposed 20-mile Light Rail Transit (LRT) line with 12 planned stations that would connect the cities of southeast Los Angeles County (LA County) to downtown Los Angeles and the Metro rail network.	Currently in the Risk Assessment phase which is step 5 of the 10 step P3 development process.	Planning/Environmental Complete: 2021 Preliminary Engineering Complete: N/A Construction Substantial Completion: 2027-2029 Anticipated Revenue Operation Date: 2028-2030	The current updated end-to-end project capital cost for the two alternatives (Alternatives E & G) is estimated at $6.5 to $6.6B (in 2018 dollars). Does not reflect potential costs for First Last Mile and UPRR ROW costs.	1) Increase labor and material costs due to market forces 2) Negotiations with UPRR and relocation of active freight tracks 3) Lack of availability of utility resources to relocate utilities. 4) Third Party Permits and Approvals	1) Shorten the environmental phase by coordinating with cooperating partners to reduce multiple review cycles 2) Advance utility design to procure and perform advanced utility relocation 3) Advance railroad track design to procure and perform advanced track relocation 4) Shorten alignment to viable MOS
Sepulveda Pass Transit	Metro is conducting a Feasibility Study to identify and evaluate a range of high-capacity rail transit alternatives between the San Fernando Valley and LAX. For Valley-Westside phase, concepts run between the Metrolink Van Nuys Station and the Expo Line. There are three heavy rail concepts and one monorail/rubber tire concept.	The Project has been identified as a potential P3, step 1 in the P3 development Process, and a Market Sounding has been conducted to assess bidder interest in a PDA contract to develop the project.	Planning/Environmental Complete: 2024 Preliminary Engineering Complete: 2024 Construction Substantial Completion: 2033-2034 Anticipated Revenue Operation Date: 2033-2035	The Sepulveda Transit Corridor is part of the Measure M expenditure plan, with approximately $5.7 billion allocated for the Valley-Westside portion of the project.	1) Increase in labor and material costs due to market forces 2) Constructing an alignment in proximity to water infrastructure on Sepulveda Boulevard or Van Nuys Boulevard. 3) Constructing an alignment through environmentally sensitive areas in the Santa Monica Mountains. 4) Identifying location for maintenance and storage facility site. 5) Third Party Permits and Approvals	1) Advance PE to overlap with Environmental phase 2) Procure several TBMs to shorten tunneling duration

Twenty-Eight by '28 Financial Forecast and Constructability Analysis

July 18, 2019

Metro®

Overview

- Motion 32.4 (Feb 2019) directs staff to prepare a financial forecast and constructability analysis:
  - prioritize 4 "pillar projects"
  - new public and private financing
  - P3 efficiencies

Financial Forecast Results – Capital Costs

Estimated Accelerated Capital Cost and Available Funding "Pillar Projects" ($ in millions)				
Pillar Projects	Total Capital Cost	Metro Local Funding	State and Federal Funding	Funding Surplus/ (Shortfall)
Gold Line Eastside Extension Phase 2	$3,637.7	$2,179.8	$385.7	$(1,072.2)
Green Line Extension to Torrance	1,086.0	854.7	231.3	-
Sepulveda Transit Corridor	8,572.6	3,448.6	3,748.1	(1,376.0)
West Santa Ana Branch to Downtown LA	5,565.6	2,513.4	2,155.5	(896.7)
TOTAL	$18,862.0	$8,996.5	$6,520.7	$(3,344.8)

Metro

- Opening of pillar projects in FY 2028:
  - higher operating costs of $300 million per year
  - estimated shortfall of $1.2 billion over next 10 years (FY 2029 to FY 2038)
- Funding for operations limited by each ordinance
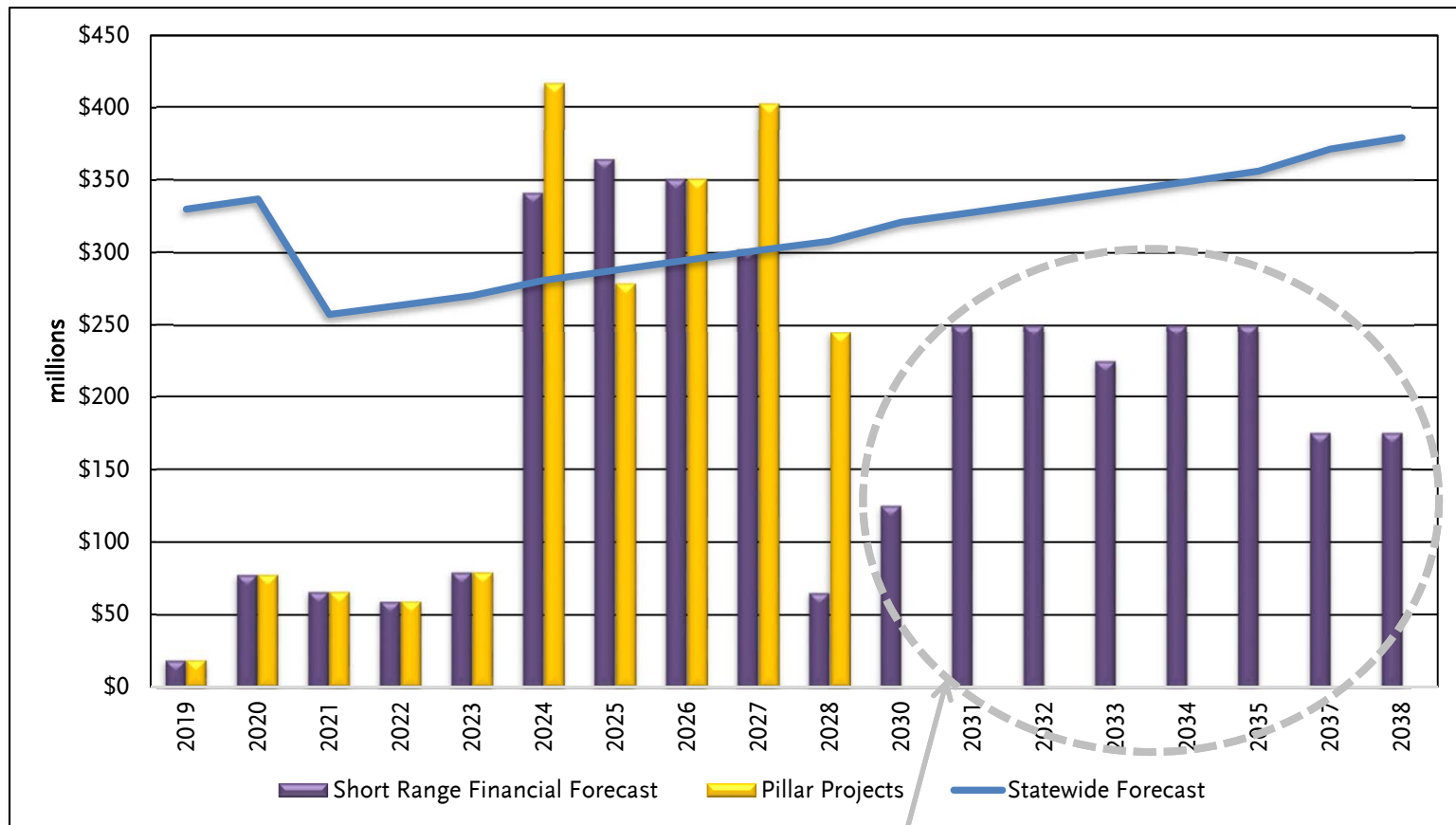
Increased Debt Financing

- The amount of debt financing is $10.0 billion greater
- This occurs because:
  - Metro receives a limited amount of sales tax each year
  - Planned new federal grants payout a limited amount each year
- Subordinate debt would be required

Operations and Debt Service Comparison

- Operations and debt service costs are $5.8 billion higher over 10 years (FY29-FY38) under Pillar Projects Financial Forecast

Legend: ■ Short Range Financial Forecast ■ Pillar Projects
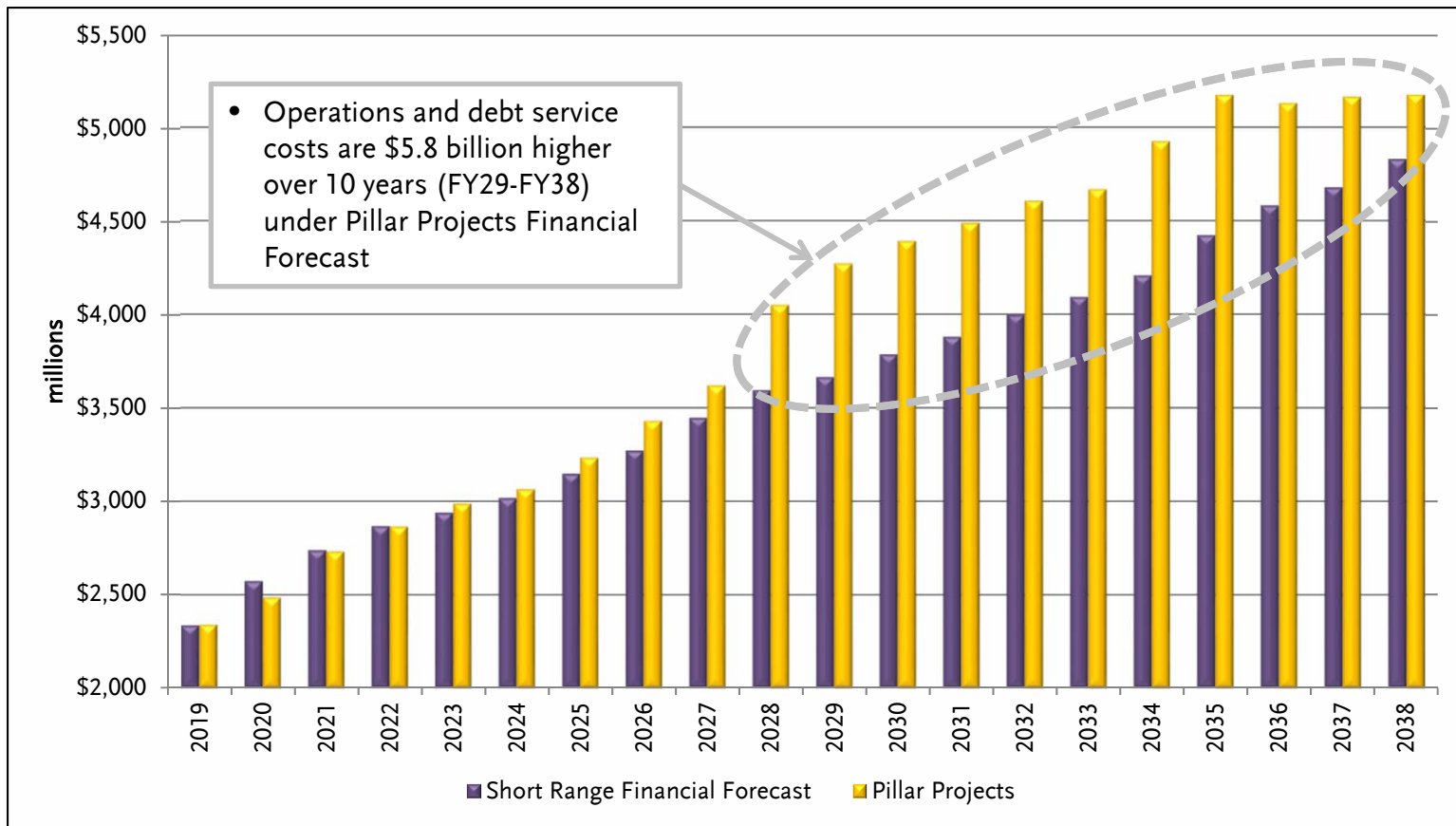
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Constructability Analysis

- Environmental and engineering work must be accelerated

- Construction must begin by 2023

- Faster regulatory review and approval is key

- Current market conditions are increasing pricing

Actions That Metro Can Take

- Pursue new revenue
- Reevaluate Board policy
- Change project delivery process
- Change regulatory process

Metro

Metro

Board Report

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

File #: 2019-0504, **File Type:** Informational Report

Agenda Number: 38.

EXECUTIVE MANAGEMENT COMMITTEE
JULY 18, 2019

SUBJECT: OFFICE OF THE INSPECTOR GENERAL REPORT, "IS LA METRO READY FOR CLIMATE CHANGE?"

ACTION: RECEIVE AND FILE

RECOMMENDATION

RECEIVE AND FILE Office of the Inspector General Climate Change Report, "Is LA Metro Ready for Climate Change?"

ISSUE

- Determine the anticipated impact of climate change on the transportation industry,
- Determine what actions LA Metro has already initiated to prepare for climate change,
- Benchmark against other transit agencies climate resilient actions,
- Determine what future steps LA Metro might take to prepare for climate change,
- Make recommendations for LA Metro to better prepare for meeting the effects of global warming.

BACKGROUND

The Office of the Inspector General (OIG) conducted a review to determine actions taken by LA Metro to address the impact of climate change on transit and identify best practices. During a board meeting in January 2019, LA Metro's Board Chair stated: "I don't think LA Metro is ready for climate change." This report is to show how LA Metro is preparing for climate change and recommend additional steps LA Metro might take. Our review found that LA Metro has been taking positive steps since 2007 in preparation for climate change; however, we identified additional steps LA Metro can take to ensure the agency continues to deliver safe and reliable public transportation service to customers under future more extreme weather conditions.

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DISCUSSION

Climate change is occurring globally with notable effects on the environment. There have been more frequent and erratic weather variations such as extreme high temperatures, strong storms, heavy rainfall, flooding of rivers and the coastline, and sustained drought. Global warming, one symptom of climate change, refers to rising temperatures caused by increased concentrations of GHG in the atmosphere. Climate scientists from 185 countries, with thousands of pages of research, recognize the adverse impact of climate change and have committed to working together to reduce atmospheric CO_2. Erratic rainfall and sea level rise are other symptoms of climate change. Sea level rise is from two factors related to global warming: the added water from melting ice glaciers and the expansion of seawater as it warms. In the last century the California coast line has risen 7 inches and is expected to rise an additional 10 to 18 inches by 2050 because of global warming.

This review was conducted to determine what actions have already been done to prepare for climate change, identify climate resilient options, and determine additional actions needed to address the impacts of anticipated future conditions. To identify industry "best practices," the OIG researched other transit agencies in our nation, and around the world to determine what is being done to mitigate the impacts of climate change.

National Innovations

The OIG "bench-marked" transit agencies in two hot climate cities and found significant innovations to counter climatic changes for LA Metro's consideration.

In Las Vegas, Nevada, RTC has multiple indoor chill stations for patrons to wait for the bus out of the heat, water wagons drive the bus routes to hand out complementary water bottles to patrons, and has solar powered shade shelters with LED lighting for their passengers. In the summer, buses run with balloon tires filled with pure nitrogen to improve tire wear and provide a safer transit experience.

In Phoenix, Arizona, Valley Metro has installed an additional air conditioning condenser on the roof of its buses which increases cooling capacity by 60%. They also installed special electric engine cooling fan systems to protect engines from overheating. Their Operations and Maintenance Center is powered by solar energy. They have installed of shade canopies on light rail platforms made from fabric that blocks the sun rays. Additionally they have bus shelters with solar powered cool air ventilation system that is push button controlled by passengers. Valley Metro light rail trains employ solar reflective window tint, train bodies painted with solar reflective paint, and two over-sized AC units for redundancy are placed on each light rail vehicles, all of which enhances cooling inside the passenger compartment. Also, the agency partnered with a local refrigeration school to provide custom AC and electrical training programs unique to Valley Metro's buses and rail cars. Graduate students are then eligible for hire, thus creating community opportunities.

Global Innovations

The cities of Hong Kong, Melbourne, Singapore and London stood out as "benchmarks" for innovation.

In Hong Kong, the Mass Transit Rail (MTR) uses regenerative braking technology to convert kinetic energy produced by the breaking process into electrical energy and puts that power back into the power supply network, with use of a super-capacitor energy storage devices.

In Melbourne, Australia, Metro Trains Melbourne (MTM), monitors real-time rail track temperatures, by installing electronic monitoring sensors in its rail lines, so that control authorities know exactly when actual track temperatures reach 131°F or higher and can immediately restrict speed limits.

In London, Network Rail has installed mini weather-stations and thousands of track-side probes to monitor the local trackside conditions (on above ground tracks). When the weather is hot, Network Rail slows down the trains to mitigate the effects of extreme heat creating track displacements due to rail buckling. Network Rail uses speed restrictions at vulnerable locations.

In Singapore, Land Transport Authority (LTA) has instituted smart bus-stops. These are equipped with the Airbitat Oasis ventilation systems which have several overhead nozzles mounted on the inner roof, and draws from a reservoir of cold water which cools and purifies the air while removing harmful particles. The cool air that is pumped out through the overhead nozzles is more than 90 percent cleaner than the air that surrounds these stations.

Los Angeles County

In California, transportation accounts for nearly 40% of all greenhouse emissions. In 2018, the Governor signed an Executive Order calling for the State to slash its overall emissions to zero by 2045. He also signed Senate Bill 100 stating, "Not only is California going to slash its emission to zero but shall have 100% of total electricity retail sales in California to come from eligible renewable energy resources and zero-carbon resources by 2045."

LA Metro's Environmental Compliance and Sustainability Department (ECSD) has put together a series of reports, policy, training, and environmental management systems that complement these state environmental goals. ECSD is proactive in climate change mitigation and adaptation with "key" performance goals of reducing GHG emissions and making the LA Metro system more resilient to extreme weather events and effects of global warming.

The OIG interviewed multiple LA Metro bus and rail operations officials and found:

1. During the peak summer months, buses undergo significantly more maintenance.
2. The LA Metro bus department tested a few electric buses, however the existing design failed to meet the LA Metro's service requirements.
3. The trolley wire system and the OCS have maintenance issues during very hot periods. High

heat causes the wires to sag and lead to entanglements with the train's pantograph and the contact wire. Newer spring stack technology is available to control sagging wires.

4. The rail tracks need to be continually monitored during sustained hot weather for buckling, cupping, and sun kinks. The current method of walking the track and ordering reduced speed to the train drivers, is the way the track is currently monitored for any track anomalies.

5. Pre-stressing the rail at the temperature in the geographic location prior to installation (for new rail) is the predominate method that LA Metro currently utilizes. Pre-stressing the rail at the projected temperatures for the geographic location based on the latest climate models should be implemented as temperatures are projected to increase dramatically.

6. There are no electronic monitoring track sensors to immediately measure rail temperatures over periods of sustained heat. Deploying the most modern technology of monitoring rail track sensors should be implemented as temperature increase.

7. The ROC currently has no instrumentation to monitor weather and temperature conditions in real time other than the media and one location at Division 20. The ROC could run more efficiently with the ability to have current "real time" weather information. It would be beneficial for efficient train operation to deploy mini weather-stations to monitor the local trackside conditions at strategic key locations based on variability in micro-climates.

LA Metro has initiated many actions to address climate change and work towards achieving the State mandated emission goals. While much has been done, the OIG team found there are other actions that LA Metro could implement using the benchmarks stated in the OIG climate change report, "Is LA Metro Ready for Climate Change?"

The evidence the team discovered found, the system will be impacted when Los Angeles has sustained heat temperatures approaching those of Phoenix, Las Vegas, or Melbourne. The LA Metro System should continue to innovate and update its operations if LA Metro is to achieve the systemic LA Metro goal as stated in the 2019 draft CAAP report of having zero GHG emission by 2050. While much has been done, there remains much to do if LA Metro is to be effectively positioned to meet the demands that climatic changes will put upon this system in the near-term and the future. Metro has the responsibility to conform to California State Laws established by the Governor. Therefore, Metro ECSD should be involved in purchases for new construction of LA Metro transit system and facilities when it pertains to climate change and the warming that will continue to increase.

Our report makes 32 recommendations for LA Metro to consider implementing to prepare for the impacts of climate change. These recommendations are suggested tactical strategies; not dictates or policies. We make these suggestions without regard to cost, which we have not researched and would be dependent on many factors. Metro does not possess unlimited funds. Fiscal responsibility of the public's dollars is an essential guiding principle that we would have to be mindful of in selecting the most appropriately prioritized options.

FINANCIAL IMPACT

The financial impact is undetermined at this time and is dependent on what options Metro chooses to implement to address the impacts of climate change for the agency.

IMPLEMENTATION OF STRATEGIC PLAN GOALS

Recommendations in this report support strategic plan goal #2. The strategic goal states, "Deliver outstanding trip experiences for all users of the transportation system."

NEXT STEPS

Recommendations are provided for multiple departments within LA Metro to consider and implement as they determine. LA Metro departments are asked to provide a written response to the OIG within 90 days.

ATTACHMENTS

Attachment A - Final OIG Climate Change Report

Prepared by: Prepared by: Suzanna Sterling, Construction Specialist Investigator, (213) 244-7368

Reviewed by: Karen Gorman, Inspector General, (213) 244-7337

Karen Gorman
Inspector General

Los Angeles County
LA Metropolitan Transportation Authority
Office of the Inspector General

"Is LA Metro Ready for Climate Change?"

Report No. 2019 – 0021   **July 18, 2019**

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Is LA Metro Ready for Climate Change?

DATE: July 18, 2019

TO: LA Metro Chief Executive Officer
       LA Metro Board of Directors

FROM: Karen Gorman, Inspector General
       Office of the Inspector General

SUBJECT: "Is LA Metro Ready for Climate Change?" Report No. 2019-0021,
       Legistar File No. 0504, July 2019 Executive Committee

I. INTRODUCTION

The Office of the Inspector General (OIG) conducted a review to determine actions taken by LA Metro to address the impact of climate change on transit and identify best practices. During a board meeting in January 2019, LA Metro's Board Chair stated: "I don't think LA Metro is ready for climate change." This report is to show how LA Metro is preparing for climate change and recommend additional steps LA Metro might take. Our review found that LA Metro has been taking positive steps since 2007 in preparation for climate change; however, we identified additional steps LA Metro can take ensure the agency continues to deliver safe and reliable public transportation service to customers under future more extreme weather conditions.

II. PURPOSE

The objective of this review was to:
- Determine the anticipated impact of climate change on the transportation industry,
- Determine what actions LA Metro has already been initiated to prepare for climate change,
- Identify climate resilient actions other transit agencies have implemented,
- Determine what future steps LA Metro might take to prepare, and
- Make recommendations for LA Metro to better prepare for meeting the effects of global warming.

III. METHODOLOGY

To accomplish our objectives, we performed the following:
- Interviewed Environmental Specialists from LA Metro's Environmental Compliance and Sustainability Development,
- Interviewed staff from Bus Operations and Maintenance Department,
- Interviewed staff from Rail Operations Control (ROC),
- Interviewed staff from Rail Operations,
- Interviewed staff from Wayside System,

VI. BACKGROUND

In the first two decades of the 21st Century, global climate change has had notable effects on the earth's environment. Glaciers have shrunk resulting in loss of sea ice, accelerated sea level rises, more drought periods, and longer intense heat waves. Climate change refers to the increasing temperature changes over a period of time including: erratic temperatures, drought, heavy precipitation, varying wind patterns, inland flash floods, sea level rises, ground water salinization, and wildfires.

Figure 1: Greenhouse gas emission by industries

Global warming is one symptom or aspect of climate change and is due to increasing concentration of greenhouse gases (GHG) in the atmosphere. Global warming refers to the earth's rising temperature. The atmosphere is warming from the rapid increase in carbon dioxide (CO_2). CO_2 is released from the burning of fossil fuels such as coal, oil, and gas (also referred to as heat trapping gases). The world's largest CO_2 emitter is China, but the three countries with the most at stake from climate change are the United States, India, and Saudi Arabia.[1] The following graph shows the major contributing countries of CO_2.
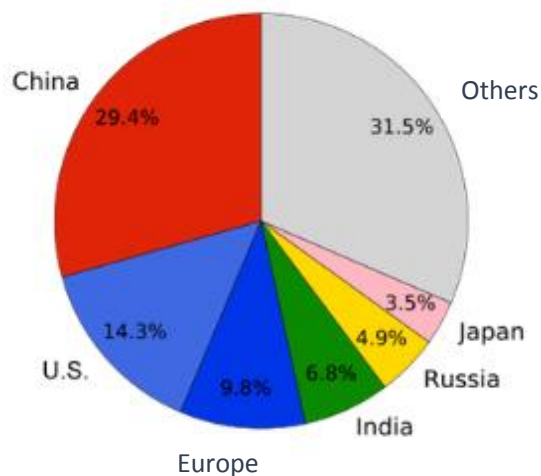
Figure 2: Global carbon dioxide emissions by country[2]

The following graph, based on the comparison of atmospheric samples contained in ice cores and more recent direct measurements, provides evidence that atmospheric CO_2 has significantly increased since the Industrial Revolution.

Figure 3 : Increase in atmospheric carbon dioxide; Ice Age to present[3]

Under the United Nations, the Paris Climate Agreement was signed in 2016 by 185 countries who agreed to reduce greenhouse gases within their countries. Each country must determine, plan, and regularly report on the contribution that it undertakes to mitigate global warming. Although the President Trump backed out of the Paris Agreement, the U.S. Climate Alliance has been created. Through that group twelve states, Puerto Rico, 396 U.S. mayors, private industry, and nonprofit institutions joined together to work on environmental improvements in their communities.[4]

The Intergovernmental Panel on Climate Change (IPCC), is a combination of 1,300 scientists from multiple countries. They released the fifth National Climate Assessment Report in Korea in 2018. A key finding is that the earth temperature will increase between 1.8 to 5.4 degrees Fahrenheit in the next few decades and up to 10 degrees Fahrenheit in the next century.[5] Ocean acidity will intensify from increasing CO_2 as the temperature rises, which will have adverse effects on ocean life from algae to fish. The magnitude of climate change beyond the next few decades depends primarily on the amount of heat-trapping gases that are emitted globally.

In 2018, Governor Brown signed Executive Order B-55-18 calling for California to slash its overall emissions to zero by 2045 and thereafter go negative in the generation of these gases.[6] He also signed Senate Bill number 100 stating:

> "100 percent of total retail sales of electricity in California to come from eligible renewable energy resources and zero-carbon resources by December 31, 2045. In order to attain a target of generating 20 percent of total retail sales of electricity in California from eligible renewable energy resources by December 31, 2013, 33 percent by December 31, 2020, 50 percent by December 31, 2026, and 60 percent by December

31, 2030, it is the intent of the Legislature that the commission and the Energy Commission implement the California Renewables Portfolio Standard Program."[7]

Erratic rainfall is another symptom of climate change. Extreme rainfall combined with coastal flooding and hurricanes has severe consequences. Increasing heavy rain leads to more soil erosion and nutrient loss on croplands. Decreases in rainfall cause drought. Severe reduction in rainfall affects agriculture and therefore food production and our economy.

In California, flooding seems rare but periods of increased rain lead to denser vegetation growth. In summer months, higher temperatures dry out the vegetation and soil, creating conditions ripe for wildfires to develop.[8] Climate change is affecting the California rainy season, thus extending the fire season. Climate change is also shifting the Santa Ana winds that fan wildfires in Southern California. The University of California at Davis forecasts that the area burned by Southern California wildfires will increase by about 70 percent by mid-century as a result of the drier, hotter, and windier conditions caused by global warming.[9]

Sea level rise is another symptom of climate change.[10] The oceans are losing the electro logical effect that breaks down hydrogen and oxygen.[11] This process is now creating dead zones (areas of excessive pollution that deplete oxygen required for marine life) in places such as San Francisco bay and the Gulf of Mexico. As the ocean water table reaches the land ground water table level, subterraneously salt will leach in and destroy the trees. Trees use the carbon dioxide and give off oxygen, but trees are dying from the leaching of salt water. Louisiana, the mouth of the Mississippi river, Gulf of Mexico and Florida experience the same phenomenon where the leaching of salt water creates brackish water, consequently the vegetation is dying.

Figure 4 : Flooding from sea level rise
Imperial Beach, San Diego CA.

The Los Angeles river ground water table is higher than the river bottom in certain areas and concrete could not be laid on the bottom. This has created multiple problems over the past 5 decades including the mixing of salt water with the ground water table and killing trees. Additionally, since the early 1920's, firms have drilled to extract petroleum, which leaves holes and consequently lowers the water table. The ground in the Los Angeles basin is very porous because there are pockets of petroleum in Los Angeles County. These pockets of porosity allow the rising ocean water to flow-inland and mix with the land water tables. As the salt water mixes and the plants die, California becomes charred as wildfires break out in the valleys and canyons.

Sea level along the California coast has risen 7 inches in the last century. Climate changes scientists are expecting an additional 10 to 18 inches of sea level rise by 2050. Higher sea levels will compound the effects of coastal storms and increase the chances for coastal flooding.[12]

Sea level rise is caused primarily by two factors related to global warming: the added water from melting ice sheets and glaciers and the expansion of seawater as it warms. The above graph tracks the change in global sea level since 1993 as observed by satellites.[10]

SATELLITE DATA: 1993-PRESENT

Data source: Satellite sea level observations.
Credit: NASA Goddard Space Flight Center

RATE OF CHANGE

↑ 3.2

millimeters per year
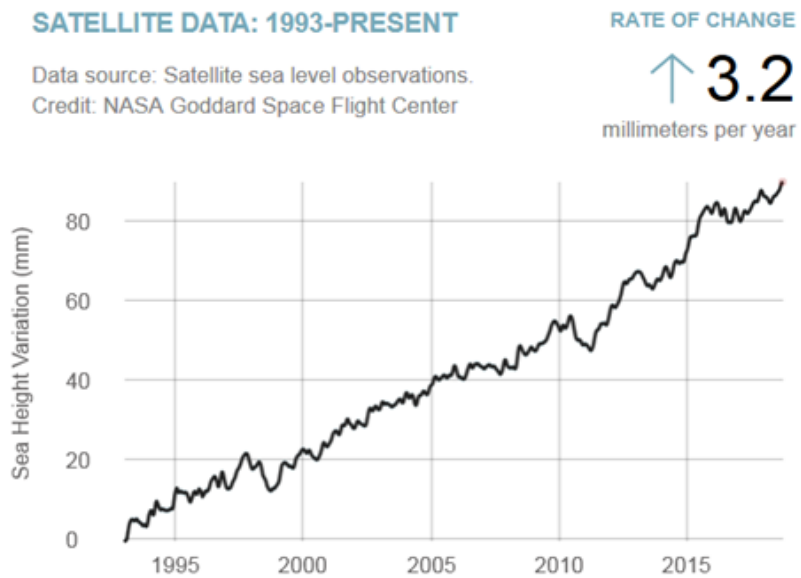
80mm = 3.15 inches in 25 years

Figure 5 : Change in sea level from 1993 to present[10]
Global Ocean rise

What does this imply for the LA Metro transit system? To consider how these factors and impacts of climate change might affect our transit system and how to prepare, it is necessary to see what other transit systems, in places already affected by a warmer climate, have done to mitigate, remediate, and prepare for keeping their patrons safe and their system functioning in increased heat.

VII. OTHER TRANSPORTATION AGENCIES

A. NATIONAL

For this report, the OIG's main focus of climate change is extreme heat, therefore the OIG staff researched two transit agencies that operate in extreme heat conditions and sustained drought to better understand problems that might affect LA Metro when climatic change increases the temperature in Los Angeles County. Phoenix is rated the 3rd hottest city in the world and Las Vegas is close behind as the 7th hottest city in the world. These cities were chosen as "baseline" comparison cities because of their extreme heat.[13]

Las Vegas, Nevada
The Las Vegas Regional Transportation Commission (RTC) provides bus service (no public rail, only short privately built monorail behind the Las Vegas strip) in the Las Vegas Metropolitan area of Clark County, Nevada. During the summer, temperatures have reached 122°F, so RTC

sets up a summer heat campaign that includes "chill stations." There are twelve chill stations located at transit centers and bus stops where RTC employees provide complimentary bottled water to riders. RTC employees also remind passengers to avoid direct sun, stay hydrated, use sunscreen, wear light clothing and hats, and use umbrellas. Moreover, RTC employees use their company "access vans" as water wagons to drive along the bus route and hand out cold bottled water to the passengers who are waiting outside for the bus. They also advise passengers to download the "RideRTC" application, use the "RideTracker" or text "RideRTC" to track their bus in real-time in order to help minimize the time spent waiting outside for the bus under extreme hot conditions. They encourage passengers to wait inside until 5-7 minutes before the RideRTC application indicates when the bus will arrive at their stop.[14]

RTC installed many solar-powered bus shelters throughout the Las Vegas Valley. These shelters feature solar panels and energy saving LED lighting. They provide shade for passengers and have enough room to accommodate a passenger in a wheelchair or other mobility device.[15] There are two kinds of shelters: one has a flat top and the other has a dome top. The older flat top units provided limited shade, whereas the new dome top shelters provide considerably more shade.

When the temperature is at 105° Fahrenheit or higher or when there is a power outage, the Local Emergency Center, which is run by Clark County, opens their shelter, and RTC provides shuttle transportation for people who want to utilize the shelter.[16] RTC and County authorities use television, newspaper, and social media such as Facebook, Twitter, and Instagram to warn the public about the temperature rise and to announce the opening of the emergency shelter.

RTC has found that everything made from rubber deteriorates more quickly in the sustained heat of Las Vegas. The hoses, belts, and tires on RTC buses are replaced more often during periods of sustained summer heat. This foretells for LA Metro higher inventory requirements for transportation properties to plan for as temperature increase. RTC operates with about a 20% contingency of spare vehicles but they exceed that capacity every year.[17]

RTC bus tires (balloon tires) are filled with pure nitrogen gas because nitrogen is less likely to migrate through the rubber tire than oxygen. Tires filled with nitrogen exhibit less pressure change with temperature swings. During the summer months, buses run with balloon tires which are bigger, fatter and ride softer compared to normal tires because it allows heat to dissipate more effectively (as there is more room for the tire to expand).

RTC buses are fitted with plexiglass on the top and sides of the bus and reflecting films are installed on the glass to lower the temperature of the bus. These reflecting films can reduce the temperature inside the bus by as much as 15^oF.

Phoenix, Arizona
Buses
About 95% of Valley Metro buses use Compressed Natural Gas (CNG) and they also have 30 hybrid electric diesel buses.[18] Unlike other transportation agencies, there is an additional air conditioning condenser on the roof of the buses. These condensers remove the heat from the inside of the vehicle and keep the air condition (AC) from shutting down during hot days. This retrofit increases the effective cooling capacity of the air conditioning by 60%. To improve performance, Valley Metro purchased new buses with a special electric engine cooling fan

system. This engine cooling system protects the engine from overheating. Valley Metro also minimizes water usage by using recycled water. They wash their buses with recycled water which saves approximately 122 gallons a month per bus, which reduces reoccurring demands for fresh water usage by 60%. Moreover, some bus shelters have louvers designed to enhance breezes, shade and reduce the temperature of the waiting area.[19]

Solar Power Facilities
Valley Metro Operations and Maintenance Center is powered by solar energy. The solar plant is comprised of 2,800 solar voltaic panels, which are mounted at ground level and on parking lot shade canopies.[20] In addition, light rail platform shade canopies are made of a fabric that effectively blocks sun rays, which reduces the heat that would result from metal canopies. There are solar powered cool air ventilation systems installed at three light rail stations. They are equipped with a button near the seating area that controls air conditioning for passengers.

Rail
The Valley Metro Rail system operates in summer temperatures of 118°F - 123°F. Light rail trains have window tint that is solar reflective. Rail cars have a special film that reduces the sun rays going through the windows. Moreover, the body of these trains is painted with solar reflective paint. Installation of these solar reflective measures reduces cooling loss inside the passenger compartment. During hot summer months, AC units run full time in the trains. Valley Metro ensures that train air condition systems are in good condition especially when temperatures are forecasted to rise. Like LA Metro, they inspect the AC and other key components during the spring. These inspections identify weak components that need repair or replacement in order to avoid failures during service periods in sustained heat. On each light rail vehicle, there are two over-sized AC units. Redundancy is required so when one of the units breaks down, the other continues to work providing cool air. Moreover, Valley Metro's director of maintenance reached out to the Refrigeration School Incorporated (RSI) in Phoenix. RSI is a private technical school that teaches custom training on Heating Venting Air Condition (HVAC), refrigeration, and electrical programs. Valley Metro partnered with RSI to develop customized training for current employees and creates a future workforce for Valley Metro.[21]

B. GLOBAL

We examined what international public transportation agencies are doing to address the challenges of climate change, with the goal of benchmarking "best practices" to better prepare for periods of sustained high heat. We researched four Metropolitan areas: Hong Kong, Melbourne, London and Singapore. The reasons for our looking at these sites are:
1) Hong Kong has created a very sustainable public transportation system,
2) Melbourne, Australia is the 4th hottest city in the world with a rail system,[13]
3) London's Underground is the oldest Metro system in the world and
4) Singapore has been rated one of the best and most affordable public transportation systems.

We found some similarity amongst these cities and their responses to climate change that parallels what LA Metro has already been doing, but there are additional innovations that LA Metro could implement.

Hong Kong

In Hong Kong, the Mass Transit Rail (MTR) is a major public transportation network consisting of light rail, heavy rail, and bus lines. According to the Sustainability Report 2017, MTR has been minimizing energy consumption, and reducing carbon emission. In order to efficiently use energy, MTR adopted regenerative braking technology for rail operations. Regenerative Braking converts kinetic energy produced during braking into electrical energy which is then put back into the overhead catenary power supply network. Other trains on the same line can then use this power as they tap into the overhead power system. MTR installed "super-capacitor" energy storage devices which store the surplus energy that is produced by regenerative braking of the trains. When energy is needed this system releases that stored energy, and that in turn, reduces the overall system demands for electrical energy.

To further minimize energy consumption, MTR replaced lighting throughout its train stations with LED lights. At some MTR stations, escalators are turned off when passenger demands are low; and cooling fans are turned off during non-operating hours. MTR has also replaced chillers, with more energy efficient ones to reduce electricity consumption. MTR cleans its trains, railway infrastructures, and stations with "recycled" water, and after rail cars are washed, this water is again recycled for toilet flushing in depots or for another evolution of train washing.

To further reduce greenhouse gas (GHG) emissions, MTR has been replacing its aged bus fleet with new Euro standard buses. Euro standard buses have LED lights and energy efficient engines installed to reduce GHG emissions. These buses also meet the latest and most stringent GHS emissions standards currently implemented in Hong Kong.[22]

Australia

Metro Trains Melbourne (MTM), operates a train system in the 4th hottest city in the world with 115°F summers.[15] Extreme heat, followed by rapid evening cooling, increases incidents of "buckled rails" (rapid expansion and cooling of the steel rail). According to MTM, trains slow down during periods of extremely high temperatures to ensure customer safety because a "heat buckled rail" can result in a derailment. To monitor real-time rail track temperature, MTM installed multiple electronic monitoring sensors on its rail lines. In 2015, MTM installed 32 new track sensors which allow them to monitor real-time rail track temperature.[23] When actual track temperatures reach 131°F or higher, the speed limit is restricted to 50 MPH.[24] Moreover, MTM installed concrete sleepers (rail ties) to prevent the rail track from buckling (because the concrete ties accommodate superior anchoring techniques).[25] Also, they found that extreme temperatures cause

Figure 6: Sun kinks occur with wooden ties

Figure 7: Concrete sleepers prevent deformation in rail

wooden sleepers to "bend" while the concrete sleepers do not distort under the changing temperatures.

London

Network Rail in London installed mini weather-stations and thousands of track-side probes to monitor track conditions. When the weather is hot, Network Rail slows down trains to mitigate the effects of extreme heat creating track displacements due to rail buckling. Network Rail uses

Figure 8: Weather station to monitor rail temperature

speed restrictions at vulnerable locations (curves and bridges). The speed restrictions reduces the dynamic stresses on the rail so that the rail is less likely to buckle during the hottest part of the day. Moreover, they paint part of the rail white to lessen heat absorption, which decreases incidents of buckling.[26] Maintenance teams check the stability of the track in winter and strengthen any weak parts before summer. Outdated electrical cables are replaced to prevent sagging in extreme temperature. Auto-tensioning devices are used to ensure the tension in the cable is kept constant. Moreover, Network Rail encourages passengers to bring water bottles and provides bottled water on-board trains during periods of hot weather.[27,28]

Singapore

In 2016, Singapore's Land Transport Authority (LTA) tested the installation of electric fans at five bus stops.[29] The purpose of the fans is to cool passengers while they are waiting for their bus in periods of sustained hot weather. The electric fans are mounted on the columns of the bus shelter to provide better airflow coverage. To activate the electric fans, patrons can press the button, and the fans turn-on for 15 minutes at a time. Since the testing results proved promising, LTA now has several high volume stops in Singapore equipped with these fans to provide heat-relief for waiting passengers.

Figure 9: Electric fans installed at the bus stop in Singapore

In 2018, LTA built a trial "smart bus-stop" on a busy major road in Singapore.[30] "Smart" bus-stops are equipped with the Airbi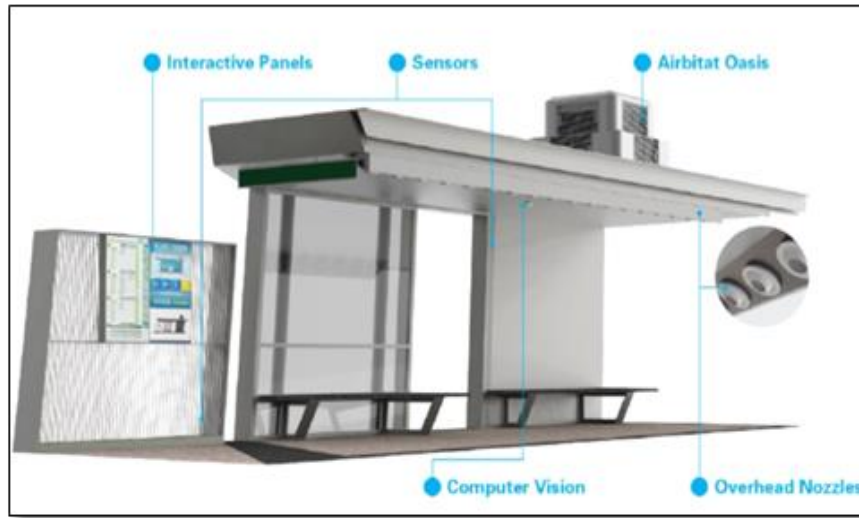tat Oasis ventilation system. This system consists of several overhead nozzles mounted on the inner roof, which draw from a reservoir of cold water. The system filters the air of harmful particles; thus, the cool air pumped out by the overhead nozzles is more than 90% cleaner than the surrounding air. Normal air-conditioners use ozone-depleting refrigerants that generate another source of heat, however, the Airbitat Oasis system creates an eco-friendly evaporative cooling of the ambient air.

Figure 10: Airbitat Oasis smart bus stop in Singapore

Additionally, the system's sensors can measure air temperatures and transmit data to supervisor screens that display temperature and air purity levels. Also, the built in computer vision and advanced analytics allows the system to detect suspicious activities, loitering, and unattended bags. Therefore, it has a safety and security benefit too.

VIII. ENVIRONMENTAL COMPLIANCE AND SUSTAINABILITY DEPARTMENT

In 2016, the State of California passed Senate Bill 32 which sets a mandate to reduce GHG emissions to 40% below 1990 levels by 2030. That goal applies to the transportation industry, including LA Metro. Transportation emissions account for nearly 40% of all GHG gas emissions in California. LA Metro has already taken steps to meet the challenge of this state law.

LA Metro is proactive in energy management and the curtailment of GHG emissions. LA Metro's 10 year Strategic Plan (LA Metro Vision 2028), addresses Metro's role and goals for achieving California's GHG reduction mandate and providing a resilient transportation system better prepared to adapt to a warming climate. The plan calls for LA Metro accomplishing the goal by expanding and improving the transportation network, as well as partnering with regional partners and stakeholders to manage and build "a resilient mobility system" that effectively reduces GHG emissions and helps to address public health issues while moving people throughout the county.

The LA Metro Environmental Compliance and Sustainability Department (ECSD) has a climate change "Program" that identifies two key avenues to address LA Metro's contribution and vulnerability to climate change and create a more resilient agency:

1) Mitigation: Taking actions to reduce greenhouse gas emissions.
2) Adaptation: Taking actions to adjust to the effects of climate change.[31]

ECSD has 150 projects under the Program taking place to promote environmental stewardship and sustainability. The LA Metro ECSD Program is guided by a Climate Action Adaptation Plan (CAAP), a Resiliency Indicator Framework, an Energy and Resources reporting mechanism, and operates under an Environmental Management System (EMS). The Program further recommends updates to the LA Metro Rail Design Criteria (MRDC) and the Bus Rapid Transit Design Criteria and other technical documents, and among others. Each element of the Program has senior environmental staff assigned to continually refine, implement, and monitor the projects under the Program (for a full list of the projects refers to Appendix A or www.metro.net/sustainability). ECSD also have put in place classes to educate both LA Metro employees and contractors on heat, resiliency, and sustainability. A few classes available are: Environmental Resilience in the Workplace, Envision Training Workshop, Heat Illness Prevention for Managers and Supervisors, and G-PRO Operations and Maintenance.

The OIG found that the draft 2019 CAAP report identifies the following five key principles of implementation to meet the challenges of climate change:
1) embrace climate leadership,
2) secure funding and prioritize resources,
3) integrate climate knowledge into existing decision-making processes,
4) monitor and evaluate progress, and
5) engage with community stakeholders.

In addition to these five key program principles, there are also two broad strategies that LA Metro is currently taking to implement climate change protection. These two strategies are:
1) reducing LA Metro's greenhouse gas (GHG) emissions, and
2) making the LA Metro system more resilient to extreme weather events and long-term climate changes.

The draft 2019 CAAP appendix section entitled "Methodology for Greenhouse Gas Analyses" identifies significant emissions sources, such as electricity usage, natural gas usage, water consumption, refrigerants used for items such as buses, wayside energy substations, photovoltaic solar panels, heating systems, water heating, water conservation, and other energy consuming systems as targets for improved efficiency and emissions reduction. The draft 2019 CAAP identifies strategies that directly target those sources of emissions and reduce them over the next several decades.

The draft 2019 CAAP report also identifies systemic risks of LA Metro facilities, equipment, and other assets based on vulnerability and criticality. A "risk" number is assigned to each factor and these factors are tallied to obtain an overall risk score. This process reveals that increased incidents of extreme heat are the worst case climate hazard for LA Metro. Of secondary importance (in declining order of impact) are landslides, wildfires, riverine flooding, electrical outages, and sea level rise (which can inundate low areas). The draft 2019 CAAP report identifies a process to evaluate and resolve these climate risks and provides a menu of adaptation actions as options for ways to resolve these risks. The draft 2019 CAAP should be used to assist

LA Metro in decision making processes to implement sustainable options when replacing parts of the existing system, purchasing products, or installing new systems.[32]

The 2019 CAAP report will be presented to the Board by ECSD for adoption in the July 2019 Board meeting. The next section of this report focuses upon LA Metro bus and rail operations and maintenance to determine the steps initiated to reduce GHG emissions. The OIG interviewed various directors and supervisors of Rail, the ROC and Bus departments to obtain information on the risks these departments face, and what is being planned as well as what is being done now to meet climate change challenges. The OIG asked what innovations the departments might implement to deal with each particular risk, and whether the desired changes are funded.

IX. BUS OPERATIONS AND MAINTENANCE

LA Metro Bus Vulnerabilities and Adaptation

There are many ways climate change can directly impact LA Metro bus operations and maintenance. During periods of extreme heat, buses tend to break down more frequently than is experienced during normal conditions. Currently, LA Metro bus operations has a 10% decrease in available buses during the summer due to un-scheduled and unplanned repairs related to excessive heat. Bus engines, air conditioning and venting, and electric systems along with other subcomponent equipment fail more frequently during extreme heat because of the added stress placed on these systems. When extreme heat extends for months, the demand for summer materials increases. Coolant wear components, surge tanks, radiators, water pumps, thermostats, and coolant hoses all have increased failure rates generating abnormal demand. Evaluating the summer versus winter bus parts consumption over a 5-year average, the costs show $1.6 million was spent on parts in the summer versus $404,000 for the winter. [Appendix B] This is almost a 4 to 1 difference in part consumption because of the current high heat of Los Angeles summers. As identified in the draft 2019 CAAP report, certain parts of the County could experience an additional 6-7 weeks of summer heat which could substantially increase the current 3 months of summer. This implies pushing the part spending in closer to $3 million. Greater maintenance demands will require an increase bus maintenance division annual budget if bus service is to continue at current levels.

ECSD has developed a program called the Environmental Management System (EMS) which is an FTA-endorsed program for managing environmental compliance. This program addresses risk and vulnerability through the EMS framework. LA Metro's bus maintenance facilities have aided maintenance personnel during periods of high heat. They now implement an early spring inspection and maintenance program and perform additional inspections on high heat days to proactively address severe weather impacts. During the summer, maintenance staff performs inspections and evaluates major system operations more frequently to reduce failures while in service. They are also replacing old-style hoses with new hoses (made with different materials) which can last five times longer than the previously specified hose model. If the average temperatures stayed hot for months instead of weeks, could existing maintenance staff keep up

with increased demands for inspections and proactive repairs? To prepare for climate change impacts, additional maintenance training, procedures, and budget for spare parts will be needed.

Heavy precipitation causes rust to form in the steel frames of buses at an accelerated rate. This results in buses having leaks, cracks and rust that affects the structural integrity of the bus. The normal rotation cycle of buses calls for replacement at 12-years. Some LA Metro buses have been in service for over 18 years. These older buses required fuel tank replacements as the fuel tanks certification expired which rendered buses inoperable. Fuel tanks were adapted to switch from diesel to compressed natural gas (CNG). The required bus upgrades coupled with a lesser availability of spare parts compounds the task of maintaining the fleet in a sustained "surge" operation.

Sustained periods of "bad" weather conditions (high heat or increased rainfall) create additional demands on bus braking systems, engine coolant systems, HVAC systems and other components such as windshield wipers and headlights require proactive inspection and replacement as needed. Sustained periods of heavy rains or high heat could put increased numbers of LA Metro buses out of service, resulting in service delays. During the "normal" rainy season, rain alerts and notifications are sent out by division managers to enable bus operators to prepare and be ready for storm conditions. During a rain alert, the maintenance staff check wipers at night and make sure buses are in good mechanical condition to operate in service the next day.

Regarding GHG emissions, LA Metro is developing a comprehensive master plan to convert LA Metro's entire bus fleet to be zero emission vehicles by 2030. The current bus fleet is powered by CNG which burns cleaner than diesel fuel.[33] LA Metro has ordered electric buses to "service test" the new electric bus technology. However, first generation test buses had to be returned because they did not meet LA Metro's service requirements. Fully loaded, the electric buses could not effectively transit some of the Los Angeles hills, without temporarily shutting down some of the onboard systems. LA Metro's return of these "service trial" electric buses leaves LA Metro in a conundrum as to effectively accomplish the "zero emissions" 2030 goal, based on the current state of the technology.

EMS has provided Bus Operations and Maintenance "targeted" training regarding safety, emergency response, and preparedness for natural disasters. Because of these education programs, employees are aware of the importance of the environment and the impact environmental change can have on operations. For example, before this training, some bus operators and maintenance employees did not know that oil and grease is harmful for the environment. Now, they have been trained on how to properly handle and dispose of these harmful chemicals. Currently, tailgate meetings are held daily to discuss safety and any improvements to keep bus operations safer for our customers and for employees.

X. FACILITIES

LA Metro's Program Management and ECSD has made some significant milestones in meeting the challenges of climate change. LA Metro's Division 13 Bus Maintenance and Operations Facility is an example of a high performance building which is designed to meet LEED Gold

Certification Standards of the United States Green Building Council.[34] It was designed and built with sustainable construction methods and has sustainable design features. Part of the building façade is covered with solar panels and photovoltaic panels (PV). Solar panels are installed at the top and sides of the building.

Figure 11: Division 13 - Bus operations and maintenance facility

The building is designed to allow daylight to major work areas and open spaces are naturally ventilated which makes the building efficiently cool down. Additionally, the rooftop of Division 13 has a green garden with native California plants to reduce contributions to the City's heat island effect. This green roof garden is accessible to LA Metro employees so that they may enjoy their breaks at the roof garden (studies have shown that this helps to maintain employee attentiveness, morale, and sense of well-being). There is an underground storm water retention tank (with a capacity of 275,000 gallons) that collects rainwater (purple water) for bus washing, landscaping, and other uses. In addition to the rain water, Division 13 receives 10,000 gallons of water per week from the prison next door. This water is also added to the underground storage tank. LA Metro also has a 15,000 gallon tank near the Central Maintenance Facility to gather storm water that drains into the larger tank when it gets full. At Division 10, buses are washed with purple water (rainwater or recycled water used for non-potable purposes) which lessens dependence on imported water sources.[35,36]

XI. RAIL OPERATIONS AND MAINTENANCE

LA Metro Rail Vulnerabilities and Adaptation

Climate change can directly impact LA Metro rail operations and maintenance. Metro's Rail Operations and Engineering teams identified that the Rail and the Overhead Catenary Systems (OCS) as LA Metro's assets most vulnerable to sustained conditions of high temperatures.

The maximum train speed is 55 mph under normal conditions (determined by California's Public Utility Commission for semi exclusive right of way). Trains are ordered to slow down to 30 mph when the temperature is 115°F. Rail temperatures typically are 20-25°F above the outside

ambient air temperature. As the rail heats, it expands. LA Metro rails are manually checked. The track department sends staff out to walk the track, check the track temperature, and visually check for anomalies in the rail and ballast that would indicate rail displacement. They look for rail that is pulled apart (failed and separated at bolted or welded joints), or with "sun kinks" (longitudinal displacement in the track alignment resulting from the heating of the rail), or a lack of ballast around the sides of the ties (cupping) and the roadbed shoulder. These occurrences are primary causal factors in train derailments. Personnel also perform inspections at night; a person rides on a High-Rail vehicle at slow speeds and visually scan the rail to ascertain if there has been any movement from the original track alignment.

The OIG inquired as to whether there were sensors on the track to monitor the real-time rail track temperature when ambient air temperatures approach the 115°F degree threshold. The response was that those monitors are too expensive and there are too many miles of track. One of the OIG's primary concerns is safety and management of cost versus risk. Track heat sensors would only need to be added to sections of rail exposed to temperature variation in the historically and projected future hottest locations. LA Metro should consider acquiring track heat sensors for rail that is exposed to high ambient temperature variations. It may also be possible to install laser temperature technology to rail cars and transmit temperatures to the ROC or provide mobile temperature lasers to train inspectors for rail monitoring.

To avoid sun kinks, pull-apart, and/or buckling (both hot and cold weather issues), the rail is pre-stressed before new installation and whenever repaired. This is the Federal Railroad Administration-49CFAR part 213 (FRA) solution to welded rail installed in chronic warmer climates or those subject to extreme temperature variations. If during installation, the laying temperature is incorrect and the rail shrinks due to a drop in temperature more than the design allows, stresses within the rail can cause the rail to break or crack. All LA Metro lines are pre-stressed to 110°F degrees at ±5°degrees tolerance. Pre-stressing mechanically / thermally alters the rail by heating it until it expands and then anchoring it in alignment at its expanded state so that the rail is in a constant state of tension. The length of rail needed equals the same length it would be at a hot air temperature; the rail is then anchored in place with thermal forces minimized. The degree to which rail is pre-stressed is dependent on the geographical location

Cupping   Sun Kink   Pull-Apart

Figure 12: Photos of rail "cupping," "sun kink," and "pull-apart"

where it is going to be laid; with curves and elevation changes (such as bridges or tunnel entrances) requiring a greater degree of pre-stressing.[37]

All LA Metro rail lines are designed with Train Control Systems that use electronic circuits through the running rails of the tracks. As such when a "Rail Pull-Apart" incident occurs generally the Train Control System will be disabled or fail and the ROC is alerted that the Train Control System has a problem and ROC will Dispatch Rail Operation Staff to check the area to determine the cause of Train Control Signal Loss.

LA Metro Overhead Catenary System and Trolley Wires Vulnerabilities and Adaptation

Trolley wire, also called copper wire is on the Blue Line at sections Long Beach to Willow and Washington Blvd. to 7th Street/Metro Center Station. The trolley wire terminates where the system goes underground into the 7th Street/Metro Center Station. This trolley wire utilizes the same type of copper wire as the Overhead Catenary System (OCS). The OCS is "standard" for all other locations on the LA Metro system except for the yards (which use trolley wire) and underground tunnels which are heavy rails and uses 3rd rail pick-up for electrical power. The trolley wire system does not have the supporting weight tensioning system that the OCS has. The trolley wire system does not have a center bar support; but instead, has a cross-wire to support and lift the wire which spans multiple lanes of street traffic and ties into poles at the sidewalk or right of way. As air

Figure 13: Blue line trolley wire & cross wire

temperatures rise, the cross-wire heats, expands and slacks, creating a sagging in both the cross-wire and the trolley wire. Adjustments occur in the spring and fall, and typically takes a considerable amount of staff, effort, and time to tighten. As necessary, measurements of the contact wire are taken and adjusted. At the location of Flower Street and Washington Blvd. the cross wires are tied to the support poles. These poles lean when the crosswire is tightened with a winch and pull in toward each other, bow, and create a potential hazard. The OIG was told the

Blue Line project originally wanted to replace this area to a spring stack tensioning system, but the upgrade would take over a year and half to obtain City Right of Way permits. We understand replacement of the poles with the spring stack heat sensitive tensioning system would take several years to accomplish as well as a significant increase in cost. With the "New Blue" project, all of the wires are being replaced but not the poles.
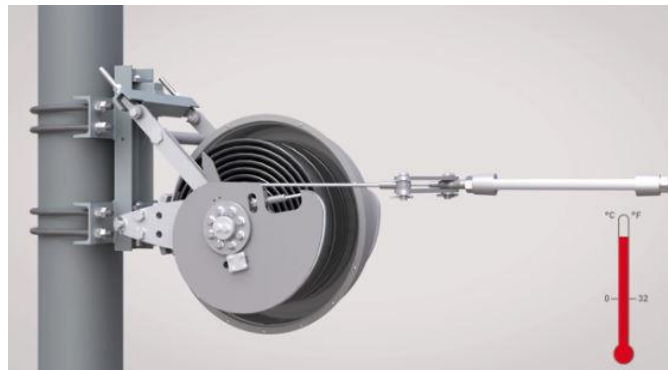

Figure 14: Proposed spring stack tensioning system

All wires are impacted by the heat. The spring stack tensioning system is most durable and effective to remove the sag from the wire in the extreme heat.

LA Metro has experienced problems with the OCS during high heat conditions on the Gold Line. To reduce and eliminate the sagging of the catenary lines, there is an automatic tension system with weight stack that is self-adjusting which exerts force on the wire to create tension. These weights pull the wire taut and remove the sag when the sun heats and expands the wire. On the Gold Line the pole heights were designed lower than the rest of the system. Additionally, on the Gold Line the original design of the pulley wheel, that the wire runs over, has frayed the wire in the past which caused the wire to snap and the weights fell to the ground. Currently the pulleys are being replaced with the correct size pulley wheel to eliminate the problem of wires fraying.   The weight stack auto tensioning is operating correctly on the Blue, Green, and Exposition Lines. The OIG was also informed that birds have occasionally made nests in the weight stacks which caused the tensioning system to fail.

Figure 15: Existing weight stack tensioning system

The locations on the Gold Line in the track region of Pasadena to the end of the line along the foothills are a concern because temperatures tend to be hotter in this area. Because of the low heights of the poles with the weight stack system and the excessive heat, this area is watched very closely in the hot summer days for sagging wires, weights on the ground, and overheated rail. LA Metro's System Engineering group has evaluated the Gold Line OCS to determine and recommend where the newer technology of a spring stack tension system is more appropriate for the area. Refer to Table 1 for the summary of results balance weight improvements and Appendix C for Systems

METRO Gold Line Balanceweight Improvements

Replace with Spring Tensioners	51
Weight Adjustments Required	16
No Action Required	63
Total	130

Table 1: Systems Engineering summary results of Gold Line

Engineering complete analysis on the balance weights. The weight stacks are bottoming out and sitting on the ground on hot days. There are 51 locations where the new spring stack tension system should be implemented, 16 locations for further adjustments to the weight system and 63 locations on the Gold Line where no action is required.   The spring stack tension system can eliminate the problem of sagging catenary lines, manual inspections and works with the shorter poles. The Gold Line could benefit from the installation of the spring stack system as mentioned by Systems Engineering noted in Appendix C in order to mitigate high temperatures. LA Metro should consider retrofitting its system to include this improvement.

A proactive solution developed by Wayside Systems Engineering is to have an on-board roof mounted OCS / trolley wire inspection system. This system will run as part of revenue rail service and document the condition of the Overhead Contact Power System with actual real time

analysis to alert the wayside traction power system of potential and pro-active issues associated with the power system inspection for light rail systems. This new system is currently running as a test on the LA Metro Expo and Blue Lines to validate the accuracy and performance of the equipment.

Plans are also in progress by Wayside Systems Engineering to have a wayside placed Pantograph Inspection System that would examine the pantograph on all light rail vehicles to determine if the pantograph may be showing signs of premature wear or cracked carbon strips that could contribute to an entanglement with loss of rail service. Entanglement is caused by hot temperatures heating the wires, wires then sagging and oscillating as the pantograph pushes forward on the line. Metro needs to rectify this vulnerability.

Figure 16: Pantograph entanglement with OCS wires

LA Metro, like Hong Kong MTR, has regenerative braking in all the rail lines and rail vehicles. MTR utilizes a super capacitor to put the energy back into the system by way of OCS where LA Metro utilizes the flywheel technology. The energy created by movement of the flywheel is transferred back into the system. LA Metro has two projects currently testing the system. One is on the Red Line at Westlake/Mac Arthur Station and the other is at the Gold Line at Pasadena Station. Metro is also looking into installation of a reversible traction power substation which would send regenerated energy back into the utility. By utilizing the system of regenerative braking, LA Metro is moving forward in reaching the State of California's goals of zero emissions and creating a renewable energy resource.

Other System Components

Other vulnerabilities that were identified are the Heating, Ventilation, and Air Conditioning (HVAC) systems in trackside equipment rooms and electronic component cabinets. These cabinets provide power (traction power sub-station) to the OCS, trolley wires, and communication system. These electric component cabinets often heat resulting in equipment failure and critical shutdowns. HVAC systems have been installed in the cabinets to keep the circuit boards from overheating and melting. However, the Gold Line is still vulnerable to overheating because that area is hotter than any other parts of the LA Metro system. A second exhaust fan has been added in various locations on the Gold Line. When the HVAC fails and the supervisory control and data acquisition (SCADA) equipment gets too hot, the system shuts down and goes offline. Communication cabinets are critical because it controls the radio system from the ROC to the trains. When it shuts down, there is no communication except by cell phones. When the HVAC fails in the control room and system failure occurs there are backup generators; however the generators can burn out if operated too long. Trains operating on the tracks can run independently of the ROC in the event that the ROC has a shut down or system failure due to power failure. LA Metro has a monitoring system to alert and control a system failure due to heat, however it is comprised of "standard" overheat alarms that come up on the SCADA network. The FRA standards for Positive Train Control mandates such sensors.

Proactively the Rail department has taken measures to protect equipment by installing insulated bungalows to provide protection for signaling and sensor components. Additionally, to make the train control and communication cabinets cooler LA Metro has painted the outside of the cabinets with ¾ inch thick, one time only, Marine paint. They have stated that this paint has helped in cooling the cabinet but still more AC, vents, and fans or other mitigation steps are needed as temperatures continue to get hotter, for more days per year. Exhaust fans are installed throughout the system.

In the event of severe heat has caused the system to shut down, the escalation procedure is the Emergency Notification system. The protocol is to send out an emergency alert by telephone, email, or text message. Staff will be dispatched to repair the problem.

A positive action that the train operators are doing in the hot summer is keeping the train doors shut at each terminus. Patrons push a green lighted circle on the outside the train door to open the doors. This helps to preserve cooled air inside the train.

For protection from the sun at the stations 2/3 of each station walkway is covered. As the climate becomes warmer and lasts for greater number of days, more complete coverage of the station walkways, misters, air cooling systems like Singapore's Airbitat Oasis system, and water fountains to enable people to refill water containers is desirable.

Older rail cars in the P865 series that operate on the Blue Line have issues with the HVAC system that are less dependable. Additionally, the Red Line cars have cooling deficiencies that may need to be considered for state of good repair prioritization.

Below the LA Metro light rail there are underground storage areas called vaults. When there is a heavy down pour, the underground vaults flood. Maintenance of way (MOW) personnel must pump out the vaults immediately when they flood. Spliced wires in the vaults corrodes and cause shortage failures. A drainage/flood solution is needed for the underground vaults.

The Rail Operations Center (ROC)

The ROC cannot precisely monitor real-time weather and temperature conditions at key locations on the system. We were told that they do not have this capability. They do obtain weather information from the media. The ROC could run more efficiently with the ability to have current 'real time' temperature informational feeds at multiple critical locations of the LA Metro system in order to dispatch employees when weather conditions cause a system failure or at higher risk. Currently, only one weather station, located at division 20, has been installed, but there are none on the entire rail system where it is most crucial.

When asked if there is anything that would help the ROC combating sustained periods of extremely hot days, ROC staff cited the following areas:
1. Conducting monthly pre-summer "Summit" meetings regarding anticipated hot weather, the heat impact, updating employees on the procedures for mitigation, and response plans when the temperature rises above a certain limit for a span of time.

2. Establishing "baseline" preventative maintenance for servicing and testing emergency generators.
3. Establishing a coordinated Severe Weather Plan. Beginnings of an Inclement Weather Plan was started in 2015, but never finalized.
4. Conducting monthly meetings, at the Superintendents level or lower, to allow information to flow down from the department heads to the field level supervisors, especially in regards to weather responsiveness.
5. Updating the communication equipment which employs speakers located at top of the rail platform canopies. The sound communications with patrons should be checked to ensure it is not garbled and is especially a problem on the Green Line, where patrons may have more trouble adequately hear system announcements because of traffic noise.

XII. SAFETY

LA Metro is firmly committed to the principle that safety comes first for its customers, employees, business partners and the public. To that end, LA Metro follows the California Occupational Safety and Health Administration (Cal OSHA) guidelines for authorizing the enforcement of standards which require employees and employers to maintain safe working conditions.

Policy for Employee Safety
To ensure the safety of employees who work outside during periods of extremely hot weather, LA Metro Corporate Safety has developed a "Heat Illness Prevention Program" in compliance with the California Code of Regulations. The program steps and procedures that should be followed by Metro supervisors and employees include:
1. Managers and supervisors should be trained on their responsibility to provide employees water, shade, and access to first aid, cool-down rests, and exercise.
2. Train on the responsibility to make sure water containers and shelters are available at the work site and are accessible by workers. Supervisors should ensure water containers are kept in sanitary condition and check the water level frequently when the temperature rises (above certain prescribed levels).
3. Before starting work, "tailgate" meetings should be held to brief employees about the importance of drinking water, rest breaks and the signs and symptoms of heat illnesses if the temperature exceeds or is expected to exceed 80 degrees Fahrenheit.
4. Supervisors should ensure that sufficient shade structures are available for employees and give employees a five-minute cool-down rest (every hour) in the shade.
5. If the weather is expected to have high temperatures or a sustained high heat, it is the supervisor's responsibility to modify the work schedule, as necessary.
6. During heat waves or when temperatures exceed 95 degrees Fahrenheit, each employee should be assigned a "buddy" to watch for signs and symptoms of heat illness. If new employees are assigned to work under conditions of high heat, supervisors should closely observe them for the first 14 days (until the employee becomes acclimated to the new environs).[38]

Customer Safety and Services
LA Metro cares about customer safety and gives excellent service to customers. During the hottest periods of the summer LA Metro trains run with speed restrictions to not damage the tracks or overhead power lines, and to ensure customer safety. This is prudent and necessary, because as the temperature gets high, the overhead wire tends to expand, stretch, and sag. During hot weather, trains run at slower speeds and sometimes trains are delayed or cancelled because of repairs to the overhead wires. LA Metro sends out LA Metro Rider Alerts regarding service delays or cancellations. Historically, LA Metro has announced the most delays on Expo Line, Gold Line, Blue Line and Green Line where power is strained or under high heat conditions because those lines are open air track. Customers are provided service updates via Twitter. During the summer, LA Metro reminds customers to wear loose-fitting and lightweight clothing, to use sun screen and to drink sufficient amounts of water. Train doors keep train interiors cool. Customers can press the buttons near the train doors to enter.[39]

XIII. CONCLUSION

Climate change is occurring globally with notable effects on the environment. There have been more frequent and erratic weather variations such as extremely high temperatures, strong storms, heavy rainfall, flooding of rivers and the coastline, and sustained drought. Global warming, one symptom of climate change, refers to rising temperatures caused by increased concentrations of GHG in the atmosphere. Climate scientists from 185 countries, with thousands of pages of research, recognize the adverse impact of climate change and have committed to working together to reduce atmospheric CO_2. Erratic rainfall and sea level rise are other symptoms of climate change. Sea level rise is from two factors related to global warming: the added water from melting ice glaciers and the expansion of seawater as it warms. In the last century the California coast line has risen 7 inches and is expected to rise an additional 10 to 18 inches by 2050 because of global warming.

This review was conducted to determine what actions have already been done to prepare for climate change, identify climate resilient options, and determine additional actions needed to address the impacts of anticipated future conditions. To identify industry "best practices," the OIG researched other transit agencies in our nation, and around the world to determine what is being done to mitigate the impacts of climate change.

National Innovations
The OIG "bench-marked" transit agencies in two hot climate cities and found significant innovations to counter climatic changes for our consideration.

In Las Vegas, the RTC has multiple chill stations for patrons to wait for the bus out of the heat, water wagons drive the bus routes to hand out complementary water bottles to patrons, and has solar powered shelters with LED lighting that provide shade for passengers. In the summer, buses run with balloon tires filled with pure nitrogen to improve tire wear and provide a safer transit experience.

Is LA Metro Ready for Climate Change?

In Phoenix, the Valley Metro has installed an additional air conditioning condenser on the roof of its buses. This increases cooling capacity by 60%. They also purchased new buses with special electric engine cooling fan systems to protect engines from overheating. The Operations and Maintenance Center is powered by solar energy. They have installed of shade canopies on light rail platforms made from fabric that blocks the sun rays. There are solar powered cool air ventilation systems installed at three light rail stations that are equipped with a button near the seating area. Valley Metro light rail trains employ solar reflective window tint, train bodies painted with solar reflective paint, and two over-sized AC units for redundancy are placed on each light rail vehicles, all of which enhances cooling inside the passenger compartment. Also, the agency partnered with a local refrigeration school to provide custom AC and electrical training programs unique to Valley Metro's buses and rail cars. Graduate students are then eligible for hire, thus creating community opportunities.

Global Innovations
The cities of Hong Kong, Melbourne, Singapore and London stood out as "benchmarks" for innovation.

In Hong Kong, the Mass Transit Rail (MTR) uses Regenerative Braking Technology to convert kinetic energy produced by the braking process into electrical energy and puts that power back into the power supply network, with use of super-capacitor energy storage devices.

In Melbourne, the Metro Trains Melbourne (MTM), monitors real-time rail track temperatures, by installing electronic monitoring sensors in its rail lines, so that control authorities know exactly when actual track temperatures reach 131°F or higher and can immediately restrict speed limits.

In London, Network Rail has installed mini weather-stations and thousands of track-side probes to monitor the local trackside conditions (on above ground tracks). When the weather is hot, Network Rail slows down the trains to mitigate the effects of extreme heat creating track displacements due to rail buckling. Network Rail uses speed restrictions at vulnerable locations.
In Singapore, Land Transport Authority (LTA) has instituted smart bus-stops. These are equipped with the Airbitat Oasis ventilation systems which have several overhead nozzles mounted on the inner roof, and draws from a reservoir of cold water which cools and purifies the air while removing harmful particles. The cool air that is pumped out through the overhead nozzles is more than 90 percent cleaner than the air that surrounds these stations.

Los Angeles County
In California, transportation accounts for nearly 40% of all greenhouse emissions. In 2018, the Governor signed an Executive Order calling for the State to slash its overall emissions to zero by 2045. He also signed Senate Bill 100 stating, "Not only is California going to slash its emission to zero but shall have 100% of total electricity retail sales in California to come from eligible renewable energy resources and zero-carbon resources by 2045."

LA Metro's ECSD has put together a series of reports, policy, training, and environmental management systems that complement these state environmental goals. ECSD is proactive in climate change mitigation and adaptation with "key" performance goals of reducing GHG

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emissions and making the LA Metro system more resilient to extreme weather events and effects of global warming.

The OIG interviewed multiple bus and rail operations officials and found:
1. During the peak summer months, buses undergo significantly more maintenance as shown in Appendix B.
2. The LA Metro bus department tested a few electric buses, however the existing design failed to meet the LA Metro's service requirements.
3. The Trolley and the OCS wire systems have maintenance issues during very hot periods. High heat causes the wires to sag and lead to entanglements with the train's pantograph and the contact wire. Newer spring stack technology is available to control sagging wires.
4. The rail tracks need to be continually monitored during sustained hot weather for buckling, cupping, and sun kinks. The current method of walking the track and ordering reduced speed to the train drivers, is the way the track is currently monitored for any track anomalies. Pre-stressing the rail at the temperature in the geographic location prior to installation (for new rail) is the predominate method that LA Metro currently utilizes. Pre-stressing the rail at the projected temperatures for the geographic location based on the latest climate models should be implemented as temperatures are projected to increase dramatically.
5. There are no electronic monitoring track sensors to immediately measure rail temperatures over periods of sustained heat. Deploying the most modern technology of monitoring rail track sensors should be implemented as temperature increase.
6. The ROC currently has no instrumentation to monitor weather and temperature conditions in real time other than the media and one location at Division 20. The ROC could run more efficiently with the ability to have current "real time" weather information. We recommend that procurement and deployment of mini weather-stations to monitor the local trackside conditions at strategic key locations based on variability in micro-climates.

LA Metro has initiated many actions to address climate change and work towards achieving the State mandated emission goals. While much has been done, the OIG team found there are other actions that LA Metro could implement using the benchmarks stated in this report. The evidence the team discovered found that the LA Metro system will be impacted when Los Angeles reaches sustained heat temperatures like those of Phoenix, Las Vegas, or Melbourne. The LA Metro System should continue to innovate and update its operations if LA Metro is to achieve the systemic LA Metro goal as stated in the 2019 draft CAAP report of having zero GHG emission by 2050. While much has been done, there remains much to do if LA Metro is to be effectively positioned to meet the demands that climatic changes will put upon this system in the near-term (7-10 years) and the future. Metro has the responsibility to conform to California State Laws established by the Governor. Therefore, Metro ECSD should be involved in purchases for new construction of transit system and facilities when it pertains to climate change and the warming that will continue to increase. June 2019, LA Metro's Procurement Department also committed to a program to seek more environmental conscious purchases.

Our report makes 32 recommendations for LA Metro to consider implementing to prepare for the impacts of climate change. These recommendations are suggested tactical strategies; not dictates or policies. We make these suggestions without regard to cost, which we have not

researched and would be dependent on many factors. Metro does not possess unlimited funds. Fiscal responsibility of the public's dollars is an essential guiding principle that we would have to be mindful of in selecting the most appropriately prioritized options.

XIV. RECOMMENDATIONS

The Office of the Inspector General recommends that LA Metro management considers the following:

FACILITY
Recommendation 1: Strengthen the system-wide effort to put more solar panels, green roof gardens, cisterns for collecting rain water, and other climate resilient solutions in place to reduce the effects of climate change.

WAYSIDE ENGINEERING
Recommendation 2: A drainage/flood solution for the underground vaults along the wayside right-of-way.

Recommendation 3: A solution to address the severely leaning crosswire poles at Washington Blvd. and Flower Street which support the trolley wires lines that are prone to sagging in extreme temperatures. When the cross wires are tightened to remove the sag caused by the heat the existing poles are pulled toward each other and should be replaced in a more stringent concrete foundation.

FACILITIES/BUS
Recommendation 4: Develop a plan to improve and add bus shelters with the cities.

Recommendation 5: Offer Incentives to cities to improve their bus shelters as a part of the NextGen review. Cities that partner with Metro to increase ridership, such as by written commitments for improving bus stop accommodations, warrant consideration for continuing or increased bus service coordination over those who do not.

Recommendation 6: Identify and prioritize bus stops that have high vulnerability to high heat and that could benefit from the addition or improved of bus shelters.

Recommendation 7a: Install dome top bus shelters that feature solar panels and energy saving LED lighting. Shelters should provide shade for passengers and should have enough room to accommodate a passenger in a wheelchair.

Recommendation 7b: Install shade canopies at bus stops that are made of a non-metallic material to block the sun's rays without the excess heat that typical metal canopies generate. Paint bus shelters in heat reflecting paint.

Recommendation 8: Install bus shelters with side louvers, which allow for breezes, thick screens made of grates to prevent the inside surface of the shelter from being too hot to touch and top shade to help reduce the radiant temperatures.

BUS OPERATIONS

Recommendation 9: For the upcoming electric buses, consider ordering a special electric engine cooling fan system. This engine cooling system protects the engine from overheating.

Recommendation 10: Consider installing plexiglass on the top and sides of the bus and reflecting films on the glass that can reduce the temperature inside the bus by as much as 15° F.

Recommendation 11: Plan for anticipated increases in rubber materials such as belts and hoses for bus and rail due to hot weather for operations and procurement inventory management and budget purposes.

VEHICLE ACQUISITION TEAM

Recommendation 12: Install for both buses and trains window tint (sacrifice film or glass) that is solar reflective and has a special film that significantly reduces the amount of the sun's rays.

Recommendation 13: Paint the body of the buses with solar reflective paint. Installation of these solar reflective measures reduces cooling loss inside the passenger compartment.

OPERATION MAINTENANCE

Recommendation 14: Expand partnerships with local schools to develop custom training programs such as HVAC, refrigeration and electrical programs to be ready for increased maintenance on bus and rail, like Valley Metro in Phoenix created a partnership with RSI, and thus created opportunities for Valley Metro maintenance employees (and future employees) to get customized training. Proactively, LA Metro is already working on a transit focused school in Los Angeles County.

RAIL & BUS OPERATIONS

Recommendation 15: Improving communication in Operations about temperature sensitive matters by having a Spring Heat Summit to prepare for summer as operations staff report.

RAIL ENGINEERING

Recommendation 16: Replace weight stack tension systems with newer technology of a spring stack tension system. The spring stack is appropriate for high heat climates, prevents sagging catenary lines, and eliminate manual inspections.

Recommendation 17: Paint the wayside cabinets (that are not covered in marine paint) with solar reflective paint. Painting with solar reflective paint reduces the heat to the inside of the cabinet and the risk of the components melting.

Recommendation 18: Provide mobile temperature lasers to train inspectors for rail monitoring.

Recommendation 19: Procure electronic monitoring track sensors to immediately measure rail temperatures in periods of sustained heat utilizing the most modern technology.

FACILITIES/RAIL

Recommendation 20: For outside rail platforms, consider installing a solar-powered ventilation system that consists of several overhead nozzles mounted on the inner roof of the canopy, which draw from a reservoir of cold water which cools and purifies the ambient air while removing harmful particulates and features push buttons near each seating area that provide blasts of cool air on demand.

Recommendation 21: Review the platform communication equipment which employs speakers located at top of the buildings for clarity. In the event of an emergency or weather announcement, people on the platform must be able to hear and understand the announcement.

RAIL OPERATIONS

Recommendation 22: Procure mini weather-stations and track-side probes to monitor the local trackside conditions.

Recommendation 23: Install an evaporative air cooling system that rapidly transforms hot air to cooler temperatures and has sensors that can transmit temperatures and other data to the ROC and BOC.

ROC

Recommendation 24: Provide funding and equipment for the ROC to receive "real time" information of weather conditions at different locations in LA County in order to address track conditions that might cause a system failure.

Recommendation 25: Complete and finalize the Severe/Inclement Weather Plan that was started in 2015.

Recommendation 26: Establish "baseline" Preventative Maintenance for servicing and testing emergency generators.

PROGRAM MANAGEMENT AND CONTROL

Recommendation 27: Elevate the sustainable comments/suggestions made by the ECSD staff in order to make the LA Metro system more resilient towards climate change.

Recommendation 28: Future transit construction, facility construction, and vehicle (bus and rail) purchases should consider impacts of climate change and ECSD should have input to procurement specifications.

EMERGENCY MANAGEMENT

Recommendation 29: Finalize the Emergency Management plan as it relates to system heat impacts.

CEO/EXECUTIVE DEPARTMENT

Recommendation 30: Continue to explore options for creating a manufacturing a rail/bus company in Southern California. Competition pushes the current technology and develops a fully functional transportation equipment that meets LA Metro's design standards and the goal of fully electric by 2030 and could promote a higher environmental consciousness.

Recommendation 31: Let the CAAP report assist the leadership of LA Metro in its decision processes to reduce agency-wide operational greenhouse gas emissions and implement resilient investment choices when replacing parts of the existing system or installing new operations.

Recommendation 32: Consider positioning LA Metro to successfully address climatic challenges by:

a. Establishing goals to effectively position LA Metro to meet climate change challenges into the state of good repair schedule.
b. Including necessary improvements in projects directed at climate change resiliency a part of the agencies performance goals.
c. Adopting strategies to limit exposure to the impacts of climate change and develop an All Hazard Mitigation Plan for the agency.
d. Establishing environmental and sustainability considerations as an element of every major project and procurement.

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	ECSD PROGRAM AND INITIATIVE STATUS UPDATE (Since September 2016 Response to Board Motion 57)							

Reference #		Year Initiated	Current Status	Completion Date	Comments	SC(1)	Motion 57 Reference (2)(3)(4)(5)(6)(7)(8)	Reference Back to FY19 Initiatives
	In Development / Completed / Continuous Improvement / Board Motion 57 Related Items							
	CLIMATE CHANGE & RESILIENCY							
	ISO 14001:2015 Certification and Implementation		(Continuous Improvement)	2017	Basis for the implementation of Metro Environmental Policy and other environmental and sustainability efforts for continual improvement.	*	E	
1	Design and Implement an Enterprise-Wide EMS solution for all facilities	2009	(In Development)	2018	EMS successfully implemented on 19 operating Divisions and three major capital projects. Evaluating the addition of three new support facilities over the next three years.	*	E	
2	Develop guiding document and integrate Climate Change into EMS	2017	(In Development)	2019	Climate change has been added to the Context of the Organization; guidance document for integrating climate change efforts into the EMS is not complete.	*	E	
3	Integrate EMS into construction activities	2016	(In Development)	2018	The Crenshaw LAX project was certified to ISO standards in 2017. Began implementation of EMS on PLE1 and Regional Connector late 2017. Ongoing evaluation of candidate construction projects to add to the EMS.	*	E	
4	Incorporate EMS into Risk Assessment/Management	2017	(In Development)	2019	Had been in discussions with Project Management Risk Management staff and QA staff on incorporating the ISO 14001 Environmental Management System principles as a risk reduction strategy.		E	
	Resiliency Framework							
5	Resiliency Indicator Framework Report	2014	(Continuous Improvement)	2018	Being updated per Cris' request. Due by end of 2018.		A4	Resiliency
6	Develop a Water Conservation Program	2015	(Continuous Improvement)	2019	Program is being managed with specific projects aimed at conserving water at Divisions and in ROWs	*	B4	
7	Develop a NOx Emissions Reduction Program	2008	(Continuous Improvement)	2017	89% reduction in NOx emissions from bus fleet	*	A1	Climate Action Plan Update
8	Develop a CO2e Emissions Reduction Program		(Continuous Improvement)	2017	25% reduction in CO2e emissions		A3	Climate Action Plan Update
9	Complete an updated study on flooding, rising seas levels, and high heat	2017	(In Development)	2019	Update to initial flood, sea level and high heat maps initiated as part of CAAP update.	*	A4	Climate Action Plan Update, Resiliency
10	Review Asset Management Framework/Tool	2017	(In Development)	2019	Being conducted as part of CAAP update.		A4	Climate Action Plan Update
	Climate Action & Adaptation Plan (CAAP)							
11	Create a CAAP working group	2017	(In Development)	2019	Working group updating CAAP	*	A2	Climate Action Plan Update
12	Develop an Energy and Sustainability Policy	2007	(Completed)	Jun-07	Board approved on June 28, 2007	*	A4	
13	Develop a CAAP	2017	(In Development)	2019	Initial CAAP was completed in 2012. The update will be completed in 2019	*	A2	Climate Action Plan Update
14	Develop Greenhouse Gas Emissions Cost Effectiveness Study		(Completed)	2012	While completed, study is underway to include new cost and environmental benefits monetization framework. This effort is separate from the CAAP.	*	A2	
15	Develop a Biomethane Implementation Study	2012	(Completed)	Jun-13	Board approved in June 2013. Metro executed first biomethane supply contract in August 2017. This effort is separate from the CAAP.	*	A1	
16	Develop a LCFS Market Analysis and Revenue Optimization Plan	2014	(Completed)	May-14	Board approved in May 2014. This effort is separate from the CAAP.	*	A1	
17	Implement Environmental Liability Assessment and Reporting		(Continuous Improvement)		METRO Policy Gen 49 covers this and is an ongoing annual activity. This is separate from the CAAP update.		A3	Climate Action Plan Update
	Metro Board Motion (2016-0157)							
18	Increase agency infrastructure resiliency	2017	(In Development)	2019	Assessment of agency-wide resiliency plans are in development. Framework will be presented to the Board in late Fall 2018/Winter 2019.		A3, E	Resiliency

ECSD PROGRAM AND INITIATIVE STATUS UPDATE (Since September 2016 Response to Board Motion 57)

Legend:
- In Development (Green)
- Completed (Yellow)
- Continuous Improvement (Purple)
- Board Motion 57 Related Items (Orange)

#	Item	Year Initiated	Current Status	Completion Date	Comments	SC(1)	Motion 57 Reference (2)(3)(4)(5)(6)(7)(8)	Reference Back to FY19 Initiatives
	Metro's Urban Greening Implementation Action Plan							
19	Project-specific Sustainability Coordinator	2016	(In Development)	2028	Each capital project is assigned a sustainability coordinator. Efforts are being made to include ECSD in the planning process to ensure that sustainability is integrated into the project scope, schedule and budget.	*	B3	
20	Increase the number of Urban Greening projects	2016	(In Development)	2019	Assessments and white paper being created to determine breadth and scope of urban greening opportunities; Initial rough order magnitude to implement completed	*	B4	
	Regional Advance Mitigation Planning (RAMP) Document							
21	Metro Regional Advance Mitigation Needs and Feasibility Assessment	2017	(Completed)	2018	Assessment document provided to the Metro Board in July 2018.	*	E	
22	Develop White Paper: Integrating Mitigation, Carbon Sequestration and Ecosystem Services at Community Relevant Scales	2017	(Continuous Improvement)	2018	Being updated to reflect urban greening opportunities.		E	
23	Develop opportunities for zero/near zero emission technologies	2016	(Continuous Improvement)	2025	Investigating and Implementing clean fuel technologies. Working with the Vehicle Engineering & Acquisition group to review technologies, negotiate rates and assess power infrastructure requirements.	*	D3	
	Green Procurement Policy, Framework and Implementation	2018	(In Development)	2019	Developing draft framework and policy. To be completed by Spring 2019	*	B2	
24	Sustainable Purchasing Guidelines for Gateway	2018		2019	Task order in process and initial stages of this project in beginning phases of research		B2	Green Procurement
	Metro Sustainability Implementation Plan (MCIP)	2018	(In Development)	2019	Draft MSIP outline discuss with Cris on 8/15/2018. As discussed, the MSIP update will proceed in conjunction with the development of the CAAP.		A, C	
25	Revise and update plan from 2008	2018	(In Development)	2019	Draft MSIP outline discuss with Cris on 8/15/2018. As discussed, the MSIP update will proceed in conjunction with the development of the CAAP.		A, C	Climate Action Plan Update
	LACMTA Green Construction Policy specification							
26	Revise the LACMTA Green Construction Policy specification	2016	(Completed)	2019	Coordinating efforts with V/CM and Project Management		B, D	Green Procurement
27	Decarbonization/Reduce onsite fuel use by 25%	2017	(Completed)	2020	Ongoing requirements to reduce onsite fuel during construction		B, D	Green Procurement
	Metro Climate Vulnerability and Risk Assessment	2016	(In Development)			*	A	
28	Update document to meet current standards	2017	(In Development)	2019	In development. Covered in the 2012 CAAP and being updated for ~2019 CAAP	*	A	Climate Action Plan Update, Green Procurement, Resiliency
	Update and Rebaseline the Metro Rail Design Criteria (MRDC)	2017	(Completed)	2018	Project was completed in 2017. To be rebaselined in 2018		A, B, C, D	Climate Action Plan Update, Green Procurement, Resiliency
29	Update baseline to cover new requirements, regulations and standards	2016	(Continuous Improvement)	2018	Reviewing/incorporating new requirements, e.g., ASCE PS 556: Owners' Commitment to Sustainability, into MRDC.		A, B, C, D	Climate Action Plan Update, Green Procurement, Resiliency
	Update and Rebaseline the Bus Rapid Transit (BRT)	2017	(Completed)	2018	BRT MRDC has been updated and is being reviewed by Metro Planning		A, B, C, D	Climate Action Plan Update, Green Procurement, Resiliency

ECSD PROGRAM AND INITIATIVE STATUS UPDATE (Since September 2016 Response to Board Motion 57)

	In Development 🟩 Completed 🟨 Continuous Improvement 🟪 Board Motion 57 Related Items 🟧	Year Initiated	Current Status	Completion Date	Comments	SC(1)	Motion 57 Reference (2)(3)(4)(5)(6)(7)(8)	Reference Back to FY19 Initiatives
30	Update baseline to cover new requirements, regulations and standards	2017	🟨	2018	Futher revision might be required after Metro Planning review		A, B, C, D	Climate Action Plan Update, Green Procurement, Resiliency
	Create relationships with external stakeholders regarding climate change							
31	Engage external stakeholder regarding industry standard best practices	2016	🟪	2020	Through the Sustainability Council, technology partners, consultants, vendors and the development of the CAAP, engaging with external engagement has been a focus for sustainability at ECSD	*	E	
	Establish a program for compiling new technologies and engineering solutions	2016	🟪	2020	Ongoing evaluation of technologies for integration into the metro system. We have not developed a system for cataloging and evaluating. In partnership with other Metro departments and organizaitons incuding outside organizaitons like LA Cleantech Incubator, currently ad hoc.		D1	
32	Develop a process for to catalog and evaluate new technologies	2016	🟪	2019	Currently ad hoc through a number of lists in various departments including ECSD, OEI, and across Metro.		D1	
	Develop an Annual Sustainability Report (Energy and Resources Report)							
33	Compile a report that illustrates all the data pertaining to Metro's sustainability achievements	2016	🟨	2018	Published 2018 Energy & Resource Report in July 2018	*	A, B, C, D	Climate Action Plan Update, Green Procurement, Resiliency
	Maintain Metro's Environmental Training Institute (ETI)	2013	🟩		In place as part of Metro Environmental Management System	*	D1	
34	On-going program management and support will be provided for the ETI	2016	🟩	2018	Continually updating modules and working on new modules for internal awareness and training of regulatory issues; trained more than 700 and certified more than 400 Metro employees and stakeholders since 2017.	*	D1	
	Incorporate Sustainability plans into metro's Project Development Plans							
35	Sustainability Plans will be incorporated into project development for ALL construction projects	2016	🟩	2018	ECSD is continually working with Project Management and Construction staff to enforce the development and implementation of sustainability plan.	*	B, C	
	Strengthen and Expand Metro's Green Construction Policy (GCP)							
36	Review GCP to identify opportunities to expand and strengthen Specifications Section 01 35 66	2016	🟪		Continually being improved and updated.	*	B, C	Climate Action Plan Update, Green Procurement, Resiliency
	Update and Implement Metro's Sustainability Program and Project Plan	2016	🟪					
37	Ongoing management and support for the sustainability program and projects	2016	🟪		ECSD management and staff are dedicated to supports Metro's sustainability programs and projects, both on Capital projects and O&M	*	B, C, E	

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- Completed (yellow)
- Continuous Improvement (purple)
- Board Motion 57 Related Items (gold)

#	Item	Year Initiated	Current Status	Completion Date	Comments	SC(1)	Motion 57 Reference (2)(3)(4)(5)(6)(7)(8)	Reference Back to FY19 Initiatives
	ENERGY							
38	**Energy Management Action Plan (EMAP)**	2016	Continuous Improvement		Working through this process within the EMS. Completing an Energy Resiliency White Paper to feed into a Metro Resiliency Policy.		D	
	Metro Board Motion (2016-0157)							
39	Reduce facility energy use/cost by 2020	2017	In Development	2020	Developing baseline for energy-use intensity to account for facility growth	*	D	
40	Increase fuel efficiency	2015	In Development	2020	ZEV transitions will increase fuel efficiency	*	A4, D	Resiliency
41	Increase energy efficient lighting	2010	In Development	2020	Various lighting upgrades in progress	*	A4, D	Resiliency
42	Increase Propulsion and Auxiliary Systems	2013	In Development		Developed a Sustainable Rail Plan in 2013 that identifies opportunities for address these issues. Several pilots have been completed at the Red/Purple Line and Gold Lines with others underway.		A4, D	Resiliency
43	Implement alternative energy generation technology	2014	In Development		Developing PPA project and supporting other Metro renewable energy installation projects	*	A4, D	Resiliency
	Electric Vehicle (EV) Charging Program							
44	Conduct feasibility study focusing on conversion of non-revenue vehicles to EV	2016	Completed	Dec-16	Project was completed	*	A3, A4, A5, D	Climate Action Plan Update
45	Conduct feasibility study of zero emission vehicles to grid (V2G)	2018	In Development	Sep-18	Metro consultant is finalizing report. December 2018.		A3, A4, A5, D	Climate Action Plan Update
46	Develop EV Charger Implementation Plan	2018	In Development	Oct-18	Metro consultant is continuing to conduct interviews and develop report		A3, A4, A5, C, D	
	Bus Electrification Program							
47	Provide ongoing and as-needed support	2017	Continuous Improvement	2020	Participating in regular coordination meetings with Vehicle Technology and Acquisition	*	A1, A2, A3	
48	Develop Rate analysis and structure - Resiliency	2015	In Development		Participating in regular coordination meetings with utility partners to identify opportunities.		A4, D, E	Resiliency
49	Develop Bus Division Energy Resiliency Site Analysis and Planning	2016	Completed	2017	White Paper completed by Metro consultants. Initiating next phase for implementation		A4, D, E	Resiliency
	Gateway LED Lighting and advanced lighting controls		In Development					
50	Retrofit Building LED Lighting and advanced lighting controls	2013	In Development	2019	Completed audits in 2016. Developed specifications in 2017. A building survey to develop As Built drawings was conducted in July/August 2018; final As Built drawing to be completed by September 2018. RFP package is being finalized.		A4, D, E	
51	Retrofit Garage LED Lighting Retrofit	2017	In Development	2018	Project is underway to be completed by December 2018		A4, D, E	
52	Parking Structure Lighting Upgrades	2017	In Development	2018	Project is over 50% complete (four parking structures - not gateway)		A4, D, E	
53	**Central Maintenance Facility Building 5 Air Scrubber**	2016	In Development	2018	Finalizing solicitation package. Pre-Bid Conference and Job Walk scheduled for August 29, 2018.		A4, D, E	
	Comprehensive Energy Efficiency Project Portfolio (BUS)							
54	Energy Conservation measures at Bus Div. 3,7,9 and 15	2015	In Development	2019	Lighting measures have been completed at Division 7 Maintenance Bay and Division 9 Fuel Island. Additional measures being considered.		A4, D, E	
55	Perform Energy Audits to plan ECMs	2015	Completed	2020	Energy audits were completed in 2015. Measures identified included $1.4M in lighting and mechanical measures, annual kWh savings of 1,986MW.		A4, D, E	
	Division 18 Energy Retrofit Project Portfolio							
56	Conduct energy audit to develop ECMs	2017	Completed	2020	Audits identified measures that would reduce overall energy cost by 13.5%. Measures are currently being discussed with facility stakeholders.		A4, D, E	

ECSD PROGRAM AND INITIATIVE STATUS UPDATE (Since September 2016 Response to Board Motion 57)

In Development	Completed	Continuous Improvement	Board Motion 57 Related Items
(green)	(yellow)	(purple)	(orange)

		Year Initiated	Current Status	Completion Date	Comments	SC(1)	Motion 57 Reference (2)(3)(4)(5)(6)(7)(8)	Reference Back to FY19 Initiatives
	103rd Watts Outdoor Area Lighting	2017	(yellow)	2018	Pilot project was completed on February 11, 2018. Ten-year cost savings = $41,118.		A4, D, E	
57	Design and Install energy efficient Outdoor Area Lighting (OAL) service	2016	(purple)		Project is in next phase of implementation		A4, D, E	
	Gateway Parking Garage Variable Frequency Drive (VDRs)							
58	Install VDRs on exhaust fans and supply fans	2016	(green)		Project was identified in April 2016 Gateway Building Energy Audit but was not immediately pursued. General Services is considering this project		A4, D, E	
	Division 30 Energy Efficiency Project Package Portfolio							
59	Install a portfolio of ECMs at the Central Maintenance Facility (CMF)	2015	(green)		Energy audits were conducted which identified $2.5M in lighting and mechanical measures. Projects have not been developed or funded.		A4, D, E	
	Comprehensive Energy Efficiency Project Portfolio (RAIL)							
60	Install a portfolio of ECMs at Divisions 11 & 22	2014	(yellow)	2016	Lighting retrofits and controls were completed at Division 11 and 22. Division 22 project verified 976,070 kWh and $59,450 in annual savings.		A4, D, E	
	Community Solar and Clean Powers Authority							
61	Work with US Department of Energy and the LA County Clean Power Authority (CPA) in increasing renewable energy mix for propulsion and facilities, specifically within the Southern California Edison (SCE) territory	2015	(purple)	2019	In negotiations with community solar provider, received US DOE grant to develop comprehensive community solar program. Transition all electric meters within SCE territory to CPA for increased renewable mix and discounted energy rates.	*	A4, D, E	Resiliency
	Conjunctive Billing and Direct Access							
62	Work with utility partners to achieve favorable structures for power	2015	(green)	2019	Participating in regular coordination meetings with utility partners to identify opportunities.		A4, D, E	Resiliency
	Power Purchase Agreement (PPA) 1							
63	PPA to install PV/Roof Repairs at Division 9, 11, 14 and 22	2016	(green)	2019	Roof replacement IFB to be released shortly; targeting Notice to Proceed by the end of 2018. *The roof IFB has been released.* Electrical surveys conducted at Divisions 9, 11, 14, and 22 to identify spare conduit for connecting PV systems to the electrical service and determine capacity of the electrical systems. PV PPA SOW under going revision based on information collected during the electrical surveys. Meeting with ATU representative to be scheduled once the SOW is updated. PPA contract documents being finalized.	*	A4, D, E	Resiliency
	Bus Yard Canopy Conceptual Design							
64	Design concepts for solar canopies at three bus divisions	2016	(yellow)	2018	Design concepts were completed. Results being considered for additional projects.	*	A4, D, E	Resiliency
	Biomethane Procurement							
65	Manage and procure biomethane fuel	2015	(purple)		Board approved in June 2013. Metro executed first biomethane supply contract in August 2017. Bench solicitation being developed for RFP release in Fall 2018.	*	A4, D, E	
	Photovoltaic Preventative Maintenance							
66	Implement a PV Preventative Maintenance system	2017	(yellow)	2018	Program was first implemented in 2015 and has been successful. 2018 Q1 system performance improved 18.8% over Q1 2017 and 40.5% over Q1 2016	*	A4, D, E	
	Measurement and verification (M&V) of Wayside Energy Storage System (WESS)							
67	M&V data on the effectiveness of the flywheel storage system in storing energy		(purple)		Data is currently generated		D, E	
	Pathways to Zero Net Energy (PZNE)							
68	PZNE seeks to eliminate energy-related greenhouse gas emissions	2017	(yellow)	Jul-17	Draft report was completed and then project was shelved due to intellectual property conflicts.		D, E	

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	Sustainability Plan - Energy Security Operations Center (ESOC)							
69	Provide ongoing and as-needed support	2017			Supporting project on an as needed basis		B, C, E	
	LOC64 Sustainability Plan							
70	Provide ongoing and as-needed support	2017			Supporting project on an as needed basis		B, C, E	
	Sustainability Plan - Westside Purple Line Extension (PLE) Section 1							
71	Provide ongoing and as-needed support	2017			Coordinating with the contractor for the May and June submittals.		B, C, E	
	Sustainability Plan - Westside Purple Line Extension (PLE) Section 2							
72	Provide ongoing and as-needed support	2017			Reviewing contractor's response to the January submittal; reviewing April and May submittals.		B, C, E	
	Sustainability Plan - Rail 2 River							
73	Provide ongoing and as-needed support	2017			Energy team gave technical advice on possibility of using DWP OAL program	*	B, C, E	
	Westwood Greenway							
74	Provided ongoing support and first mile, last mile strategies	2015			Development sustainability strategies for helping communities connect to transit		B1, B4, C3	
	Environmental Attribute (Carbon Credit) Reporting and Sales							
75	Manage the Low Carbon Fuel Standard and Renewable Fuel Standard program	2016		2028	Metro sales are 9.5% above market average. In 2018 Metro sold 150,000 credits generating $25M.		E	
	LEED-EBOM for Gateway							
76	Pursue a LEED-EBOM Re-Certification based on new lighting and other measures	2015		2019	LEED recertification is pending completion of ongoing energy measures at gateway including building lighting and controls and garage.		A, B, C, D, E	
	Division 13 LEED Audit							
77	Conduct a LEED Audit at Division 13 to identify and address ongoing operational activities	2017			Report is being finalized. Findings have resulted in additional retro-Cx activities at Division 13		A, B, C, D, E	
	Develop Enhanced Process for Commissioning and Retro-Commissioning of Facilities							
78	Implement process to reduce energy consumption through proper O&M of equipment/systems	2017		2018	Project is in development		A, B, C, D, E	
	Evaluate an Energy Management System (EMS/BMS) for Building to Reduce Energy Consumption							
79	Evaluate existing BMS systems to determine requirements for a enterprise-wide EMS system	2017		2018	Project is in development		A4, D1, D2, E	
	Conduct a Microgrid Study to determine the resiliency requirements for the Metro Power System							
80	Evaluate the system to determine if microgrids could keep critical infrastructure functioning	2016		2018	Project is in development. Working with city of Santa Monica on Bergamot Station Pilot		A4, D	Resiliency

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In Development								
Completed								
Continuous Improvement								
Board Motion 57 Related Items								
SOLID WASTE & RECYCLING							
	Metro Board Motion (2016-0157)							
81	Reduce environmental liabilities related to hazardous waste	2016		2020	A review of 15 of Metro's waste related construction policies was completed in 2016 and recommendations for policy updates were identified. Recommendations to be implemented. On-going improvement related to the management of hazardous waste are being implemented quarterly.		A4, E	
	Minimize Amount of Paper Waste and Related Consumables							
82	Evaluate paper saving initiatives	2016		2018	Paper saving initiatives have been identified through Division waste characterization studies, facility walk-throughs, and staff interviews. Opportunities need to be reviewed and prioritized for implementation.	*	E	
	Reduce Stretch Wrap and Related Operations Waste							
83	Assess alternates to stretch wraps	2016		2018	A tech memo on the alternatives to stretch and sustainable shipping methods is in development and expected to be delivered in September 2018.		E	
	Revise Metro's Environmentally Preferred Purchasing Policy							
84	Develop a "Green Team" to review product and develop consensus	2016		2018	This task is being removed from the solid waste program and addressed as part of the green purchasing program		D2, E	
85	Develop a Metro-wide environmentally Preferred Purchasing Program	2016		2018	Being integrated into the Green Procurement program		D2, E	
	Increase Material Refurbishing and Re-Use							
86	A re-use program to include coffee cups, cleaning supplies, durable goods, electronics, etc.	2016		2018	Existing material reuse programs were identified through the Metro solid waste baseline assessment process. New programs for implementation are being proposed as part of the Waste Characterization Study for Gateway		E	
	Evaluate Processes and Methods to Maximize Waste Diversion							
87	Evaluate Metro's Waste service levels to determine if service can be reduced	2016		2019	Service level evaluation is being conducted as part of the new solitation for waste collecting and disposal		B2, E	
	Identify Key Recyclable Items in Waste Stream							
88	Develop a enterprise-wide recycling system	2016		2020	Waste characterization studies have been completed at Gateway, Division 7, and Division 11. Recyclable items to capture through program improvements have been identified. A recycling program is being implemented in fall 2018 at Gateway as a test case for the rest of the agency.		B2, E	
	Improve Recycling Rates Through Operational Awareness and Signage							
89	Develop a enterprise-wide recycling system	2016		2020	Metro Communications was engaged in August 2018 to design new waste and recycling signage for the agency. Signage will be rolled out at Gateway first as part of the new recycling program.		B2, E	
	Reduce Paint Waste and Recycle Usable Paint							
90	Evaluate improvements to the paint use and recycling process	2016		2020	Being reviewed as part of the wast mangement process		B2, E	
	Prevent Contamination of Recyclable Through Training and Education							
91	Develop and provide training sessions to Metro Staff	2016		2019	A custodial and general staff training program will be developed in fall 2018 to support the roll out of the Gateway recycling program.		D1, E	
	Develop and Implement an Organic Waste Management System							
92	Conduct a pilot program for Organic Waste Collection	2016		2019	Organic recycling requirements were integrated into the new tree trimming contract in spring 2018. Similar requirements need to be added to the landscaping contract. An organics collection program will be developed with the Metro cafeteria in fall 2018.		B4, E	

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	In Development 🟩 **Completed** 🟨 **Continuous Improvement** 🟪 **Board Motion 57 Related Items** 🟧							
	Ensure Waste Management Policy is Compliant at State/Federal and Local Levels							
93	Evaluate and confirm Metro's Policies	2016	🟩	2019	Recycling SOP and Gateway Waste Management Guidelines need to be updated to reflect BMPs and state statutory requirements. Work to be completed in FY19, as budget allows.		B, E	
	Establish Metrics and Revise Policies for Demo/Construction/Renovation Projects for Compliance							
94	Expand requirements to ensure compliance during construction activities	2016	🟪	2028	ECSD incorporated as a pilot the Crenshaw Project into the Environmental Management System to capture best practices and gaps in environmental construction compliance. Director Solis, during the August 2018 Board meeting requested documentation and report back in a future meeting (no timing provided).		B, D, E	
	Establish Baseline Metrics for Each Facility/Operation							
95	Collect and set baseline metrics for all facilities and existing programs	2016	🟨	2018	An agency wide solid waste baseline was finalized in Summer 2018 using the 2016 calendar year. The baseline will be updated in Fall 2018 to reflect additional information gathered through the Division waste characterization studies.	*	E	
	Develop a Comprehensive Solid Waste Performance Metrics System							
96	Develop a performance metrics system that ensure compliance with state/Federal and Local laws	2016	🟨	2018	Metrics tied to state and local laws were developed as part of the Metro baseline development process.	*	E	
	Standardize Solid Waste/Recycling Reporting Protocols into EMS							
97	Update EMS to include evaluation and monitoring protocols	2016	🟪	2019	Taking on the ongoing EMS efforts, ECSD staff is exploring opportunities of incoporation into the existing management system		B, D, E	
	Create Project Evaluation Tool to Rank/Prioritize Waste Management Initiatives							
98	Develop a policy, tool, and SOP	2016	🟨	2020	An Excel based tool was created to assist with ranking and prioritizing solid waste initiatives for implementation. The tool is being evaluatied for implementation into projects.		B, D, E	
	Integrate Water and Energy Sectors to Find Program Collaboration Opportunities							
99	Collaborate within the Energy and Water Sector to identify outreach and education efforts	2016	🟩		Working directly with LADWP and SCE to identify collaboration opportunities for energy development, integration and rate structures.		B, D, E	
	Develop and Integrated Waste Management Hierarchy for Highest/best Use of Materials							
100	Develop and adopt an integrated waste management hierarchy (IWMH)	2016	🟩	2019	A proposed IWMH has been developed and presented to Metro. Metro to determine how the IWMH policy will be formally adopted.		E	
	Maximize Disposal Reduction using the IWMH							
101	Expand the IWMH with a focus on Material Recovery Facility (MRF)	2016	🟩	2019	Disposal reduction and diversion opportunities following the IWMH were identified through the waste characterization studies. Recommendations need to be prioritized for implementation based on the remaining program budget.		E	
	Report Annually on Waste Sector Initiatives and Successes							
102	Report the success of the program in the E&R Report	2016	🟨	7/1/2018	Reporting for the 2017 year is complete. This is an annual initiative and requires ongoing data monitoring and validation throughout the year.	*	B3, D1, E	

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WATER								
	Metro Board Motion (2016-0157)							
103	Conserve and reduce water usage	2016	[green]		Surveys and pilots to identify and test water conservation measures are underway.	*	B1, E	
104	Future construction projects to use methods to capture and treat stormwater/reclaimed water	2012	[green]		Incorporated into Metro Rail Design Criteria and Technical Requirements. *Developing equivalent requirements for BRT infrastructure.*	*	B, E	
105	Construction project (>$5M) shall use sustainable building material	2012	[green]		Incorporated into Metro Design Criteria and Technical Requirements	*	B, E	
	Draft 2015 Urban Water Management Plan							
106	By 2017 reduce per capita potable water use by 20% (2025 - 2035)	2015	[purple]		20% reduction in water use (from 2015 levels) was achieved in 2016, but consumption increased in 2017.	*	B, E	
	Apply Diamond Seal System (DSS) to ALL Bus to Reduce Bus Washing							
107	Apply DSS to reduce dirt and residue build-up	2015	[yellow]	2017	Program implemented in 2016. Results showed no significant change in water use. Pilot discontinued		E	
	Retrofit BUS/CAR Wash Nozzles with Higher Efficiency Options							
108	Modify existing nozzles to reduce the amount of water needed to complete vehicle cleaning	2015	[green]		A pilot project is currently underway at Division 15 to test the water savings and cleanliness of buses using low-flow nozzle alternatives. 2.0 GPM is the baseline. A combination of 1.0 GPM and 0.5 GPM nozzles will be tested.		E	
	Adjust Sensors in Car Wash Areas to Limit Water Usage							
109	Modify the cycles to limit the amount of water used Before, During and After the Wash	2015	[yellow]		Timing adjustment pilots are being conducted at Division 7 and Division 9. Adjustments were made the week of 8/13/18.		E	
	Re-evaluate and Implement All 15 Water Conservation Strategies Outline in 2010 Action Plan							
110	Update all strategies to identify additional water conservation opportunities	2015	[yellow]	6/25/2018	A tech memo assessing the 2010 Water Action Plan strategies and recommending updates based on current opportunities was submitted to Metro on 6.25.18. Strategies are being prioritized for implementation.	*	D, E	
	Restrict Irrigation with Potable Water							
111	Research/evaluate options to reduce potable water use for irrigation	2015	[yellow]		Irrigation study conducted in 2015. Initial review and study completed. A tech memo on an evaluation of irrigation along the Orange Line was submitted to Metro on 1.29.18. The next step is to develop a SOW for irrigation controller replacement and determine a funding mechanism for the annual network subscription. An irrigation plan for Division 15 has also been developed. Field work requires capital funding.	*	D, E	
	Adjust BUS/CAR Wash Blowers to Capture and Recover Wash Water							
112	Pilot studies to evaluate effectiveness of modifying blowers to conserve water		[green]		Project still under development.		D, E	
	Reduce Water Consumption							
113	Remove Ornamental Turf and Install Drought Tolerant Plants	2015	[green]	2018	A tech memo on the results of a Division survey and turf removal opportunities was submitted to Metro on 6/4/18. A work plan is being developed for implementing a turf removal project at Division 15. Implementation of drought tolerant and native landscaping for *new* construction has been in place since 2003.	*	B2	
114	Conduct a survey with a focus on upcoming renovations	2016	[yellow]	2017	Survey Completed.		B2	
	Retrofit Cooling Towers							
115	Complete study to improve water recycling and reduce cost of operations	2017	[yellow]	8/15/2018	Cooling towers, boilers, and chillers at Gateway are already being replaced by General Services. This project is no longer necessary.		D, E	
	Replace Sanitary and Kitchen Fixtures							
116	Identify existing fixtures to be replaced with high efficiency plumbing fixtures	2017	[green]	2019	Sanitary and kitchen fixtures have been audited at the Divisions. A SOW is being developed for a pilot at Division 15 identifying the recommended make/model of the fixtures and project cost.		D, E	

ECSD PROGRAM AND INITIATIVE STATUS UPDATE (Since September 2016 Response to Board Motion 57)

Legend	
In Development	(green)
Completed	(yellow)
Continuous Improvement	(purple)
Board Motion 57 Related Items	(orange)

#	Initiative	Year Initiated	Current Status	Completion Date	Comments	SC(1)	Motion 57 Reference (2)(3)(4)(5)(6)(7)(8)	Reference Back to FY19 Initiatives
	Track Water Consumption for Individual Operations							
117	Prioritize water conservation efforts based on survey of Metro facilities	2015	(purple)	Ongoing	Water use is currently being tracked for all facilities, but data validation and improvements to the tracking system are ongoing efforts. Sub-meters have been installed on the Division 7, 9, 15, and 24 bus washes to improve water tracking capabilities.		B, D, E	
	Identify Opportunities for Graywater Use							
118	Conduct study to determine if graywater retrofits are suitable for Metro Facilities	2017	(yellow)	3/30/2018	A tech memo on opportunities for Metro to retrofit existing properties for graywater was submitted to Metro on 3/30/18. Exploring how to fund implementation.		B2, B4, E	
	Increase Capture of Storm Water Runoff for Use in Landscaped Areas							
119	Increase bio-retention tech., permeable pavement, vegetated swales and infiltration trenches	2017	(green)		A tech memo evaluating strategies to capture and store stormwater was submitted to Metro on 5/3/18. Recommendations to be reviewed by ECSD and prioritized for implementation.		B1, B2, E	
	Require Existing Facilities to use Technologies to Capture, Reuse and Treat Storm Water Onsite							
120	Implement best management practices regarding storm water recapture and reclamation	2016	(purple)	2019	Has been a best practice since 2003 in major capital projects. Current state and local requirements are being implemented on projects within Metro rights of way but has been in discussion with City and County of LA in other jurisdictions. LA Metro is inclined to install but not maintain these Low Impact Development strategies at locations other than Metro rights-of-way.	*	B1, B2, E	
	Educate Public on Water Conservation and Water Database							
121	Information shall be shared with the public via website and other outlets	2017	(purple)		Metro ECSD website has information including annual reports that serve as information. We also have an opportunity to increase awareness through Green Workforce training and on-site program information panels at stations and projects like Division 4 permeable pavement.	*	D1, E	
	Educate Staff on Water Usage and Conservation Through Training							
122	Develop and integrate content for training staff on water usage and conservation strategies	2017	(purple)		We also have an opportunity to increase awareness through Green Workforce training and quarterly Metro ENV SP and G-Pro certified Metro staff.		D1, E	
	Identify Funding Opportunities and Collaborate With Local and State Agencies Water Projects							
123	Identify external funding sources for water-related projects	2017	(green)		In current conversation with P3, city, and other entities on possible funding opportunities for these types of projects.		E	
	Maximize Use of Recycled Water							
124	Develop a Recycled Water Plan	2015	(green)	2019	A work plan for the cross connection test at Division 3 has been prepared and submitted for review. Metro to determine who will complete this test. Opportunity to connect Orange Line irrigation at Chandler and Colfax has been identified and is being scoped out.		B2, B3, D1, E	
125	Evaluate the feasibility and cost effectiveness of using recycled water (Purple Pipe)	2015	(green)		Purple pipe installed in capital projects such as Metro Orange Line MOL and MOL Extension. Metro has participated in the LADWP Integrated Water Resource Planning Process, City-wide One Water LA initiative, and the LA Sanitations Bluebelt research projects to develop opportunities for recycled water in multiple LA Meto facilties. Infrastructure has been built in MOL and MOL extension, but recycled water in limited use due to limited supply. Opportunities have been identified and need to be followed-up.		B2, B3, D1, E	

	ECSD PROGRAM AND INITIATIVE STATUS UPDATE (Since September 2016 Response to Board Motion 57)								
	In Development		Year Initiated	Current Status	Completion Date	Comments	SC(1)	Motion 57 Reference (2)(3)(4)(5)(6)(7)(8)	Reference Back to FY19 Initiatives
	Completed								
	Continuous Improvement								
	Board Motion 57 Related Items								
	Upgrade Metro Resiliency in Terms of Water Supplies for Catastrophic Events								
126	Increase emergency water supply at Divisions and Locations		2018			Working with Emergency Management Department on a path forward.		A4, B, D1, E	
	Implement Green Construction Policies Governing New/Future Metro Divisions								
127	Leverage existing policies, ordinance, and regulations requiring the technologies that capture, treat and infiltrate storm water		2017			Expand implementation into existing facilities. Currently a requirement in new facilities.		A4, B, D1, E	
	Increase Existing underground Storage Capacity for Storm Water								
128	Assess the usage of storm water capture cisterns to reduce the use of potable water		2017		2019	Implemented in several facilities. A tech memo evaluating underground storage of stormwater system-wide was submitted to Metro on 5/3/18. Recommendations currently being reviewed by ECSD staff		A4, B, D1, E	

References:
(1) Presented to the Sustainability Council either as a stand alone item or part of an overall related report.
(2) Refer to Board Motion Item #57 by Garcetti, Kuehl, Ridley-Thomas, Solis, and Bonin Dated February 18, 2016.
(3) Each of the codes below refer to the items in Motion Item #57.
(4) Item "A" referrs to climate change and resiliency
(5) Item "B" refers to sustainable infrastructure strategies
(6) Item "C" refers to transit connectivity activities
(7) Item "D" refers to green technology and partnerships
(8) Item "E" refers to Metro Environmental Compliance and Sustainability activities

BUS PART CONSUMPTION - SUMMER and WINTER
2014 -2018

Summer Part Items consists of cooling parts such as A/C belts, A/C compressors, Alternators, Coolant - Thermostat, Inverter -Control Box and many other A/C type components. **The 5-year average of Summer Part Consumption for Bus is: $1.6 million**

Winter Part Items consists of Wiper Blades, Windshield Wiper Arms, Heater/Defroster Blower ASM's, Air intake Filters, Wiper Control Motor ASM, and many other wet weather type components. **The 5-year average of Winter Part Consumption for Bus is: $404 thousand**

Year	Winter Part Items	Summer Part Items
2018	$352,412	$1,610,598
2017	$407,981	$1,547,966
2016	$406,501	$1,666,561
2015	$413,105	$1,698,741
2014	$439,207	$1,572,910

■ Winter Part Items   ■ Summer Part Items

Metro Gold Line Balanceweight Analysis

Wire Run	Tension Length	Station	Midpoint/FT Sta	Hot Temp	Neutral Temp	Cold Temp	BW Rise	BW Fall	Total Movement	Available Travel	Recommended Fix
881	1951	390+37	409+88	130	75	20	3.026	-3.026	6.052	6.86	OK
882	2086	388+97	409+83	130	75	20	3.235	-3.235	6.471	7.03	OK
883	1952	374+85	394+37	130	75	20	3.028	-3.028	6.055	5.53	OK
884	1847	376+40	394+87	130	75	20	2.865	-2.865	5.729	6.60	OK
885 S	2415	329+05	353+20	130	75	20	3.746	-3.746	7.491	3.59	OK
885 N	2645	379+65	353+20	130	75	20	4.102	-4.102	8.205	4.80	OK
886 S	2265	330+55	353+20	130	75	20	3.513	-3.513	7.026	4.81	OK
886 N	2792	381+12	353+20	130	75	20	4.330	-4.330	8.661	4.76	OK
887	2589	333+65	307+76	130	75	20	4.016	-4.016	8.031	3.80	OK
888	2584	335+15	309+31	130	75	20	4.008	-4.008	8.016	3.07	OK
889	1826	312+41	294+15	130	75	20	2.832	-2.832	5.664	6.17	OK
890	1796	313+41	295+45	130	75	20	2.786	-2.786	5.571	5.51	OK
891	2283	296+85	274+02	130	75	20	3.541	-3.541	7.082	4.75	OK
892	2600	298+10	272+10	130	75	20	4.033	-4.033	8.065	3.02	OK
897 S	2395	135+16	159+11	130	75	20	3.715	-3.715	7.429	4.90	OK
897 N	1320	172+31	159+11	130	75	20	2.047	-2.047	4.095	8.59	OK
898 S	2250	136+61	159+11	130	75	20	3.490	-3.490	6.980	4.60	OK
898 N	1320	172+31	159+11	130	75	20	2.047	-2.047	4.095	8.59	OK
899 S	1711	102+70	119+81	130	75	20	2.654	-2.654	5.308	2.44	OK
899 N	1818	137+99	119+81	130	75	20	2.820	-2.820	5.639	6.69	OK
900 S	1711	102+70	119+81	130	75	20	2.654	-2.654	5.308	2.44	OK
900 N	2158	141+39	119+81	130	75	20	3.347	-3.347	6.694	4.89	OK
901 S	3101	100+49	131+50	130	75	20	4.810	-4.810	9.619	-3.54	SPRING TENSIONER
901 N	3150	163+00	131+50	130	75	20	4.886	-4.886	9.771	-2.19	SPRING TENSIONER
902 S	3101	100+49	131+50	130	75	20	4.810	-4.810	9.619	-3.54	SPRING TENSIONER
902 N	2975	161+25	131+50	130	75	20	4.614	-4.614	9.228	-1.65	SPRING TENSIONER
903	2075	159+80	180+55	130	75	20	3.218	-3.218	6.437	1.15	OK
904	2135	179+55	158+20	130	75	20	3.311	-3.311	6.623	-1.04	SPRING TENSIONER
905	2450	177+80	202+30	130	75	20	3.800	-3.800	7.600	-2.02	SPRING TENSIONER
906	2760	176+55	204+15	130	75	20	4.281	-4.281	8.562	-1.98	SPRING TENSIONER
907 S	3045	198+75	229+20	130	75	20	4.723	-4.723	9.446	-2.86	SPRING TENSIONER
907 N	3208	261+28	229+20	130	75	20	4.976	-4.976	9.951	-2.87	SPRING TENSIONER
908 S	2855	200+65	229+20	130	75	20	4.428	-4.428	8.856	-2.27	SPRING TENSIONER
908 N	3070	259+90	229+20	130	75	20	4.762	-4.762	9.523	-0.94	SPRING TENSIONER
909 S	1730	257+40	274+70	130	75	20	2.683	-2.683	5.366	3.22	OK
909 N	2930	304+00	274+70	130	75	20	4.544	-4.544	9.089	-0.51	SPRING TENSIONER
910 S	1865	256+05	274+70	130	75	20	2.893	-2.893	5.785	2.80	OK
910 N	3065	305+35	274+70	130	75	20	4.754	-4.754	9.508	-0.92	SPRING TENSIONER
911	2929	330+50	301+21	130	75	20	4.543	-4.543	9.086	-0.84	SPRING TENSIONER
912	2620	329+00	302+80	130	75	20	4.064	-4.064	8.127	-0.21	ADJUST WEIGHT HEIGHT

Metro Gold Line Balanceweight Analysis

Wire Run	Tension Length	Station	Midpoint/FT Sta	Hot Temp	Neutral Temp	Cold Temp	BW Rise	BW Fall	Total Movement	Available Travel	Recommended Fix
917 S	3158	380+75	412+33	130	75	20	4.898	-4.898	9.796	-1.96	SPRING TENSIONER
917 N	3292	445+25	412+33	130	75	20	5.106	-5.106	10.212	-2.63	SPRING TENSIONER
918 S	3168	380+65	412+33	130	75	20	4.914	-4.914	9.827	-1.99	SPRING TENSIONER
918 N	3119	443+52	412+33	130	75	20	4.838	-4.838	9.675	-1.09	SPRING TENSIONER
919 S	2380	440+00	463+80	130	75	20	3.691	-3.691	7.383	1.20	OK
919 N	3055	494+35	463+80	130	75	20	4.738	-4.738	9.477	-0.89	SPRING TENSIONER
920 S	2700	436+80	463+80	130	75	20	4.188	-4.188	8.375	-0.29	ADJUST WEIGHT HEIGHT
920 N	2816	491+96	463+80	130	75	20	4.368	-4.368	8.735	-0.15	ADJUST WEIGHT HEIGHT
921 S	2900	486+80	515+80	130	75	20	4.498	-4.498	8.996	-0.41	ADJUST WEIGHT HEIGHT
921 N	2910	544+90	515+80	130	75	20	4.513	-4.513	9.027	-0.94	SPRING TENSIONER
922 S	2860	487+20	515+80	130	75	20	4.436	-4.436	8.872	-0.29	ADJUST WEIGHT HEIGHT
922 N	2685	542+65	515+80	130	75	20	4.164	-4.164	8.329	-0.25	ADJUST WEIGHT HEIGHT
923 S	2325	538+85	562+10	130	75	20	3.606	-3.606	7.212	0.87	OK
923 N	1981	581+91	562+10	130	75	20	3.073	-3.073	6.145	2.44	OK
924 S	2500	537+10	562+10	130	75	20	3.878	-3.878	7.755	0.83	OK
924 N	2113	583+23	562+10	130	75	20	3.277	-3.277	6.555	2.03	OK
925 S	2404	579+48	603+52	130	75	20	3.729	-3.729	7.457	1.13	OK
925 N	1833	621+85	603+52	130	75	20	2.843	-2.843	5.686	1.40	OK
926 S	2271	580+81	603+52	130	75	20	3.522	-3.522	7.045	1.54	OK
926 N	1833	621+85	603+52	130	75	20	2.843	-2.843	5.686	1.40	OK
927	2885	617+60	646+45	130	75	20	4.475	-4.475	8.949	-2.87	SPRING TENSIONER
928	3054	617+66	648+20	130	75	20	4.737	-4.737	9.474	-3.39	SPRING TENSIONER
929 S	3095	643+25	674+20	130	75	20	4.800	-4.800	9.601	-3.52	SPRING TENSIONER
929 N	2970	703+90	674+20	130	75	20	4.606	-4.606	9.213	-3.13	SPRING TENSIONER
930 S	2920	645+00	674+20	130	75	20	4.529	-4.529	9.058	-2.97	SPRING TENSIONER
930 N	3140	705+60	674+20	130	75	20	4.870	-4.870	9.740	-3.66	SPRING TENSIONER
931 S	2630	700+70	727+00	130	75	20	4.079	-4.079	8.158	-2.07	SPRING TENSIONER
931 N	2615	753+15	727+00	130	75	20	4.056	-4.056	8.112	-2.03	SPRING TENSIONER
932 S	2460	702+40	727+00	130	75	20	3.815	-3.815	7.631	-1.55	SPRING TENSIONER
932 N	2430	751+30	727+00	130	75	20	3.769	-3.769	7.538	-1.45	SPRING TENSIONER
933	2695	748+10	775+05	130	75	20	4.180	-4.180	8.360	-2.28	SPRING TENSIONER
934	3070	746+40	777+10	130	75	20	4.762	-4.762	9.523	-3.44	SPRING TENSIONER
935 S	2124	771+70	792+94	130	75	20	3.294	-3.294	6.589	-0.51	SPRING TENSIONER
935 N	2156	814+50	792+94	130	75	20	3.344	-3.344	6.688	-0.60	SPRING TENSIONER
936 S	1949	773+45	792+94	130	75	20	3.023	-3.023	6.046	0.04	OK
936 N	2316	816+10	792+94	130	75	20	3.592	-3.592	7.184	-1.10	SPRING TENSIONER
937	2585	835+80	809+95	130	75	20	4.009	-4.009	8.019	-1.44	SPRING TENSIONER
938	2459	836+09	811+50	130	75	20	3.814	-3.814	7.628	-1.04	SPRING TENSIONER
4 S	1860	833+80	852+40	130	75	20	2.885	-2.885	5.770	2.31	OK
4 N	1993	872+33	852+40	130	75	20	3.091	-3.091	6.182	1.90	OK

Metro Gold Line Balanceweight Analysis

Wire Run	Tension Length	Station	Midpoint/FT Sta	Hot Temp	Neutral Temp	Cold Temp	BW Rise	BW Fall	Total Movement	Available Travel	Recommended Fix
3 S	1860	833+80	852+40	130	75	20	2.885	-2.885	5.770	2.31	OK
3 N	1810	870+50	852+40	130	75	20	2.807	-2.807	5.615	2.47	OK
6 S	2610	867+40	893+50	130	75	20	4.048	-4.048	8.096	-0.01	ADJUST WEIGHT HEIGHT
6 N	2920	922+70	893+50	130	75	20	4.529	-4.529	9.058	-0.97	SPRING TENSIONER
5 S	2770	865+80	893+50	130	75	20	4.296	-4.296	8.593	-0.51	SPRING TENSIONER
5 N	2695	920+45	893+50	130	75	20	4.180	-4.180	8.360	-0.28	ADJUST WEIGHT HEIGHT
8 S	3015	917+25	947+40	130	75	20	4.676	-4.676	9.353	-1.27	SPRING TENSIONER
7 S	3040	915+35	945+75	130	75	20	4.715	-4.715	9.430	-1.35	SPRING TENSIONER
10 S	2145	944+25	965+70	130	75	20	3.327	-3.327	6.654	1.43	OK
10 N	2215	987+85	965+70	130	75	20	3.435	-3.435	6.871	3.21	OK
9 S	2311	942+59	965+70	130	75	20	3.584	-3.584	7.169	0.91	OK
9 N	2015	985+85	965+70	130	75	20	3.125	-3.125	6.251	2.33	OK
12 S	2785	982+45	1010+30	130	75	20	4.320	-4.320	8.639	-0.06	ADJUST WEIGHT HEIGHT
12 N	2995	1040+25	1010+30	130	75	20	4.645	-4.645	9.290	-1.21	SPRING TENSIONER
11 S	3005	980+25	1010+30	130	75	20	4.661	-4.661	9.322	-0.74	SPRING TENSIONER
11 N	2815	1038+45	1010+30	130	75	20	4.366	-4.366	8.732	-0.65	SPRING TENSIONER
14	2845	1035+25	1063+70	130	75	20	4.413	-4.413	8.825	-0.74	SPRING TENSIONER
13	2895	1033+15	1062+10	130	75	20	4.490	-4.490	8.980	-0.90	SPRING TENSIONER
16 S	2650	1060+60	1087+10	130	75	20	4.110	-4.110	8.220	0.86	OK
16 N	2690	1114+00	1087+10	130	75	20	4.172	-4.172	8.344	0.74	OK
15 S	2840	1058+70	1087+10	130	75	20	4.405	-4.405	8.810	0.77	OK
15 N	2520	1112+30	1087+10	130	75	20	3.909	-3.909	7.817	1.27	OK
18 S	2715	1109+20	1136+35	130	75	20	4.211	-4.211	8.422	0.66	OK
18 N	2900	1165+35	1136+35	130	75	20	4.498	-4.498	8.996	-0.91	SPRING TENSIONER
17 S	2885	1107+50	1136+35	130	75	20	4.475	-4.475	8.949	0.13	OK
17 N	2730	1163+65	1136+35	130	75	20	4.234	-4.234	8.468	-0.39	ADJUST WEIGHT HEIGHT
20 S	2720	1162+15	1189+35	130	75	20	4.219	-4.219	8.437	-0.35	ADJUST WEIGHT HEIGHT
20 N	2495	1214+30	1189+35	130	75	20	3.870	-3.870	7.739	0.34	OK
19 S	2890	1160+45	1189+35	130	75	20	4.482	-4.482	8.965	-0.88	SPRING TENSIONER
19 N	2285	1212+20	1189+35	130	75	20	3.544	-3.544	7.088	1.00	OK
22	2720	1208+90	1236+10	130	75	20	4.219	-4.219	8.437	-0.35	ADJUST WEIGHT HEIGHT
21	2740	1207+10	1234+50	130	75	20	4.250	-4.250	8.499	-0.42	ADJUST WEIGHT HEIGHT
24 S	3100	1232+80	1263+80	130	75	20	4.808	-4.808	9.616	-1.53	SPRING TENSIONER
24 N	2800	1291+80	1263+80	130	75	20	4.343	-4.343	8.686	-0.60	SPRING TENSIONER
23 S	3270	1231+10	1263+80	130	75	20	5.072	-5.072	10.144	-2.06	SPRING TENSIONER
23 N	2625	1290+05	1263+80	130	75	20	4.071	-4.071	8.143	-0.06	ADJUST WEIGHT HEIGHT
26 S	3080	1286+90	1317+70	130	75	20	4.777	-4.777	9.554	-0.47	ADJUST WEIGHT HEIGHT
26 N	2935	1347+05	1317+70	130	75	20	4.552	-4.552	9.104	0.98	OK
25 S	3005	1285+25	1315+30	130	75	20	4.661	-4.661	9.322	-0.24	ADJUST WEIGHT HEIGHT
25 N	2985	1345+15	1315+30	130	75	20	4.630	-4.630	9.259	0.82	OK

Metro Gold Line Balanceweight Analysis

Wire Run	Tension Length	Station	Midpoint/FT Sta	Hot Temp	Neutral Temp	Cold Temp	BW Rise	BW Fall	Total Movement	Available Travel	Recommended Fix
28 S	2235	1341+95	1364+30	130	75	20	3.466	-3.466	6.933	3.15	OK
28 N	2430	1388+60	1364+30	130	75	20	3.769	-3.769	7.538	2.55	OK
27 S	2425	1340+05	1364+30	130	75	20	3.761	-3.761	7.522	2.56	OK
27 N	2270	1387+00	1364+30	130	75	20	3.521	-3.521	7.042	3.04	OK
30 S	2720	1383+90	1411+10	130	75	20	4.219	-4.219	8.437	1.65	OK
30 N	1773	1428+83	1411+10	130	75	20	2.750	-2.750	5.500	3.58	OK
29 S	2907	1382+03	1411+10	130	75	20	4.509	-4.509	9.018	1.07	OK
29 N	1773	1428+83	1411+10	130	75	20	2.750	-2.750	5.500	3.58	OK
31	1150	1423+80	1435+30	130	75	20	1.784	-1.784	3.567	5.52	OK
32	1150	1423+80	1435+30	130	75	20	1.784	-1.784	3.567	5.52	OK

Office Of Inspector General "Is LA Metro Ready for Climate Change?"

Presented By

Karen Gorman

Inspector General

Rail Vulnerabilities and Adaptations

Rail expands with high heat temperatures

| (1) Sun Kink | (2) Cupping | (3) Pull-Apart |

A. Impacts
Trained staff walk the track, ride on high-rail vehicle and manually/visually check for anomalies in the rail
   1. Sun Kink (longitudinal displacement in the track alignment)
   2. Cupping (a lack of ballast rock support around the sides of the ties)
   3. Pull-Apart (failed and separated at bolted or welded joints)

B. Mitigations
   1. Track Sensor or Temperature Lasers
   2. Track Weather Stations

Overhead Catenary System (OCS) Heat Impacts

A. Impacts
1. **Existing Weight Stack** (4) is used to reduce and eliminate sagging of catenary lines
   A. Wires fraying & broke due to incorrect pulley design. Result weights fell to the ground.
   B. Manual inspections on hot summer days, looking for sagging catenary lines
   C. Sagging catenary lines oscillate, as pantograph hook (5) passes causing entanglement with the wires

B. Mitigations
1. **Spring Stack Tension System** (6) prevents sagging & eliminates inspections
2. **Pantograph Inspection System** trackside & determines signs of wear or cracks
3. **On-board roof mounted OCS/trolley wire inspection system**, performs real time analysis of the OCS to alert ROC of power system **conditions before failure.**

(4) Existing Weight Stack Tensioning System

(5) Pantograph Entanglement with OCS Wires
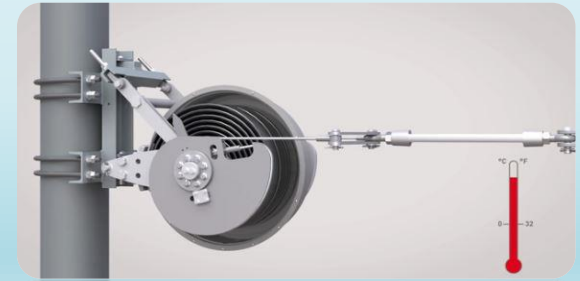
(6) Proposed Spring Stack Tensioning System

Bus Vulnerabilities To Heat

A. Impacts
1. Buses break down more summer, 10% decrease in available buses
2. Bus equipment has a higher failure in summer resulting in unscheduled repairs
3. Current Bus Part Consumption $1.6 Million in summer vs. $404 thousand for winter
4. Maintenance costs could significantly increase over extended summer, greater temperatures

B. Mitigations
1. Plan for increased maintenance
2. Pre-Summer Operations Summits
3. Parts and spares inventory readiness

C. Electric Bus
1. LA Metro Comprehensive Plan states zero emission vehicles by 2030
2. Service test failed for first generation electric buses
3. Metro is waiting for next generation to be developed

BUS PART CONSUMPTION - SUMMER and WINTER
2014 -2018

Summer Part Items consists of cooling parts such as A/C belts, A/C compressors, Alternators, Coolant - Thermostat, Inverter -Control Box and many other A/C type components. The 5-year average of Summer Part Consumption for Bus is: $1.6 million

Winter Part Items consists of Wiper Blades, Windshield Wiper Arms, Heater/Defroster Blower ASM's, Air intake Filters, Wiper Control Motor ASM, and many other wet weather type components. The 5-year average of Winter Part Consumption for Bus is: $404 thousand

Year	Winter Part Items	Summer Part Items
2018	$352,412	$1,610,598
2017	$407,981	$1,547,966
2016	$406,501	$1,666,561
2015	$413,105	$1,698,741
2014	$439,207	$1,572,910

■ Winter Part Items ■ Summer Part Items

Benchmarks of Other Transit Agencies

Other Mitigations:
Nationally

A. Las Vegas, Nevada
1. Multiple Chill Stations for patrons waiting for bus
2. Hand out complementary water bottles
3. Solar powered bus shelters with LED lighting
4. Bus tires filled with pure nitrogen (exhibit less pressure change)

B. Phoenix, Arizona
1. Additional second AC on the bus roof
2. Electric engine cooling fan system on buses
3. Non-metalic shade canopies on light rail platforms
4. Solar powered cool air ventilation system at platform, button controlled by passengers
5. Solar reflective window tint and solar reflective paint on the train bodies
6. Two over-sized AC units on each light rail vehicle
7. Partner with local refrigeration school and provide custom training programs

Benchmarks of Other Transit Agencies

Other Mitigations:
Globally

A. Hong Kong
Regenerative braking technology that pushes energy back into the overhead catenary system to be used by other trains

B. Melbourne, Australia
Installed electronic monitoring sensors in rail tracks to monitor real-time rail track temperature (7)

C. London
Installed remote automated weather-stations (8) and thousands of track-side probes to monitor the local trackside temperatures and conditions

(7) Rail Track Temperature Monitoring Sensor

(8) Remote Automated Weather Station

Benchmark of Other Transit Agencies

Other Mitigations:
Globally

D. Singapore
1. Smart bus-stop equipped with the Airbitat Oasis ventilation system
2. Electric fans installed at bus stops

Interactive panels
Displays real-time information on environmental conditions within and outside of bus stop, and bus services information.

Airbitat Oasis
Creates cool and pure air while removing harmful particles such as PM2.5 and PM10.
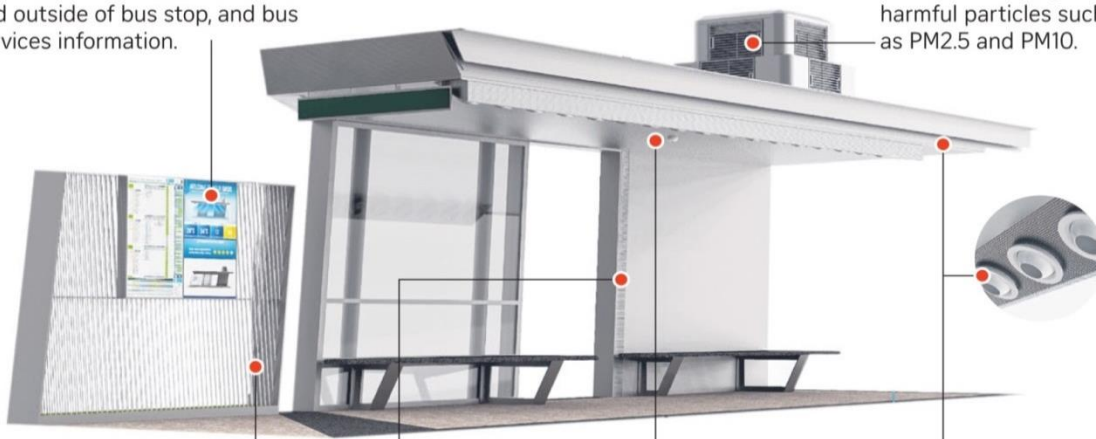
Sensors
Embedded sensors to monitor environmental conditions to optimise energy-smart performance.

Computer vision
Video analytics to detect commuter traffic, waiting time and suspicious activities such as unattended bags and loitering.

Overhead nozzles
Cool and pure air is delivered directly to commuters' waiting zone through overhead nozzles.

Source: INNOSPARKS, AN ST ENGINEERING OPEN LAB   STRAITS TIMES GRAPHICS

(9) Bus stop with Airbitat Oasis Ventilation System

(10) Electric fans at bus stop

Metro

Summary of Recommendations for LA Metro

Recommendations for Rail

1. Spring stack tension system
2. Solar reflective paint
3. Track sensors to immediately measure rail temperatures
4. Remote automated weather-stations and track-side probes to monitor trackside temperatures & conditions

Recommendations for Rail Operation Control

1. ROC to receive "real time" weather information from automated weather-station
2. Establish a coordinated Severe Weather plan
3. Establish "baseline" Preventive Maintenance for servicing and testing emergency generators

Recommendations for Bus

1. Add bus shelters with shade canopy and side ventilation louvers
2. Add dome top bus shelters featuring solar panels and LED lighting
3. Solar-powered ventilation system with overhead nozzles for cooling
4. Solar reflective paint, window tint and special films on buses
5. Purchase buses with electric engine cooling fan system

Summary of Recommendations for LA Metro

Other Key Recommendations

1. Utilize CAAP report to further analyze L A Metro's adaptation to climate change

2. Elevate the sustainable and pro-green comments and suggestions made by the environmental ECSD engineers. Environmental sustainability features should not be dismissed and eliminated as luxury items

3. ECSD should advise on climate impacts to the L A Metro system and coordinate a unified response to climate change

4. Factor climate change impacts into the State of Good Repair schedule

5. Finalize the Emergency Management Plan as it relates to system heat impacts

6. Make improvements in projects directed at climate change resiliency part of the agency performance goals

7. Consider environmental and sustainability considerations for every major project and procurement

Metro

Metro®

Board Report

File #: 2019-0481, **File Type:** Informational Report   **Agenda Number:** 26.

**OPERATIONS, SAFETY, AND CUSTOMER EXPERIENCE COMMITTEE
EXECUTIVE MANAGEMENT COMMITTEE
JULY 18, 2019**

SUBJECT: **OFFICE OF THE INSPECTOR GENERAL REPORT ON METRO SECURITY
PERFORMANCE REVIEW FISCAL YEAR 2018**

ACTION: **RECEIVE AND FILE**

RECOMMENDATION

RECEIVE AND FILE OIG report on Metro Security Performance Review Fiscal Year 2018.

ISSUE

On February 23, 2017, the Metro Board passed a motion directing that the Inspector General conduct
an annual audit of each law enforcement services contract to determine how key performance
indicators are measuring up against actual performance metrics. The audit is to ensure that Metro is
receiving the services it is paying for.

BACKGROUND

In 2017, LACMTA (Metro) awarded three separate 5-year firm fixed unit rate contracts to the Los
Angeles Police Department (LAPD), the Los Angeles County Sheriff's Department (LASD), and the
Long Beach Police Department (LBPD) for transit law enforcement services to support day-to-day
operations across Metro's entire service area.   Metro also directly employs transit security officers
who perform fare checks and bus/rail patrolling.

DISCUSSION

A.   Trends in Crime, Perceptions of Safety, and Safety and Security Complaints

There are three key outcome measures that can be used to evaluate the effectiveness and trends of
Metro's safety and security approach and program. These are the level of reported crime on the
system, the perceptions of safety by users of the system, and the number of safety and security
complaints made by users of the system.

Reported Crime

Total reported Violent Crime on the Metro System decreased by 18% between FY 2015 and FY 2018,

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with most of this decrease (14%), occurring between FY 2017 and FY 2018. Total reported Property Crime on the Metro System decreased 15% between FY 2015 and FY 2018, with a decrease of 16% occurring between FY 2015 and FY 2017, and an increase of 1% occurring between FY 2017 and FY 2018.

Obtaining complete and accurate reporting of crime that occurs on the Metro System continues to be challenging. This is partially due to the fact that the Metro System operates within multiple jurisdictions with their own law enforcement agencies who respond to, handle, and report crime that may not be reported to Metro.

In addition, in the LAPD service area of the Metro System, LAPD neighborhood patrol units respond to and handle many crimes that occur within the Metro System. An unknown number of these crimes are not reported to the LAPD Transit Policing Division and so are not tracked and reported to Metro.

We recommend the Metro System Security and Law Enforcement (SSLE) Department continue to work with contract law enforcement agencies to improve the complete and accurate reporting of crime that occurs on the Metro System.

Rider Perceptions of Safety

Perception of crime and disorder on the Metro System creates a risk to the confidence in safety held by passengers and Metro employees and poses a risk to the reputation of Metro as a safe and secure system. Passengers who perceive the system to be unsafe will not use the service, and therefore reduce the number of people using transit and Metro's ridership.

Based on Metro rider surveys conducted annually, rider perceptions of safety on the Metro Train system declined slightly and rider perceptions of safety on the Metro Bus system improved slightly between FY 2015 and FY 2018. These changes in perceptions of safety are small and within the margin of error for the survey. However, it is important to continue to monitor rider perceptions of safety on the Metro System and to develop strategies to address concerns and improve that perception.

Complaints Regarding Safety and Security

Another important indicator of the public or riders' perception of the safety of the Metro System is the number of complaints received regarding safety and security. During the period from FYs 2015 to 2018, rider complaints for the bus system regarding passenger safety or conduct issues were not among the top ten complaints. However, for the rail system, rider complaints regarding passenger safety or conduct issues were the second most common complaint of the top ten complaints for FYs 2015 to 2017. For FY 2018, complaints regarding passenger safety or conduct issues dropped to five of the top ten.

We recommend the SSLE Department continue to monitor rider survey results regarding perceptions of safety of riders on the Metro System and complaints regarding safety and passenger conduct issues and develop strategies to improve those perceptions and reduce complaints.

B.   Resource Monitoring and Oversight

The SSLE Department is charged with ongoing oversight of the contracted law enforcement services as well as the operations of Metro Security.

Audits of Contracted Law Enforcement Personnel Presence

Metro has and will continue to have a substantial investment in resources devoted to system safety and security. Ensuring that these resources are effectively and efficiently used is very important.

Oversight and monitoring of contracted law enforcement resources has been problematic. Metro has had some difficulty in ensuring that law enforcement personnel assigned to Metro are actually present and performing as assigned. Historically, Metro has not had an effective means of verifying the accuracy of staffing information provided by contract law enforcement, or of verifying that personnel charging time on the Metro contract are actually present and providing the contracted services.

Beginning with FY 2018, the SSLE Department implemented regular "audits" of law enforcement personnel to monitor consistency between personnel time reported and the invoiced costs. Beginning in September 2017, Metro also began conducting "field audits" of law enforcement personnel in addition to the comparison audits of information provided by contracted law enforcement agencies. These field audits involve taking the roster of law enforcement personnel assigned to work and verifying that those personnel are actually in the field and providing the contracted service. These field audits strengthen Metro's contract oversight and monitoring.

GPS Based Contracted Law Enforcement Oversight and Monitoring

The SSLE Department has been working to develop and implement an effective method of tracking and monitoring the activities of safety and security resources deployed on the Metro System using the GPS function on smartphones used by Metro safety and security personnel.

The Mobile Phone Validators (MPV) provided to contracted law enforcement officers are now GPS enabled and are able to provide information on the location and movement of the MPV and law enforcement resources. Metro has not yet begun using the GPS function and information generated to track or monitor the activities of contracted law enforcement resources.

We recommend the SSLE Department should work to develop a more macro approach to oversight and monitoring of contracted law enforcement resources using the GPS function of the MPV assigned to contracted law enforcement personnel and the data generated from them.

Oversight of Other Law Enforcement Contract Requirements

In our review of compliance with the contract terms, we found some instances of non-compliance by all three law enforcement agencies with qualifications and training of personnel assigned, reports and information being provided to Metro, equipment provided under the contract, and appropriate support for invoices submitted. Increased monitoring and oversight of these requirements seems warranted given the size of the contracts and the importance of the services being provided.

We recommend the SSLE Department should consider expanding monitoring and oversight of other contract requirements including qualifications and training of personnel, required reporting, equipment provided, and invoice support and compliance with the contract. We also recommend

Metro seek reimbursement for overbillings and overpayments resulting from noncompliance with contract terms during FY 2018.

C.   Key Performance Indicators (KPI)

It is essential that Metro clearly define performance expectations for each of the contract law enforcement agencies and use meaningful performance indicators to evaluate how well these expectations are being met.

Reporting of Crime and Incident Response Time Indicators

Two of the KPI included in each of the law enforcement contracts were intended to provide information on the outcomes of the law enforcement service provided including changes in the number of crimes reported and increases in crime incident response times.

In crime reporting the emphasis should be on violent crime, which is obviously the most impactful to the Metro System and has the greatest impact on Metro's riders. Reporting all crime in the aggregate is less meaningful because violent crimes such as homicide, robbery and rape are given the same weight as lesser crimes such as larceny, petty theft, and vandalism.

A primary workload for law enforcement is responding to and handling incidents that occur on the Metro System or calls for service. Metro's SSLE Department currently only collects and reports response time information for emergency calls for service. While emergency calls for service are obviously the most important calls, tracking and reporting response time on less urgent incidents and calls for service is also important.

Often these lower priority calls for service involve quality of life issues and concerns as well as victims of property crimes. A slow response to these incidents can have a negative impact on the perception of the riding public transit that the system is safe and well protected. In addition, not requiring contract law enforcement agencies to track and report these response times communicates to them and their officers that these calls are not important.

We recommend that Metro's SSLE Department begin to collect and report on response times for all calls for service that require a law enforcement response.

Visibility of Law Enforcement Security Personnel Indicators

Providing a visible security presence within the Metro System is an important strategy for providing both a sense and reality of safety. Three of the KPI included in each of the law enforcement contracts were intended to provide information on the visibility of law enforcement security personnel on the Metro System. These are 1) the ratio of proactive versus dispatched activity, 2) the number of foot and vehicle patrols of bus stops, transit centers, train platforms, plazas, and stations, and 3) the number of bus and train boardings.

Contract law enforcement agencies were only able to report on the ratio of proactive versus dispatched activity. Contract law enforcement agencies were not able to report on the other two KPI. While these are important indicators and would provide useful information on the level of activity and visibility of contracted law enforcement personnel, it was not practical for the law enforcement

agencies to reliably collect meaningful information for these indicators. As discussed in Section B of this report, using the GPS function and the data generated could provide more reliable and meaningful information on the amount of time contracted law enforcement officers spend on each of these activities related to KPI 2 and 3 above.

Law Enforcement Personnel Presence Indicator

One of the KPI included in each of the law enforcement contracts was intended to provide information on the presence of the contracted law enforcement personnel. This is the ratio of staffing levels and vacant assignments. This indicator is important in both communicating to the contract law enforcement agencies the need to actually staff contracted assignments and to report how effectively these positions are actually being staffed. Reported staffing levels collectively were at 98.5% or above during FY 2018.

Baseline Expectations and Other Potential Performance Indicators

It is important to establish baseline expectations or targets for each performance indicator. This not only clearly communicates performance expectations, but it also can help drive improvements in performance through the development and implementation of new strategies. Baseline performance levels for each KPI have not been developed.

We recommend Metro's SSLE Department work with contract law enforcement agencies to establish baseline or target performance levels for each of the KPI currently in use. They should also work together to determine if additional KPI would be appropriate and meaningful.

D.   Community Policing

Community policing within a transit system should place an emphasis on quality of life issues. The customers of the Metro System must feel safe and secure. The presence of security, in whatever form, must have a "felt presence;" that is, they must be visible and engaged without becoming oppressive and threatening.

Metro Community Policing Plan

The Metro SSLE Department is in the process of developing a community policing plan for the Metro System. The Metro Community Policing Plan will be a unified plan instead of having each of the three law enforcement agencies develop individual community policing plans. The Metro Community Policing Plan is part of Metro's new Equity Platform, which aims to assure equity across all programs impacting transit service, planning, and policing. The SSLE Department expects to have a draft Metro Community Policing Plan completed by the Fall of 2019.

We recommend the Metro SSLE Department continue to develop the Metro Community Policing Plan and ensure it includes specific training in Problem Oriented Policing for law enforcement personnel, attendance by law enforcement personnel at community meetings, and protocols to obtain feedback from bus and rail managers.

Law Enforcement Service Request (LESR) System

Metro employees, including bus and train operators, maintenance personnel, customer service

representatives, and others are the front-line representatives of Metro and have ongoing and direct interaction with the riding public. The LESR system implemented in FY 2018 should provide good information on Metro employee safety and security issues and concerns on the system going forward.

During FY 2018, a total of 935 law enforcement service requests were generated by Metro employees. Our review of the requests and responses indicate that law enforcement agencies are using the LESR to identify and resolve issues and concerns.

E.   Compliance with Specific Contract Requirements

The contracts with the three law enforcement agencies each contain specific requirements related to personnel and training, billing, required reports, and other contractual requirements.

Overview of Law Enforcement Contract Requirements

Each of the contracts with the three law enforcement agencies includes specific contract requirements. This includes requirements for the experience and training of law enforcement personnel assigned to Metro, billing information and supporting documentation, required information and reports on activities, and other information on equipment provided.

Los Angeles Police Department (LAPD) Contract Compliance

The following are the results of our review of LAPD's contract compliance:

- LAPD was not in compliance with two of the contract requirements related to personnel and training.

- The total amount billed and paid to LAPD for FY 2018 did not exceed the estimated cost specified in the contract for Year 1.

- Invoices submitted to Metro were based on actual services provided and supported by daily summary of assignments and hours worked using the cost data from the payroll system. However, actual payroll records were not submitted with the invoices as required.

- For overtime charges, we were unable to determine whether the billing rates exceeded the approved maximum fully burdened hourly rates because the list of maximum fully burdened hourly rates that LAPD submitted to Metro was not in compliance with the contract.

- Eight labor classifications totaling $281,400.77 were not found in the required list of maximum fully burdened hourly rates.

- For straight time charges, we identified a total amount of $3,874.99 as overbilled by LAPD and overpaid by Metro.

- LAPD invoiced an overhead rate of 12.76% for overtime hours that was unsupported by

adequate documentation.

- LAPD met 8 out of 9 contract requirements for submitting required reports to Metro. The reports were submitted with adequate information and in a format that allows Metro to determine the calculation of the reported figures. However, no information was provided as to when these reports were submitted to Metro so we were unable to determine if the reports were submitted on time in accordance with the contract.

- Exhibit E of the contract provides a list of equipment that the LAPD was supposed to provide under the contract. We found that LAPD did not provide the equipment in the quantities listed in Exhibit E.

Los Angeles County Sheriff's Department (LASD) Contract Compliance

- LASD was not in compliance with two of the contract requirements related to personnel and training.

- The total amount billed and paid for FY 2018 to LASD did not exceed the estimated cost specified in the contract for Year 1.

- Except for a credit amount understatement of $1,699.68, the billing rates were consistent with Metro's approved rates. Invoices were based on actual services provided and supported by Payment Certification, the Service Level and Billing Status Report, and the Patrol Compliance Report.

- LASD met 7 out of 8 contract requirements for required reports. The reports were submitted in a timely manner, with adequate information and in a format that allows Metro to determine the calculation of the reported figures.

Long Beach Police Department (LBPD) Contract Compliance

- LBPD was not in compliance with the contract requirement for Transit Policing training.

- The total amount billed and paid for FY2018 exceeded the estimated cost specified in the contract for Year 1 by $885,578.

- Daily summary of assignments for all hours worked and payroll records were not submitted with the invoices.

- The billing rates exceeded Metro's approved maximum fully burdened hourly rates for three labor categories. Only one of the three labor categories was listed in the approved maximum fully burdened hourly rates. We identified a total amount of $14,643.89 as overbilled by LBPD

and overpaid by Metro.

- The billing methodology for equipment cost was not consistent with the contract agreement.

- LBPD met 8 out of 9 contract requirements for required reports. The reports were submitted with adequate information and in a format that allows Metro to determine the calculation of the reported figures. No information was provided as to when these reports were submitted to Metro so we were unable to determine if the reports were submitted to Metro on time.

F.   Fare and Code of Conduct Compliance Enforcement

Enforcing fare compliance on the Metro System as well as the Metro Customer Code of Conduct is a key element of Metro's safety and security mission.

Code of Conduct and Parking Enforcement and Citations

The vast majority (98%) of the citations for Metro Code of Conduct violations are issued by Metro Security. This demonstrates the substantial change in the transfer in responsibility for fare and code of conduct enforcement from contracted law enforcement to Metro Security. The number of Code of Conduct citations issued increased substantially (162%) between FY 2017 and FY 2018. Total citations are 35% below the level for FY 2013.

Performance Indicators for Metro Security

The role and responsibilities of Metro Security have expanded substantially over the past few years and now includes primary responsibility for enforcing Metro's Code of Conduct on the system, including fare enforcement. Given this, it is important that Metro Security have an effective accountability system, including meaningful performance indicators.

The SSLE Department reports they will be developing KPIs for Metro Security during 2019.   These KPIs will cover two key areas: Fare Enforcement and Critical Infrastructure Protection.   The fare enforcement KPI will focus on effective strategies to increase fare compliance. The critical infrastructure KPI will focus on assessing and mitigating security threats to the transit system and its critical structures.

FINANCIAL IMPACT

Adoption of the recommendations in this report does not increase the financial impact on the agency.

IMPLEMENTATION OF STRATEGIC PLAN GOALS

The recommendations in this report support Strategic Plan Goal 2.1 (Improving security), Goal 5.6 (fostering and maintaining a strong safety culture), and Goal 2 (delivering outstanding trip experiences).

NEXT STEPS

Metro management should:

- Complete the Schedule for Tracking Metro's Proposed Actions in response to the recommendations provided in Appendix B of the report as determinations are made on implementing the recommendations; and
- Periodically report to the Metro Board on the status of actions taken to implement the recommendations.

<u>ATTACHMENTS</u>

Attachment A - Metro Security Performance Review Fiscal Year 2018

Prepared by: Myra Taylor, Senior Auditor, (213) 244-7306
                 Yvonne Zheng, Senior Manager, Audit, (213) 244-7301
Reviewed by: Karen Gorman, Inspector General, (213) 922-2975

Karen Gorman
Inspector General

Los Angeles County
Metropolitan Transportation Authority
Office of the Inspector General

Metro Security
Performance Review
Fiscal Year 2018

Report No. 19-AUD-10

June 24, 2019

Metro

Los Angeles County	Office of the Inspector General	213.244.7300 Tel
Metropolitan Transportation Authority	818 West 7th Street, Suite 500	213.244.7343 Fax
	Los Angeles, CA 90017	

Metro

June 24, 2019

Metro Board Members

Re: Report on Metro Security Performance Review Fiscal Year 2018

Dear Metro Board Members:

The Office of the Inspector General (OIG) conducted a security-focused review to determine the level of performance for transit security function services (law enforcement and Metro's Transit Security Officers) during FY 2018. Since 2009, Metro has had a contract with the Los Angeles County Sheriff's Department (LASD) to provide Metro with transit policing services. Beginning July 1, 2017, Metro implemented a new transit security strategy, which includes obtaining services from three law enforcement agencies – the City of Los Angeles Police Department (LAPD), the City of Long Beach Police Department (LBPD), and the Los Angeles County Sheriff's Department (LASD). Metro also directly employs transit security officers and began using Metro security officers for fare checks and bus/rail patrolling.

The Metro Board directed the OIG to perform an annual audit of each law enforcement services contract to determine how key performance indicators are measuring up against metrics and ensure that Metro is receiving the services it is paying for. To accomplish this directive, the OIG prepared a scope of work for the Request for Proposal. BCA Watson Rice WR, LLP, was hired to perform the security performance review for fiscal year 2018, and completed the attached report.

The review identified a number of recommendations for improving transit security performance. The Appendix to the report lists 25 recommendations that will enhance performance efficiency and effectiveness in the following transit security areas:

- Crimes reporting accuracy and completeness
- Report response times for all categories of dispatched incident calls for service
- Oversight and monitoring law enforcement resources
- Review, revise, and adopt key performance indicators (KPI) for law enforcement services including base line target levels of performance for each KPI, and develop KPIs for Metro Transit Security
- Develop a Metro Community Policing Plan
- Monitor each law enforcement services contract to ensure compliance with contract requirements in areas such as:
    - Meeting required personnel certifications and completing required training
    - Monitoring billings and submission of payroll records and other required supporting documentation
    - Providing maximum hourly rates for each labor classification
    - Submitting required reports in a timely manner

- o Providing the equipment in the quantities required by the contract
- o Returning to Metro overbilled and overpaid amounts (LAPD $3,874.99) and (LBPD $164,643.89), and issuing an additional credit amount to Metro (LASD $1,699.68) because the monthly rate to calculate the original credit did not comply with the contract.

We appreciate the assistance provided by Metro staff during this review. I am available to answer any questions the Board Directors may have regarding this report.

Sincerely,

Karen Gorman
Inspector General

Metro Office of the Inspector General

Metro Security
Performance Review
Fiscal Year 2018

June 2019

FINAL REPORT

Submitted by

BCA Watson Rice, LLP

TABLE OF CONTENTS

1. Executive Summary

Background and Objectives

In 2017, Metro awarded three separate 5-year firm fixed unit rate contracts to the Los Angeles Police Department (LAPD), the Los Angeles County Sheriff's Department (LASD), and the Long Beach Police Department (LBPD) ("Contractors") for transit law enforcement services to support day-to-day operations across Metro's entire service area.

On February 23, 2017, the Metro Board passed a motion directing that the Inspector General be tasked with annually auditing each law enforcement services contract to determine how key performance indicators are measuring up against actual performance metrics. The audit is to ensure that Metro is receiving the services it is paying for.

A. Trends in Crime, Perceptions of Safety, and Safety and Security Complaints

There are three key outcome measures that can be used to evaluate the effectiveness and trends of Metro's safety and security approach and program. These are the level of reported crime on the system, the perceptions of safety by users of the system, and the number of safety and security complaints made by users of the system.

Reported Crime

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Obtaining complete and accurate reporting of crime that occurs on the Metro System continues to be challenging. This is partially due to the fact that the Metro System operates within multiple jurisdictions with their own law enforcement agencies who respond to, handle, and report crime that may not be reported to Metro.

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We recommend the Metro System Security and Law Enforcement (SSLE) Department continue to work with contract law enforcement agencies to improve the complete and accurate reporting of crime that occurs on the Metro System.

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We recommend the SSLE Department continue to monitor rider survey results regarding perceptions of safety of riders on the Metro System and complaints regarding safety and passenger conduct issues and develop strategies to improve those perceptions and reduce complaints.

More information on trends in crime, perceptions of safety, and safety and security complaints can be found beginning on page 14 of this report.

B. Resource Monitoring and Oversight

The SSLE Department is charged with ongoing oversight of the contracted law enforcement services as well as the operations of Metro Security.

Audits of Contracted Law Enforcement Personnel Presence

Metro has and will continue to have a substantial investment in resources devoted to

system safety and security. Ensuring that these resources are effectively and efficiently used is very important.

Oversight and monitoring of contracted law enforcement resources has been problematic. Metro has had some difficulty in ensuring that law enforcement personnel assigned to Metro are actually present and performing as assigned. Historically, Metro has not had an effective means of verifying the accuracy of staffing information provided by contract law enforcement, or of verifying that personnel charging time on the Metro contract are actually present and providing the contracted services.

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In our review of compliance with the contract terms, we found some instances of non-compliance with qualifications and training of personnel assigned, reports and information being provided to Metro, equipment provided under the contract, and appropriate support for invoices submitted. Increased monitoring and oversight of these requirements seems

warranted given the size of the contracts and the importance of the services being provided.

We recommend the SSLE Department should consider expanding monitoring and oversight of other contract requirements including qualifications and training of personnel, required reporting, equipment provided, and invoice support and compliance with the contract. We also recommend Metro seek reimbursement for overbillings and overpayments resulting from noncompliance with contract terms during FY 2018.

More information on resource monitoring and oversight can be found beginning on page 21 of this report.

C. Key Performance Indicators (KPIs)

It is essential that Metro clearly define performance expectations for each of the contract law enforcement agencies and use meaningful performance indicators to evaluate how well these expectations are being met. The KPIs for each of the three contracted law enforcement agencies are listed in Exhibit 6 on page 25 of this report.

Reporting of Crime and Incident Response Time Indicators

Two of the KPI included in each of the law enforcement contracts were intended to provide information on the outcomes of the law enforcement service provided including changes in the number of crimes reported and increases in crime incident response times.

In crime reporting the emphasis should be on violent crime, which is obviously the most impactful to the Metro System and has the greatest impact on Metro's riders. Reporting all crime in the aggregate is less meaningful because violent crimes such as homicide, robbery and rape are given the same weight as lesser crimes such as larceny, petty theft, and vandalism.

A primary workload for law enforcement is responding to and handling incidents that occur on the Metro System or calls for service. Metro's SSLE Department currently only collects and reports response time information for emergency calls for service. While emergency calls for service are obviously the most important calls, tracking and reporting response time on less urgent incidents and calls for service is also important.

Often these lower priority calls for service involve quality of life issues and concerns as well as victims of property crimes. A slow response to these incidents can have a negative impact on the perception of the riding public transit that the system is safe and well protected. In addition, not requiring contract law enforcement agencies to track and report these response times communicates to them and their officers that these calls are not important.

We recommend that Metro's SSLE Department begin to collect and report on response times for all calls for service that require a law enforcement response.

Visibility of Law Enforcement Security Personnel Indicators

Providing a visible security presence within the Metro System is an important strategy for providing both a sense and reality of safety. Three of the KPI included in each of the law enforcement contracts were intended to provide information on the visibility of law enforcement security personnel on the Metro System. These are 1) the ratio of proactive versus dispatched activity, 2) the number of foot and vehicle patrols of bus stops, transit centers, train platforms, plazas, and stations, and 3) the number of bus and train boardings.

Contract law enforcement agencies were only able to report on the ratio of proactive versus dispatched activity. Contract law enforcement agencies were not able to report on the other two KPI. While these are important indicators and would provide useful information on the level of activity and visibility of contracted law enforcement personnel, it was not practical for the law enforcement agencies to reliably collect meaningful information for these indicators. As discussed in Section B of this report, using the GPS function and the data generated could provide more reliable and meaningful information on the amount of time contracted law enforcement officers spend on each of these activities related to KPI 2 and 3 above.

Law Enforcement Personnel Presence Indicator

One of the KPI included in each of the law enforcement contracts was intended to provide information on the presence of the contracted law enforcement personnel. This is the ratio of staffing levels and vacant assignments. This indicator is important in both communicating to the contract law enforcement agencies the need to actually staff contracted assignments and to report how effectively these positions are actually being staffed. Reported staffing levels collectively were at 98.5% or above during FY 2018.

Baseline Expectations and Other Potential Performance Indicators

It is important to establish baseline expectations or targets for each performance indicator. This not only clearly communicates performance expectations, but it also can help drive improvements in performance through the development and implementation of new strategies. Baseline performance levels for each KPI have not been developed.

We recommend Metro's SSLE Department work with contract law enforcement agencies to establish baseline or target performance levels for each of the KPI currently in use. They should also work together to determine if additional KPI would be appropriate and meaningful.

More information on KPI can be found beginning on page 25 of this report.

D. Community Policing

Community policing within a transit system should place an emphasis on quality of life issues. The customers of the Metro System must feel safe and secure. The presence of security, in whatever form, must have a "felt presence;" that is, they must be visible and engaged without becoming oppressive and threatening.

Metro Community Policing Plan

The Metro SSLE Department is in the process of developing a community policing plan for the Metro System. The Metro Community Policing plan will be a unified plan instead of having each of the three law enforcement agencies develop individual community policing plans. The Metro Community Policing plan is part of Metro's new Equity Platform, which aims to assure equity across all programs impacting transit service, planning, and policing. The SSLE Department expects to have a draft Metro Community Policing Plan completed by the Fall of 2019.

We recommend the Metro SSLE Department continue to develop the Metro Community Policing plan and ensure it includes specific training in Problem Oriented Policing for law enforcement personnel, attendance by law enforcement personnel at community meetings, and protocols to obtain feedback from bus and rail managers.

More information on Community Policing can be found beginning on page 37 of this report.

Law Enforcement Service Request (LESR) System

Metro employees, including bus and train operators, maintenance personnel, customer service representatives, and others are the front-line representatives of Metro and have ongoing and direct interaction with the riding public. LESR system implemented in FY 2018 should provide good information on Metro employee safety and security issues and concerns on the system going forward.

During FY 2018, a total of 935 law enforcement service requests were generated by Metro employees. Our review of the requests and responses indicate that law enforcement agencies are using the LESR to identify and resolve issues and concerns.

E. Compliance with Specific Contract Requirements

The contracts with the three law enforcement agencies each contain specific requirements related to personnel and training, billing, required reports, and other contractual requirements.

Overview of Law Enforcement Contract Requirements

Each of the contracts with the three law enforcement agencies includes specific contract requirements. This includes requirements for the experience and training of law enforcement personnel assigned to Metro, billing information and supporting documentation, required information and reports on activities, and other information on equipment provided.

Los Angeles Police Department (LAPD) Contract Compliance

The following are the results of our review of LAPD's contract compliance:

- LAPD was not in compliance with two of the contract requirements related to personnel and training.

- The total amount billed and paid to LAPD for FY 2018 did not exceed the estimated cost specified in the contract for Year 1.

- Invoices submitted to Metro were based on actual services provided and supported by daily summary of assignments and hours worked using the cost data from the payroll system. However, actual payroll records were not submitted with the invoices as required.

- For overtime charges, we were unable to determine whether the billing rates exceeded the approved maximum fully burdened hourly rates because the list of maximum fully burdened hourly rates that LAPD submitted to Metro was not in compliance with the contract.

- Eight labor classifications totaling $281,400.77 were not found in the required list of maximum fully burdened hourly rates.

- For straight time charges, we identified a total amount of $3,874.99 as overbilled by LAPD and overpaid by Metro.

- LAPD invoiced an overhead rate of 12.76% for overtime hours that was unsupported by adequate documentation.

- LAPD met 8 out of 9 contract requirements for submitting required reports to Metro. The reports were submitted with adequate information and in a format that allows Metro to determine the calculation of the reported figures. However, no information was provided as to when these reports were submitted to Metro so we were unable to determine if the reports were submitted on time in accordance with the contract.

- Exhibit E of the contract provides a list of equipment that the LAPD was supposed to provide under the contract. We found that LAPD did not provide the equipment

in the quantities listed in Exhibit E.

More information on LAPD's contract compliance can be found beginning on page 49 of this report.

Los Angeles County Sheriff's Department (LASD) Contract Compliance

- LASD was not in compliance with two of the contract requirements related to personnel and training.

- The total amount billed and paid for FY 2018 to LASD did not exceed the estimated cost specified in the contract for Year 1.

- Except for a credit amount understatement of $1,699.68, the billing rates were consistent with Metro's approved rates. Invoices were based on actual services provided and supported by Payment Certification, the Service Level and Billing Status Report, and the Patrol Compliance Report.

- LASD met 7 out of 8 contract requirements for required reports. The reports were submitted in a timely manner, with adequate information and in a format that allows Metro to determine the calculation of the reported figures.

More information on LASD's contract compliance can be found beginning on page 63 of this report.

Long Beach Police Department (LBPD) Contract Compliance

- LBPD was not in compliance with the contract requirement for Transit Policing training.

- The total amount billed and paid for FY 2018 exceeded the estimated cost specified in the contract for Year 1 by $885,578.

- Daily summary of assignments for all hours worked and payroll records were not submitted with the invoices.

- The billing rates exceeded Metro's approved maximum fully burdened hourly rates for three labor categories. Only one of the three labor categories was listed in the approved maximum fully burdened hourly rates. We identified a total amount of $14,643.89 as overbilled by LBPD and overpaid by Metro.

- The billing methodology for equipment cost was not consistent with the contract agreement.

- LBPD met 8 out of 9 contract requirements for required reports. The reports were submitted with adequate information and in a format that allows Metro to determine

the calculation of the reported figures. No information was provided as to when these reports were submitted to Metro so we were unable to determine if the reports were submitted to Metro on time.

More information on LBPD's contract compliance can be found beginning on page 70 of this report.

F. Fare and Code of Conduct Compliance Enforcement

Enforcing fare compliance on the Metro System as well as the Metro Customer Code of Conduct is a key element of Metro's safety and security mission.

Code of Conduct and Parking Enforcement and Citations

The vast majority (98%) of the citations for Metro Code of Conduct violations are issued by Metro Security. This demonstrates the substantial change in the transfer in responsibility for fare and code of conduct enforcement from contracted law enforcement to Metro Security. The number of Code of Conduct citations issued increased substantially (162%) between FY 2017 and FY 2018. Total citations are 35% below the level for FY 2013.

Performance Indicators for Metro Security

The role and responsibilities of Metro Security have expanded substantially over the past few years and now includes primary responsibility for enforcing Metro's Code of Conduct on the system, including fare enforcement. Given this, it is important that Metro Security have an effective accountability system, including meaningful performance indicators.

The SSLE Department reports they will be developing KPI for Metro Security during 2019. These KPI will cover two key areas: Fare Enforcement and Critical Infrastructure Protection. The fare enforcement KPI will focus on effective strategies to increase fare compliance. The critical infrastructure KPI will focus on assessing and mitigating security threats to the transit system and its critical structures.

More information on fare and code of conduct compliance can be found beginning on page 80 of this report.

2. Background

The Los Angeles County Metropolitan Transportation Authority (Metro) is the region's principal agency for multi-modal transit operations. Metro operates transit service from eleven (11) geographically distinct bus divisions, four light rail lines, and two subway lines. In addition, critical rail infrastructure includes Union Station, 7th Street/Metro Center, and Willowbrook/Rosa Parks Station. Critical bus infrastructure includes the Harbor/Gateway Station and El Monte Transit Center.

In 2017, Metro awarded three separate 5-year firm fixed unit rate contracts to the LAPD, the LASD, and the LBPD ("Contractors") for transit law enforcement services to support day-to-day operations across Metro's entire service area. The objective of this review is to determine and verify the level of performance being reported for transit security function services for LAPD, LASD, LBDP, and Metro's Transit Security Officers during FY 2018 (July 1, 2017 to June 30, 2018).

- LAPD Contract No. PS5862100LAPD24750: On March 1, 2017, Metro entered a 5-year firm fixed unit rate contract with LAPD to provide transit law enforcement services within the specified coverage areas as indicated in Attachments 1 and 2 of the Statement of Work (SOW) in the contract. This contract became effective on March 1, 2017, and ends on June 30, 2022. The total contract amount is not-to-exceed $369,330,499.

- LASD Contract No. PS5863200LASD24750: On September 1, 2017, Metro entered a 5-year firm fixed unit rate contract with LASD to provide transit law enforcement services within the specified coverage areas as indicated in Attachments 1 and 2 of the SOW in the contract. This contract became effective on September 1, 2017, and ends on June 30, 2022. The total contract amount is not-to-exceed $246,270,631.

- LBPD Contract No. PS5862300LBPD24750: On March 23, 2017, Metro entered a 5-year firm fixed unit rate contract with LBPD to provide transit law enforcement services within the specified coverage areas as indicated in Attachments 1 and 2 of the SOW in the contract. This contract became effective on March 23, 2017, and ends on June 30, 2022. The total contract amount is not-to-exceed $30,074,628.

Except for different service coverage areas specified in Attachments 1 and 2 of each contract, the three contracts have the same or similar scope of work including specific responsibilities, training requirements, reporting requirements (including reports and

documents submission), monthly key performance indicators (KPI), and billing requirements. The contracts state that the Contractor is responsible for the following:

- Augment Contractor or regional response to 911 emergency, priority, and routine calls for service;

- Crime analysis and reporting;

- Augment Contractor or regional criminal investigations, accident investigations, and law enforcement response to major incidents;

- Reduce system-wide vulnerability to terrorism;

- Conduct joint anti-terrorism drills, training sessions, and intelligence sharing with other local, state, and federal law enforcement agencies;

- Provide access to K9 explosive detection on an on-call overtime basis;

- Ride Metro buses and trains, patrol bus and rail stations/corridors, and maintain high visibility at key Metro critical infrastructure locations;

- Provide law enforcement presence during periodic fare enforcement and passenger screening operations;

- Remove persons without a valid transit fare from buses, trains, buildings, and stations;

- Conduct mutually agreed upon grade crossing enforcement operations;

- Respond to and resolve incoming calls for service from Metro bus, rail, and security dispatch centers;

- Respond to and resolve incoming complaints from Metro's Transit Watch program;

- Respond to and resolve citizen complaints related to criminal activity;

- Conduct proactive anti-crime operations when not handling a dispatched call;

- Participate in Metro emergency and disaster preparedness planning and drills;

- Collaborate with social service agencies to address the impact of homelessness on the transit system;

- Enforce Metro's Code of Conduct;

- Attend weekly coordination meetings or other meetings as required; and

- Provide additional law enforcement services to address unforeseen events/requirements.

In addition to contract transit law enforcement services, Metro's SSLE Department employs Transit Security Officers (TSO) who provide security over Metro facilities, perform fare compliance checks, and patrol bus and rail systems. Metro TSOs are not sworn or certified law-enforcement officers and do not have authority to detain or arrest.

3. Objectives, Scope and Methodology

On February 23, 2017, the Metro Board passed a motion directing that "the Inspector General be tasked with annually auditing each law enforcement services contract to determine how key performance indicators are measuring up against actual performance metrics. The audit is to ensure that Metro is receiving the services it is paying for."

The overall objective of the audit is to evaluate transit security performance provided by each of the three Contractors and Metro's Transit Security Department during FY 2018. In particular, the audit will review, analyze, and report on:

- Actual performance of the performance indicators in the transit law enforcement services contracts.

- Contractor (LAPD, LASD, LBPD) adherence to requirements in matters such as:
  - Personnel and training,
  - Reporting,
  - Community Policing Plan,
  - Billing, and
  - Security and Emergency Preparedness.

- Effectiveness of fare compliance checks.

- Number of fare validation checks accomplished in FY 2018, compared to fare checks made in the previous 3 years.

- Number of citations issued in FY 2018, compared to the past 3 years.

- Crime statistics for Metro in FY 2018, compared to the statistics for the past 3 years.

The methodology used to complete this review is described in each section of this report.

4. Review Results

The following sections provide information on the results of the review of Metro's transit security function performance review.

A. Trends in Reported Crime, Perceptions of Safety, and Complaints

There are three key outcome measures that can be used to evaluate the effectiveness and trends of Metro's safety and security approach and program. These are the level of reported crime on the system, the perceptions of safety by users of the system, and the number of safety and security complaints made by users of the system. Each of these are described in the following sections.

Reported Crime

Crime and disorder risks within the Metro System include the incidents of crime, general disturbances of the peace, and public safety. These risks are similar to those faced by most communities, albeit in a more specific arena. Crime and disorder risks are measured primarily by the number and severity of crime that occurs within an area.

Finding 1: Obtaining complete and accurate reporting of crime that occurs on the Metro System continues to be challenging.

Some crimes that occur on the Metro System are not reported to Metro and therefore cannot be tracked or used to determine trends in crime on the Metro System. This is partially due to the fact that the Metro System operates within multiple jurisdictions with their own law enforcement agencies.

Many calls for service on the Metro System are received directly by local law enforcement agencies. This is due to patrons on the Metro System dialing 911 on their mobile phones to report an incident and to request law enforcement services. These calls would, in most cases, go to the public safety call taking and dispatch center of the local law enforcement agency. Once the call is received, the incident or call would be responded to and handled by the local law enforcement agency. The call would be given a priority and would be responded to and handled as deemed appropriate by the local law enforcement agency given the relative priority of other calls the agency is handling.

These law enforcement agencies respond to and handle an unknown number of crimes that occur within the Metro System. This is the case in the areas of the Metro System that are serviced by the LASD, much of which is within the jurisdiction and service area of municipal law enforcement agencies. In many cases, the LASD is not informed of

these crimes and so has no way to track or report them. In other cases, the LASD may receive a copy of the crime report, but these crimes are not added to the crimes reported to Metro as having occurred within the system because they are not responded to and handled by the LASD.

In the LAPD service area of the Metro System, LAPD neighborhood patrol units respond to and handle many crimes that occur within the Metro System. An unknown number of these crimes are not reported to the LAPD Transit Policing Division and so are not tracked and reported to Metro. The LAPD has developed an approach and system to identify these crimes and include them in the tracking and reporting of crime that occurs within the LAPD service area of the Metro System. However, this system is still fairly new and not all LAPD neighborhood police units are aware of the need to report these crimes to the LAPD Transit Policing Division.

Recommendation 1: The Metro SSLE Department should continue to work with contract and other law enforcement agencies to improve the complete and accurate reporting of crime that occurs on the Metro System.

Reported Part I Crime

The Federal Bureau of Investigation (FBI) Uniform Crime Reporting system defines serious crime (Part I) as homicides, rape, robbery, aggravated assault, burglary, larceny-theft, motor vehicle theft and arson. The Uniform Crime Reports (UCR) are official data on crime in the United States, published by the FBI. UCR is a nationwide, cooperative statistical effort of law enforcement agencies voluntarily reporting data on crimes. Crime statistics are compiled from UCR data and published annually by the FBI in the Crime in the United States report series.

Reported Violent Crime

Part I violent crime[1] includes homicide, rape, aggravated assault, and robbery. Total reported Violent Crime on the Metro System decreased by 18% between FY 2015 and FY 2018, with most of this decrease (14%) occurring between FY 2017 and FY 2018.

As shown in Exhibit 1, Part I Violent Crimes reported to Metro during the four-year period (FY 2015 to FY 2018) declined by 18% during the period. The most significant decline

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[1] In the FBI's UCR Program, violent crime is composed of four offenses: murder and non-negligent manslaughter, forcible rape, robbery, and aggravated assault. Violent crimes are defined in the UCR Program as those offenses which involve force or threat of force.

occurred between FY 2017 and FY 2018 with a 14% decline. Some of this decline may be due to a 12% decline in ridership over the four-year period. As the exhibit shows, reported violent crime per million riders declined 14% between FY 2017 and FY 2018, but only declined 7% over the entire four-year period.

Exhibit 1							
Reported Part 1 Violent Crime on the Metro System FY 2015 to FY 2018							
Crime	FY 2015	FY 2016	Change	FY 2017	Change	FY 2018	Change	Total Change
Homicide	1	3	200%	3	0%	1	-67%	0%
Rape	3	11	267%	5	-55%	16	220%	433%
Robbery	375	404	8%	404	0%	393	-3%	5%
Aggravated Assault	370	322	-13%	308	-4%	219	-29%	-41%
Aggravated Assault on an Operator	30	18	-40%	20	11%	6	-70%	-80%
Totals	779	758	-3%	740	-2%	635	-14%	-18%
Ridership (Millions)	445.3	428.9	-4%	390.0	-9%	390.9	0%	-12%
Per 1 Million Riders	1.75	1.77	1%	1.90	7%	1.62	-15%	-7%
Per Day	2.13	2.08	-2%	2.03	-2%	1.74	-14%	-18%
Source: Analysis of crime reported by LASD for FYs 2015 to 2017, and reported by LAPD, LASD, and LBPD for FY 2018							

Reported Property Crime

Property crime on the Metro system is also an important consideration. Part I Property Crimes[2] include burglaries, thefts, motor vehicle thefts, and arsons. Total reported Property Crime per day on the Metro System decreased 15% between FY 2015 and FY 2018, with a decrease of 16% occurring between FY 2015 and FY 2017, and an increase of 1% occurring between FY 2017 and FY 2018.

As shown in Exhibit 2 Part I Property Crimes reported to Metro during the four-year period compared (FY 2015 to FY 2018) declined by 15% during the period. The most significant decline occurred between FY 2015 and FY 2017 with a 16% decline. Some of this decline may be due to a 12% decline in ridership over the four-year period. As the exhibit shows,

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[2] In the FBI's UCR Program, property crime includes the offenses of burglary, larceny-theft, motor vehicle theft, and arson. These theft-type offenses involve the taking of money or property, without force or threat of force against the victims. The property crime category includes arson because the offense involves the destruction of property.

reported property crime per million riders declined 3% over the four-year period. Reported Property Crime essentially stayed the same between FY 2017 and FY 2018.

Exhibit 2								
Reported Part 1 Property Crime on the Metro System FY 2015 to FY 2018								
Crime	**FY 2015**	**FY 2016**	**Change**	**FY 2017**	**Change**	**FY 2018**	**Change**	**Total Change**
Burglary	16	12	-25%	18	50%	11	-39%	-31%
Larceny-Theft	1027	921	-10%	882	-4%	927	5%	-10%
Grand Theft Auto	138	128	-7%	101	-21%	71	-30%	-49%
Arson	3	8	167%	4	-50%	2	-50%	-33%
Totals	1,184	1,069	-10%	1,005	-6%	1,011	1%	-15%
Ridership (Millions)	445.3	428.9	-4%	390.0	-9%	390.9	0%	-12%
Per 1 Million Riders	2.66	2.49	-6%	2.58	4%	2.59	0%	-3%
Per Day	3.24	2.93	-10%	2.75	-6%	2.77	1%	-15%
Source: Analysis of crime reported by LASD for FYs 2015 to 2017, and reported by LAPD, LASD, and LBPD for FY 2018								

Reported Other Crime

Other significant crime (Part II[3]) reported also provides useful information on the safety and security of the Metro System. Total reported Other Crime (Part II) per day on the Metro System decreased 15% between FY 2015 and FY 2018, with a decrease of 16% occurring between FY 2015 and FY 2017, and an increase of 1% occurring between FY 2017 and FY 2018.

As shown in Exhibit 3 on the following page, Other Crime (Part II) reported to Metro during the four-year period compared (FY 2015 to FY 2018) declined by 17% during the period. The most significant decline occurred between FY 2016 and FY 2017 with an 11% decline. Some of this decline may be due to a 12% decline in ridership over the four-year period. As the exhibit shows, reported other crime per million riders declined 3% over the four-year period. Reported other crime declined 8% between FY 2017 and FY 2018.

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[3]In the FBI's Uniform Crime Reporting (UCR) Program Part II, the following categories are tracked: simple assault, curfew offenses and loitering, embezzlement, forgery and counterfeiting, disorderly conduct, driving under the influence, drug offenses, fraud, gambling, liquor offenses, offenses against the family, prostitution, public drunkenness, runaways, sex offenses, stolen property, vandalism, vagrancy, and weapons offenses.

Exhibit 3							
Reported Other Crime (Part II) on the Metro System FY 2015 to FY 2018							
Crime	**FY 2015**	**FY 2016**	**Change**	**FY 2017**	**Change**	**FY 2018**	**Change**	**Total Change**
Battery	450	512	14%	501	-2%	766	53%	70%
Battery on Op	63	114	81%	84	-26%	74	-12%	17%
Sex Offenses	88	120	36%	123	3%	151	23%	72%
Weapons	99	74	-25%	83	12%	50	-40%	-49%
Narcotics	502	292	-42%	341	17%	138	-60%	-73%
Trespassing	160	197	23%	83	-58%	59	-29%	-63%
Vandalism	321	375	17%	291	-22%	154	-47%	-52%
Totals	1,683	1,684	0%	1,506	-11%	1,392	-8%	-17%
Ridership (Millions)	445.3	428.9	-4%	390.0	-9%	390.9	0%	-12%
Per 1 Million Riders	3.78	3.93	4%	3.86	-2%	3.56	-8%	-6%
Per Day	4.61	4.61	0%	4.13	-10%	3.81	-8%	-17%
Source: Analysis of crime reported by LASD for FYs 2015 to 2017, and reported by LAPD, LASD, and LBPD for FY 2018								

Trends in reported crime over the four-year period for each rail line, bus operations, and for Union Station are provided in Appendix A of this report.

Trends in Rider Perceptions of Safety

Perception of crime and disorder on the Metro System, and any mass transit system for that matter, creates a risk to the confidence in safety held by passengers and Metro employees and poses a risk to the reputation of Metro as a safe and secure system. Passengers who perceive the system to be unsafe will not use the service and therefore reduce the number of people using transit and Metro's ridership.

Based on Metro's On-Board Customer Satisfaction Surveys conducted during FYs 2015 to 2019 the percentage of riders responding they feel safe either waiting for a train or riding a train declined between FY 2015 and FY 2019. In FY 2015, 84% of riders responded they felt safe waiting for a train, compared to 79% for FY 2019. Similarly, in FY 2015 83% of riders responded they feel safe riding a train, compared to 77% for FY 2019, as shown in Exhibit 4 on the following page.

Exhibit 4 **Metro Rider Perceptions of Safety of Train and Bus System**									
2015	**2016**	**Change**	**2017**	**Change**	**2018**	**Change**	**2019**	**Change**	**Total Change**
Percentage Responding Feel Safe Waiting for a Train									
84%	82%	-2.4%	80%	-2.4%	82%	2.5%	79.0%	-3.7%	-6.0%
Percentage Responding Feel Safe Riding a Train									
83%	81%	-2.4%	79%	-2.5%	79%	0.0%	77.0%	-2.5%	-7.2%
Percentage Responding Feel Safe Waiting for a Bus									
85%	88%	3.5%	86%	-2.3%	87%	1.2%	87.0%	0.0%	2.4%
Percentage Responding Feel Safe Riding a Bus									
89%	91%	2.2%	90%	-1.1%	90%	0.0%	91.0%	1.1%	2.2%
Source: Metro On-Board Customer Satisfaction Surveys Conducted during FYs 2015 to 2019									

As this exhibit shows, the percentage of riders responding they feel safe either waiting for a bus or riding a bus increased between FY 2015 and FY 2019. In FY 2015, 85% of riders responded they felt safe waiting for a bus, compared to 87% for FY 2019. Similarly, in FY 2015 89% of riders responded they feel safe riding a bus, compared to 91% for FY 2019.

These changes in perceptions of safety are small and within the margin of error for the survey. However, it is important to continue to monitor rider perceptions of safety on the Metro System and to develop strategies to address concerns and improve that perception.

Trends in Complaints Regarding Safety and Security

Another important indicator of the public or riders' perception of the safety of the Metro System is the number of complaints received regarding safety and security. Metro Customer Relations tracks complaints received by category using the C-CATS complaint tracking system.

During the period from FY's 2015 to 2018 rider complaints regarding passenger safety or conduct issues were not among the top ten complaints on the bus system. However, on the rail system, rider complaints regarding passenger safety or conduct issues were the second most common complaint of the top ten complaints for FY's 2015 to 2017. For FY 2018, complaints regarding passenger safety or conduct issues dropped to number five of the top ten.

As Exhibit 5 on the following page shows, complaints regarding passenger safety or conduct issues increased from 296 in FY 2015 to 381 in FY 2016 and to 458 in FY 2017. These complaints declined by over half for FY 2018.

Exhibit 5 Number of Metro Rider Complaints Regarding Passenger Safety or Conduct Issues							
2015	**2016**	**Change**	**2017**	**Change**	**2018**	**Change**	**Total Change**
296	381	28.7%	458	20.2%	223	-51.3	-24.7%

The Metro SSLE Department should continue to monitor rider survey results regarding perceptions of the safety of riders on the Metro System and complaints regarding safety and passenger conduct issues, and develop strategies to address significant rider concerns, improve perceptions, and reduce complaints.

B. Resource Monitoring and Oversight

Metro's SSLE Department is charged with ongoing oversight of the contracted law enforcement services as well as the operations of Metro Security. We reviewed and evaluated the oversight and supervision provided by SSLE to ensure compliance with contract requirements.

Audits of Contracted Law Enforcement Personnel Presence

Metro has and will continue to have a substantial investment in resources devoted to system safety and security. Ensuring that these resources are effectively and efficiently used is very important.

Oversight and monitoring of contracted law enforcement resources has been problematic. Metro has had some difficulty in ensuring that law enforcement personnel assigned to Metro are actually present and performing as assigned. Historically, Metro has not had an effective means of verifying the accuracy of this reporting, or of verifying that personnel charging time on the Metro contract are actually present and providing the contracted services.

Beginning with FY 2018, the SSLE Department implemented regular "audits" of law enforcement personnel. These paper audits involve comparing the amounts billed by each law enforcement agency on the invoice to information on personnel charging time to the contract and the roster or schedule of personnel working (in-service). This comparison is completed for specific days each month. These regular paper audits are a positive step and provide increased oversight and monitoring of law enforcement staffing. However, these audits only monitor consistency between personnel time reporting and the invoice. They do not ensure that personnel charging time are actually present and working as assigned.

Observation: Field audits of contracted law enforcement personnel presence strengthens contract oversight and monitoring.

In September 2017, Metro's SSLE Department contract compliance staff began conducting "field audits" of law enforcement personnel to verify personnel assigned to work under each contract are actually present. These audits involve taking the roster of law enforcement personnel assigned to work and verifying that those personnel are actually in the field and providing the contracted service. These "spot" checks are a move in the right direction and provide some assurance that law enforcement services are being provided as contracted. This approach is different from the approach recommended in the FY 2017 performance review to use radio and camera systems throughout the Metro

System several days each month to conduct audits of personnel assigned. However, the field audit approach should be at least as effective.

The Metro SSLE Department should continue to conduct field audits of contracted law enforcement personnel to provide assurance that the law enforcement services contracted for are actually being provided.

GPS Based Contracted Law Enforcement Oversight and Monitoring

The Metro SSLE Department has been working to develop and implement an effective method of tracking and monitoring the activities of safety and security resources deployed on the Metro System using the GPS function on smartphones used by Metro safety and security personnel. There is much potential for this function to provide a reliable and verifiable mechanism for Metro to ensure that contracted law enforcement resources are being used effectively and as planned.

The Mobile Phone Validators (MPV) provided to contracted law enforcement officers are now GPS enabled and are able to provide information on the location and movement of the MPV and law enforcement resources. This information is being used by two of the contracted law enforcement agencies (LAPD and LBPD) to monitor the deployment of their resources under the contract and have reportedly found this function to be helpful. The other law enforcement agency (LASD) has not fully used this function due to concerns raised by the LASD's labor union.

Finding 2: The Mobile Phone Validator GPS function and information generated is not being used by Metro to monitor or provide oversight of contracted law enforcement resources.

Metro has not yet begun using the GPS function and information generated to track or monitor the activities of contracted law enforcement resources. This is partially due to concerns about live tracking of police personnel outside of each police agency and partially due to concerns raised by the LASD's labor union.

These concerns could largely be mitigated by taking a more macro approach to monitoring and oversight. Rather than tracking each individual MPV and officer, the system and data could be used to generate overall information such as how much time was spent at different locations or parts of the Metro System. For example, the function and data could be used to generate reports on the amount of time spent riding each rail line, patrolling each station, or riding on buses. The data collected could be anonymous and not provide information on individual MPV or officers, which should largely alleviate concerns raised.

Recommendation 2: The Metro SSLE Department should continue to work to develop a more macro approach to oversight and monitoring of contracted law enforcement resources using the GPS function of the Mobile Phone Validators (MPV) assigned to contracted law enforcement personnel and the data generated from them.

Oversight of Other Law Enforcement Contract Requirements

Providing monitoring and oversight of contract law enforcement personnel assigned to ensure they are actually present and providing the service Metro is paying for is a top priority. However, it is also important that monitoring and oversight be performed to ensure other contract requirements are also being complied with. These contract requirements include those related to the qualifications and training of personnel assigned, reports and information being provided to Metro, equipment provided under the contract, and providing appropriate support for invoices submitted.

Observation: Monitoring and oversight of compliance with law enforcement contract requirements could be strengthened.

In our review of compliance with the contract terms, we found some instances of non-compliance with the terms in the above areas (See Section E: Compliance with Contract Requirements of this report for our discussion and recommendations). Increased monitoring and oversight of these requirements seems warranted given the size of the contract and the importance of the services being provided.

Observation: Billing discrepancies with contract terms were identified for the two months reviewed as part of this audit.

In our review of compliance with contract terms (See Section E of this report – Compliance with Contract Requirements for our discussion and recommendations) we also found some instances where contract billings and payments were not in compliance with the contract terms, resulting in potential overbillings and overpayments. Billings and payments for all twelve months of FY 2018 should also be reviewed since this audit focused on only two months. Metro should also consider amending the billing terms of the contracts if needed.

SSLE Department Changes

The following key organizational changes were reported by the SSLE Department during FY 2018.

- A new Director of Compliance was appointed in 2018. This change has greatly improved overall contract compliance and performance management.

- A new Deputy Executive Officer (DEO) joined the team in 2019. The DEO will oversee the design and construction of Metro's new Emergency Services Operations Center (ESOC). The ESOC will serve as SSLE's central command center, integrating law enforcement, transit security, and physical security operations.

- A new Executive Officer (EO) joined the team in 2019. The EO will serve as the Deputy Chief of the SSLE and will directly oversee transit security and emergency management operations.

- LA Metro's Emergency Management Department joined the SSLE in 2019. This will ensure seamless communications/planning between law enforcement, transit security, and operations.

C. Key Performance Indicators (KPIs)

It is essential that Metro clearly define performance expectations for each of the contract law enforcement agencies and use meaningful performance indicators to evaluate how well these expectations are being met. The following exhibit shows the KPI included in each of the three law enforcement contracts.

		Exhibit 6			
		Key Performance indicators in Law Enforcement Services Contracts			
	KPI Title	**Definition**	**LAPD**	**LASD**	**LBPD**
1	The number of foot and vehicle patrols of bus stops, transit centers, train platforms, plazas, stations	The total number of patrol minutes per officer spent on the following: • Riding the train/buses • Foot patrols of bus stops/transit centers/train platforms/plazas/stations • Vehicle patrols of bus stops, transit centers, train platforms, plazas, stations	X	X	Train Only
2	Ratio of staffing levels and vacant assignments	The number of officers required to work per contract compared to the number of officers present	X	X	X
3	Ratio of proactive versus dispatched activity	The percentage of time law enforcement personnel spend proactively patrolling the system compared to responding to calls for service	X	X	X
4	Number of bus and train boardings	The number of times contracted law enforcement personnel board buses or trains	X	X	Train Only
5	Incident response times	The time from when the call is received by the police department (dispatch center) to the time when a law enforcement officer actually makes contact at the scene	X	X	X
6	Decreases/Increases in crime	Part 1 & Part 2 crimes per million passenger boardings	X	X	X
7	Number of grade crossing operations	Each agency conducts 1 grade crossing operation per month (minimum 4-hour operation). The focus is on pedestrian safety and vehicle compliance with gates	X	X	X
8	Number of fare enforcement operations	The number of contracted law enforcement agencies operations focused specifically on fare enforcement.	NA	NA	X

To review key performance indicators, we:

- Obtained, summarized, and analyzed the monthly reports on KPIs for FY 2018.

- Determined whether Metro and the three law enforcement agencies jointly developed baseline performance metrics for each KPI in the contract.

- If the baseline performance metrics were developed, compared the baseline performance metrics for each KPI to actual performance for each agency. Discussed with Metro management the reason(s) for any KPIs where actual performance was above the metrics (30% or more), and determined appropriate corrective actions.

- If baseline performance metrics were not developed, determined the reason and timeframe for developing these metrics.

Reporting of Crime and Incident Response Time Indicators

Two of the KPI included in each of the law enforcement contracts were intended to provide information on the outcomes of the law enforcement service provided. These are:

- Decreases/Increases in crime

- Incident response times

The level of crime on the Metro System is clearly the most important indicator of the effectiveness of Metro's SSLE Department and each of the contract law enforcement agencies. Continuing to track and report the level of crime on the system is essential.

Finding 3: Current aggregate reporting of all reported Part I and Part II crime on the Metro System does not adequately reflect the amount of reported violent crime.

In crime reporting, the emphasis should be on violent crime, which is obviously the most impactful to the Metro System and has the greatest impact on Metro's riders. Reporting all crime in the aggregate is much less meaningful because the number of violent crimes such as homicide, robbery, and rape is given the same weight as lesser crimes such as larceny, petty theft, and vandalism.

As discussed in Section A of this report, complete and accurate reporting of crime on the Metro System continues to be a challenge.

The following Exhibit 7 shows how crime on the Metro System is reported.

Exhibit 7
Reported Part I and Part II Crime
for FY 2018

■ Part 1 ■ Part 2

Part 2 55% Part 1 45%

Compared to June of Last Year There Were 79 More Part 1 Crimes Which Resulted In A 92.94% Increase
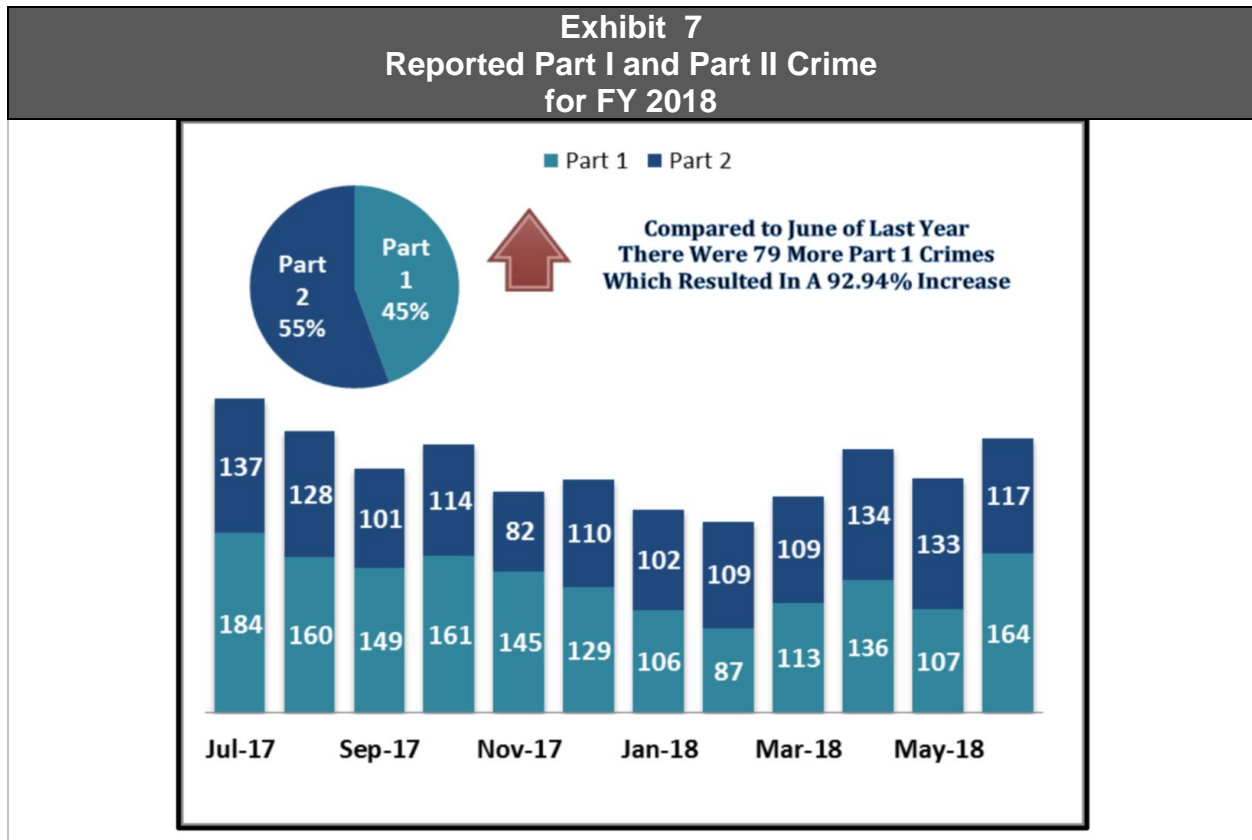
Recommendation 3: The Metro SSLE Department should consider providing more detailed information on reported crime to distinguish between violent crime and property and petty crime.

A primary workload for law enforcement is responding to and handling incidents that occur on the Metro System or calls for service. Responding to these calls and effectively handling the incidents that generate these calls is a high priority for ensuring system safety and security. Calls for service that require a physical response are categorized and dispatched by each of the law enforcement agencies using priority categories. The following are representative of categories used:

- **Emergency Calls:** Are the highest priority and include situations where life or property is in imminent danger. These include crimes in progress such as robberies, rapes, assaults, or burglaries. These also include violent domestic disturbances and reports of individuals with guns or other weapons.

- **Priority Calls:** Include situations that require a fairly immediate police response, with no immediate threat to life or property. These could include disputes, disturbances of the peace, and suspicious activities.

- **Routine Calls:** Include calls where there is no substantial threat to life or property, but a response is needed. These include taking reports on crimes where a significant amount of time has elapsed since the occurrence of the crime as well as quality of life issues that need to be addressed.

Finding 4: Metro's SSLE Department currently only collects and reports response time information for emergency calls for service.

While emergency calls for service are obviously the most important calls, tracking and reporting response time on less urgent incidents and calls for service is also important. Often these lower priority calls for service involve quality of life issues and concerns as well as victims of property crimes. A slow response to these incidents can have a negative impact on the perception of the riding public that the system is safe and well protected. In addition, not requiring contract law enforcement agencies to track and report these response times communicates to them and their officers that these calls are not important.

Exhibit 8 below shows that the monthly average emergency incident response times for FY 2018 ranged from 3.83 minutes to 7.91 minutes.

Exhibit 8
Reported Average Emergency Incident Response Times for FY 2018

	Jul-17	Aug-17	Sep-17	Oct-17	Nov-17	Dec-17	Jan-18	Feb-18	Mar-18	Apr-18	May-18	Jun-18
Emergency	6.42	5.75	5.86	5.43	5.30	7.91	3.83	5.82	6.06	4.53	4.49	6.86
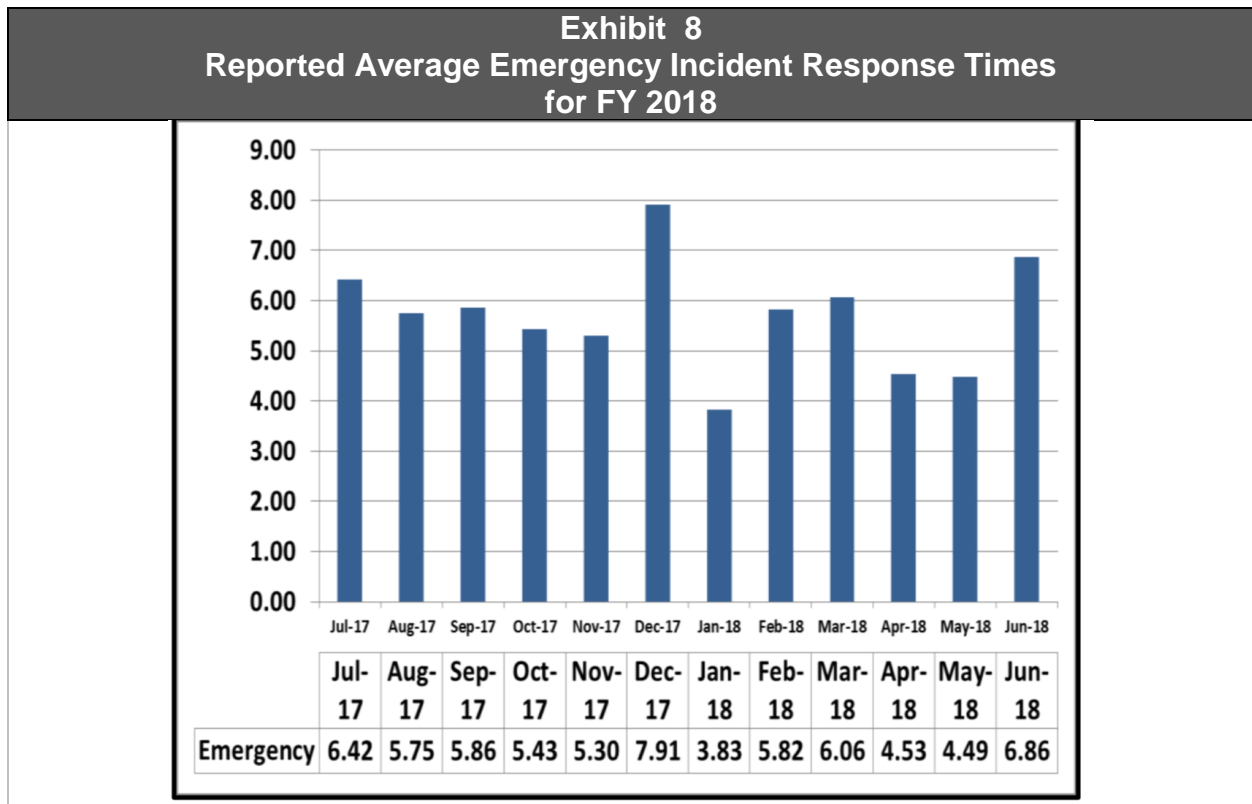
Recommendation 4: The Metro SSLE Department should collect and report response time information for all three categories of calls for service.

Visibility of Law Enforcement Security Personnel Indicators

Providing a visible security presence within the Metro System is an important strategy for providing both a sense and reality of safety. Uniformed patrols, usually within the high traffic stations of the system creates a felt presence of safety and security among the riding public. Visible presence in areas frequently used by passengers include areas near fare gates, boarding areas of buses and trains, station entrances, and public parking areas.

Three of the KPI included in each of the law enforcement contracts were intended to provide information on the visibility of law enforcement security personnel on the system. These are:

- The ratio of proactive versus dispatched activity

- The number of foot and vehicle patrols of bus stops, transit centers, train platforms, plazas, stations

- The number of bus and train boardings

Contract law enforcement agencies were able to only report on the ratio of proactive versus dispatched activity. This is an important measure related to visibility as it indicates how much of their time is spent being visible, doing problem solving, and other proactive activities including community policing. Exhibit 9 on the following page shows the distribution of time spent by contract law enforcement agencies. As this exhibit shows, the reported proactive law enforcement activity ranged from a low of 81% in August of 2017, to a high of 92% in June of 2018. This also shows a positive trend.

Exhibit 9
Contract Law Enforcement Proactive vs. Dispatched Activity
for FY 2018
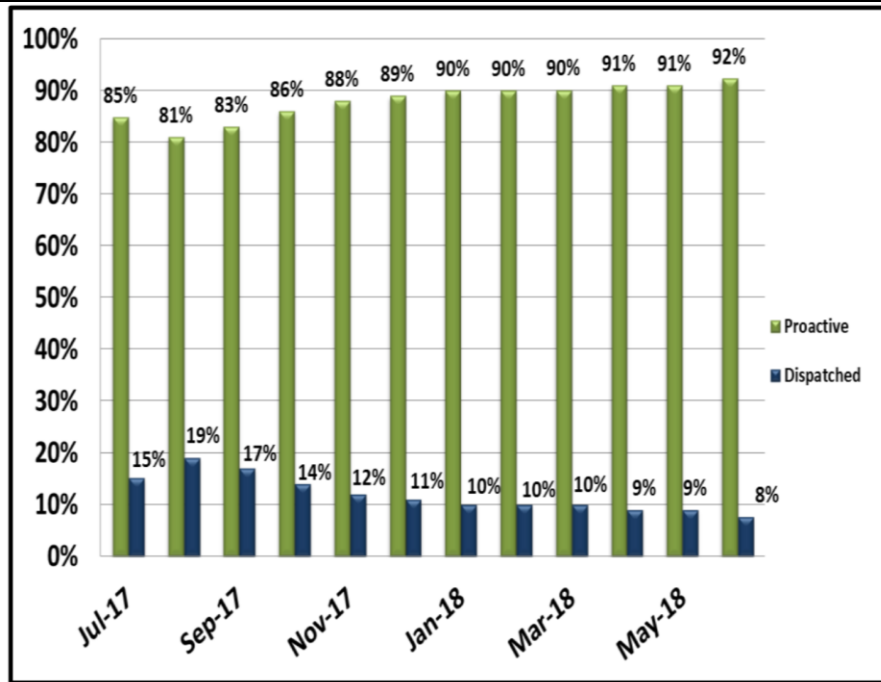
Finding 5: Contract law enforcement agencies were not able to report on two of the Key Performance Indicators outlined in each of the contracts:

- **The number of foot and vehicle patrols of bus stops, transit centers, train platforms, plazas, stations**

- **Number of bus and train boardings**

While these are important indicators and would provide useful information on the level of activity and visibility of contracted law enforcement personnel, it was not practical for the agencies to reliably collect meaningful information for these indicators. This is partly due to the lack of definition for patrols or boardings and partly due to the fact that reliably tracking this information would be difficult even with clear definitions.

In addition, what is important is the amount or percentage of contracted law enforcement time that is actually spent on trains and buses, platforms, and stops. The count of the number of times law enforcement personnel step on or off a train or bus or other locations is not that useful. As discussed in Section B of this report, using the GPS function and data generated could provide reliable and meaningful information on the amount of time contracted law enforcement officers spend on each of these activities.

Recommendation 5: The Metro SSLE Department should use the GPS function and data generated to provide reliable and meaningful information on the amount of time contracted law enforcement officers spend on various parts of the Metro System.

Law Enforcement Personnel Presence Indicator

One of the KPI included in each of the law enforcement contracts was intended to provide information on the presence of the contracted law enforcement personnel. This is the ratio of staffing levels and vacant assignments.

This performance indicator is largely the result of past experience where a significant number of the law enforcement assignments that were to be staffed by contracted law enforcement were vacant or were not staffed. This indicator is important in both communicating to the contract law enforcement agencies the need to actually staff contracted assignments and to report how effectively these positions are actually being staffed.

As shown in Exhibit 10 staffing levels have been at 98.5% or higher for FY 2018.
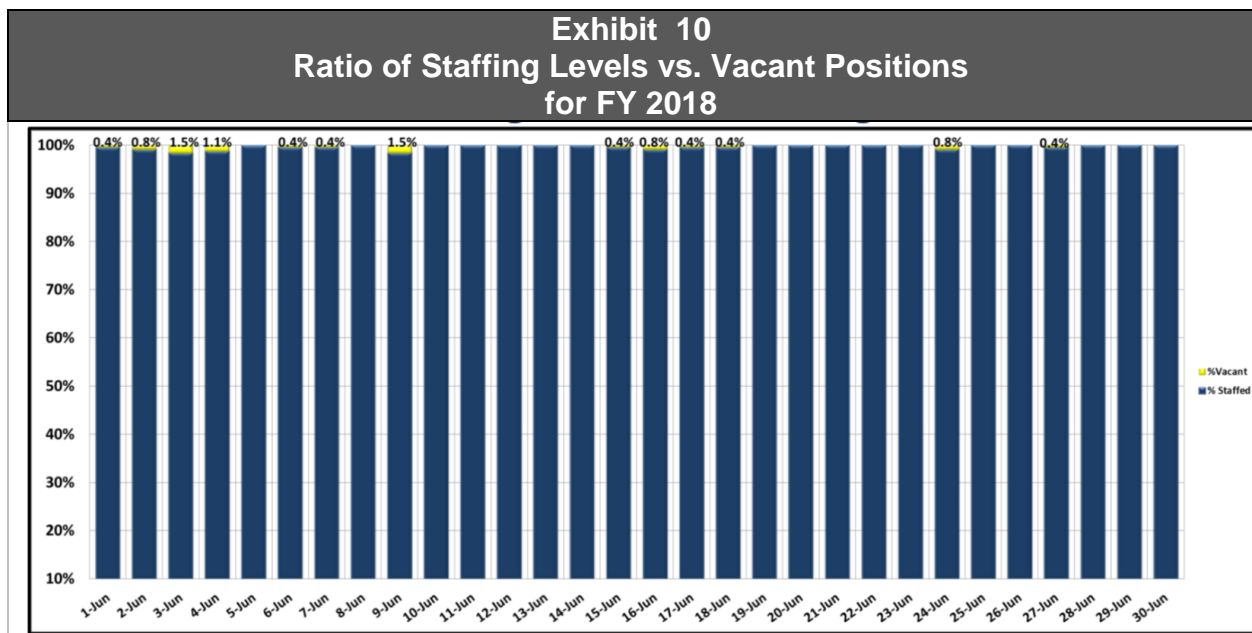
Law Enforcement Personnel Activity Indicators

Two of the KPI included in law enforcement contracts were intended to provide information on the level of specific activities of the contracted law enforcement personnel. These are:

- Number of grade crossing operations

- Number of fare enforcement operations (Only LBPD)

A grade crossing is where a rail line and road or pedestrian walkway come together. Each contracted law enforcement agency is required to conduct grade crossing operations to enforce grade crossing rules and improve pedestrian safety. Each of these operations are to be for four hours. Exhibit 11 on the following page shows the number of grade crossing operations for each month by law enforcement agency. As this exhibit shows, reported grade crossing operations increased from 15 in July of 2017 to 639 in June of 2018.

The number of fare enforcement operations is a KPI reporting requirement for only the Long Beach Police Department. Information on the number of these operations is not included in the monthly KPI reports.

Exhibit 11
Number of Grade Crossing Operations
for FY 2018

	Jul-17	Aug-17	Sep-17	Oct-17	Nov-17	Dec-17	Jan-18	Feb-18	Mar-18	Apr-18	May-18	Jun-18
LBPD	4	5	4	2	4	5	5	4	5	4	5	3
LASD	1	1	6	3	13	65	141	228	246	246	290	422
LAPD	10	16	185	100	289	289	285	334	177	369	282	214
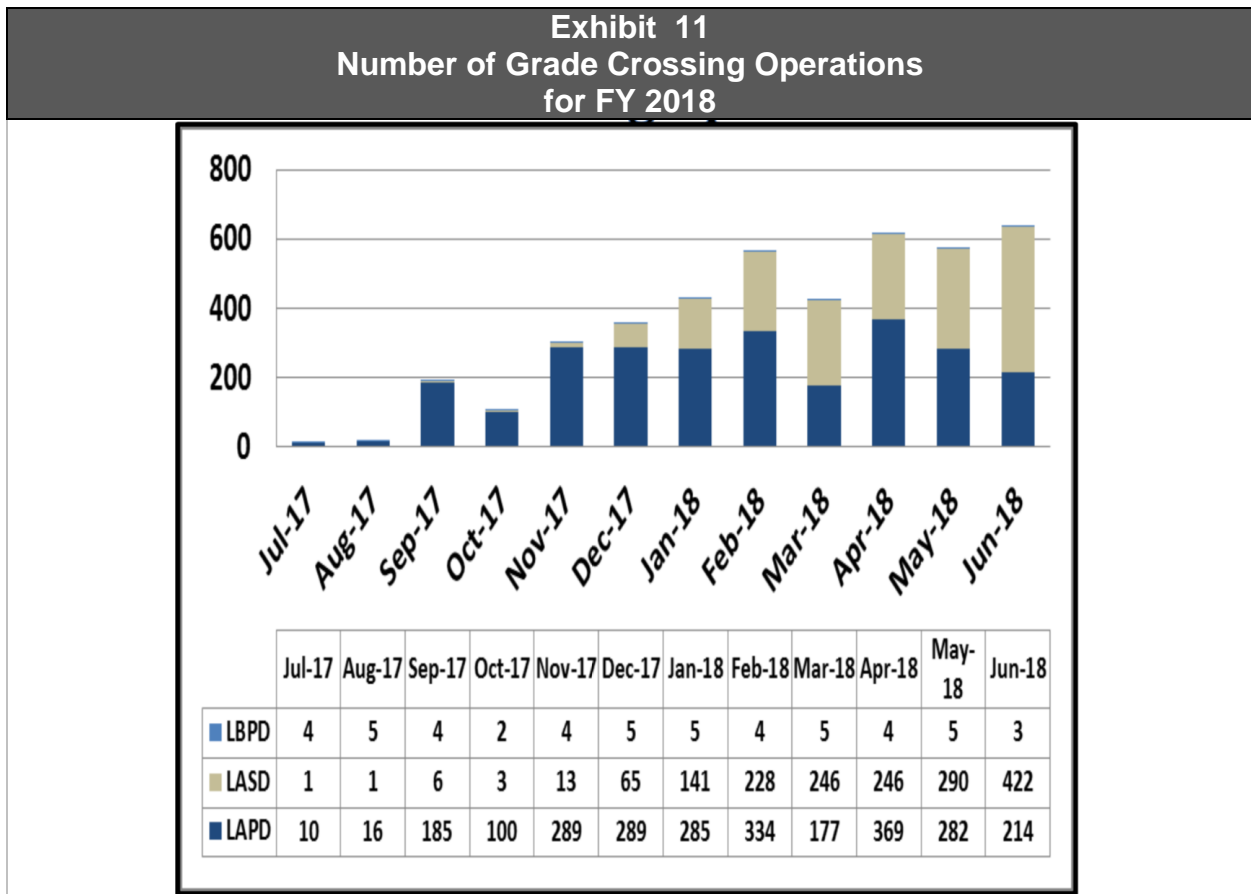
Baseline Expectations and Potential Performance Indicators

Performance measurement and reporting demonstrates the success or effectiveness of organizational or program activities in addressing a specific need or attaining a specific goal. A meaningful performance measurement framework includes a balanced set of indicators, ensures the collection of sound and reliable indicator data, provides for the analysis and reporting of indicator information and drives service improvement efforts and the testing of new initiatives.

In addition, it is important to establish baseline expectations or targets for each performance indicator. This not only clearly communicates performance expectations; it also can help drive improvements in performance through development and implementation of new strategies.

Finding 6: Baseline performance levels for each Key Performance Indicator have not been developed.

To establish clear expectations, Metro's SSLE Department should work with contract law enforcement agencies to establish baseline or target performance levels for each KPI currently in use. They should also work together to determine if additional KPI's would be appropriate and meaningful. The following Exhibit 12 provides a list of potential performance indicators as a starting point for discussions between Metro's SSLE Department and contract law enforcement agencies on performance tracking and reporting.

Exhibit 12 Potential Performance Indicators		
Indicator	**Data Source**	**Comments**
Metro Patrons / Riders Perceptions of Safety and LASD Service		

Percentage of Metro Patrons / Riders who feel safe on the system:
  During the Daytime
  During the Nighttime
	Annual or Bi-annual safety and security survey of Metro Patrons / Riders.	Community surveys have become very common among law enforcement agencies to gauge the level of fear of crime, as well as the level of satisfaction with law enforcement services provided.

Percent of Metro Patrons / Riders who feel likely / unlikely to be crime victims on the Metro system.		
Percent Favorable Impression of Transit Policing Services		
Service Rating - Follow-up		
Service Rating - Problem Solving		
Service Rating - Response Time		

Exhibit 12		
Potential Performance Indicators		
Indicator	**Data Source**	**Comments**
Service Rating - Service Quality		
Service Rating - Fairness		
Service Rating - Helpfulness		
Crime on the Metro System		
Part I Violent Crime (Homicide, Rape, Aggravated Assault, Robbery)	Crime as reported to the FBI Uniform Crime Reporting System, including both crimes responded to and handled by the contract law enforcement agencies and by other municipal law enforcement agencies.	Crime should be tracked and reported by line, with trends tracked over time to identify areas of concern or requiring additional focus.
Part I Violent Crimes per Million Riders	Total Part I Violent Crimes divided by the average number of daily passengers on the line, multiplied by a million.	This indicator will allow comparison as the transit system and ridership continues to expand. This ratio should also be tracked and reported by line over time to identify areas of concern or requiring additional focus.
Part I Property Crime (Burglary, Theft, Grand Theft Auto, and Arson)	Crime as reported to the FBI Uniform Crime Reporting System, including both crimes responded to and handled by the contract law enforcement agencies and by other municipal law enforcement agencies.	Crime should be tracked and reported by line, with trends tracked over time to identify areas of concern or requiring additional focus.
Part I Property Crimes per Million Riders	Total Part I Property Crimes divided by the average number of daily passengers on the line, multiplied by a million.	This indicator will allow comparison as the transit system and ridership continues to expand. This ratio should also be tracked and reported by line over time to identify areas of concern or requiring additional focus.
Part II Crime	Crime as reported to the FBI Uniform Crime Reporting System, including both crimes responded to and handled by the contract law enforcement agencies and by other municipal law enforcement agencies.	Crime should be tracked and reported by line, with trends tracked over time to identify areas of concern or requiring additional focus.
Emergency Call Taking, Dispatch and Response		

Exhibit 12		
Potential Performance Indicators		
Indicator	**Data Source**	**Comments**
Time to Answer 911 Calls (Seconds)	Call center and Computer Aided Dispatch system software.	Each of these are standard performance indicators that should be tracked using basic call center and Computer Aided Dispatch Software.
Percent Calls Dropped		
Call Processing Time (Minutes)		
Emergency Dispatch Time (Minutes)		
Priority Dispatch Time (Minutes)		
Routine Dispatch Time (Minutes)		
Emergency Patrol Response Time (Minutes)		
Priority Patrol Response Time (Minutes)		
Routine Patrol Response Time (Minutes)		
Criminal Investigations		
Violent Crime Clearance Rate	FBI Uniform Crime Reporting	This provides an indication of how effective criminal investigators are at solving crime on the Metro system.
Violent Crimes per Investigator	Number of violent crimes reported divided by the number of investigators assigned to investigate them.	This provides an indication of the level of investigative workload for TSB investigators.
Property Crime Clearance Rate	FBI Uniform Crime Reporting	This provides an indication of how effective criminal investigators are at solving crime on the Metro system.
Property Crimes per Investigator	Number of property crimes reported divided by the number of investigators assigned to investigate them.	This provides an indication of the level of investigative workload for TSB investigators.
Metro Patron / Riders Commendations and Complaints, and Internal Affairs Investigations		
Number of Commendations	Contract law enforcement agency Service Commendation and Complaint Tracking System	Provides an indication of the number of times Metro patrons or riders are pleased with the actions of the contract law enforcement personnel.
Commendations per 100 Contracted Law Enforcement Personnel		Provides for a comparison of performance over time with changes in staffing levels.

Exhibit 12		
Potential Performance Indicators		
Indicator	**Data Source**	**Comments**
Number of Complaints Against Sworn Officers		Provides an indication of the number of times Metro patrons or riders complain about the actions of contract law enforcement personnel.
Complaints per 100 Sworn Officers		Provides for a comparison of performance over time with changes in staffing levels.
Number of Complaints against Metro Security Officers		Provides an indication of the number of times Metro patrons or riders complain about the actions of Metro Security personnel.
Complaints per 100 Metro Security Officers		Provides for a comparison of performance over time with changes in staffing levels.
Number of Internal Affairs Cases	Internal Affairs	Provides an indication of the number of serious allegations against contract law enforcement and Metro Security personnel.
Internal Affairs Cases per 100 Assigned Personnel		Provides for a comparison of performance over time with changes in staffing levels.

Recommendation 6: The Metro SSLE Department should work with the contract law enforcement agencies to review, revise, and adopt KPI's including baseline or target levels of performance for each KPI.

D. Community Policing

According to the U.S. Department of Justice's Office of Community Oriented Policing Services (COPS), community policing is an approach defined by combining the development of partnerships (i.e., the building of relationships) among affected stakeholders and with problem solving. Concerted engagement in these activities ultimately results in transformations within law enforcement organizations and communities as their efforts break down cultural barriers.

Community policing within a transit system should place an emphasis on quality of life issues. The customers of the Metro System must feel safe and secure. The presence of security, in whatever form, must have a "felt presence;" and must be visible and engaged without becoming oppressive and threatening.

Quality of life issues such as fare evasion, graffiti, and panhandling are problems within the system. Program personnel should employ a zero-tolerance approach for minor issues in order to ensure that an environment enabling the commission of major crimes does not emerge.

Each of the law enforcement services contracts contains requirements related to community policing. The specific requirements are:

- The Contractor shall update annually the Metro approved Community Policing Plan. Building and sustaining community partnerships is central to Metro's goal of reducing vulnerability to crime. This will require periodic attendance at community meetings and other events designed to foster Metro's relationship with the community. Contractor's staff shall be provided specific training in Problem Oriented Policing in order to assist Metro in addressing longstanding challenges related to crime, blight, and disorder. The cost of such training and/or exercises are eligible for reimbursement by Metro under this Contract.

- As part of the Community Policing Plan, it is important for the Contractor to incorporate feedback from rail managers into the overall policing strategy. Maintaining a continuous dialogue will foster an operational understanding of the unique challenges associated with policing in a transit environment. The primary goal of these collaborative efforts is to ensure that each of the Divisions are given appropriate coverage and foster the safety of the operators.

To determine the extent to which law enforcement resources servicing the Metro System are following community policing principles we:

- Requested the Metro approved Community Policing Plan for each Contractor to determine if each Contractor:

- o Created or updated the Community Policing Plan?

- o Provided staff with specific training in Problem Oriented Policing to assist Metro in addressing matters related to crime and disorder?

- o Attended community meetings and other events designed to foster Metro's relationship with the community?

- o Have a protocol in place to obtain feedback from bus and rail managers (feedback that will be used in the overall policing strategy)?

- • Determined whether each Contractor and Transit Security is using reports of Law Enforcement Service Requests (LESR) as a tool to where crime, fare evasion and other problems occur.

Metro Community Policing Plan

Finding 7: The Metro SSLE Department is in the process of developing a community policing plan for the Metro System.

The Metro Community Policing plan will be a unified plan instead of having each of the three law enforcement agencies develop individual community policing plans. The Metro Community Policing plan is part of Metro's new Equity Platform, which aims to assure equity across all programs impacting transit service, planning, and policing.

The SSLE Department will be partnering with community-based organizations to develop the new Community Policing Plan. So far, SSLE has attended 3 planning sessions facilitated by the LA Metro's Planning Department and attended by multiple community organizations.

Metro's SSLE Department and the community will jointly develop a Community Policing Plan that accomplishes three basic goals:

1. Develop a common understanding of what it means to be "safe/secure" while riding transit

2. Establish policing priorities (such as reducing/preventing crime, reducing sexual assault/harassment, and addressing homelessness)

3. Establish clear accountability measures (transparent crime reporting, commendations/compliant processes, etc.)

The SSLE Department expects to have a draft Metro Community Policing Plan completed by the Fall of 2019.

Recommendation 7: The Metro SSLE Department should continue to develop the Metro Community Policing plan and ensure it includes:

- **Specific training in Problem Oriented Policing for law enforcement personnel to assist Metro in addressing matters related to crime and disorder**

- **Attendance at community meetings and other events designed to foster Metro's relationship with the community**

- **Protocols to obtain feedback from bus and rail managers that will be used in the overall policing strategy**

Law Enforcement Service Request (LESR) System

Metro employees, including bus and train operators, maintenance personnel, customer service representatives, and others are the front-line representatives of Metro and have ongoing and direct interaction with the riding public. As such, they are in a prime position to identify and report public safety and law enforcement issues and concerns.

Observation: LESR system implemented in FY 2018 should provide good information on safety and security issues and concerns on the system going forward.

During FY 2018, a total of 935 law enforcement service requests were generated by Metro employees. Review of the requests and responses indicate that law enforcement agencies are using the LESR to identify and resolve issues and concerns. The following Exhibit 13 shows some of the more frequent requests (fare evasion and threats to operators) made by Metro employees using the LESR system during FY 2018.

Exhibit 13 Law Enforcement Service Request System Requests for FY 2018	
Problem Identified	**Number Identified**
Fare Evasion	150
Threats to Operator	109
Passenger Disturbing the Peace	77
Drug Use or Sale on Bus or Train	65
Obstruction of Bus Zone	54
Drug Use or Sale on Bus or Train Terminal/Platform	42
Threats to Patrons	35
Transients at Bus Stop or Train Terminal	32
Alcohol Use at Bus Stop or Train Terminal	30

Exhibit 13 Law Enforcement Service Request System Requests for FY 2018	
Problem Identified	**Number Identified**
Chronic Homeless	28
Eating/Drinking on Bus or Train	25
Under the Influence in Public	23
Transients Refusing to Leave	23
Objects Thrown at Bus or Train	22
Playing Music on Bus or Train	21
Assault on Bus or Rail Operator	19
Smoking on Bus or Train	18
Assault on Patron(s)	15
Rowdy School Children	14
Gang Members	12
Alcohol Use on Bus or Train	11
Rowdy Behavior	10

The Metro SSLE Department should continue to use the Law Enforcement Service Request System to provide information on safety and security issues and concerns on the Metro System.

Transit Community Policing Training Curriculum

Each of the contracts with the three law enforcement agencies required all contracted law enforcement personnel to attend a course on Transit Policing. This course was to outline Metro's community policing approach for the Metro System. The curriculum will be developed by Metro prior to the training and cover the topics of:

a) Overview of Metro's Organization Chart, Bus and Rail Operations
b) Mitigating Terrorism in the Transit Environment
c) Impact of Crime and Disorder on Transit Ridership
d) Transit Watch App
e) Metro's Customer Service Expectations
f) Partnering with Metro's Security Team
g) Fare Collection and Fare Evasion
h) Grade Crossing Enforcement
i) Metro Customer Code of Conduct

Observation: Metro's Transit Community Policing Training curriculum covers the topics listed in the contracts.

Metro provided a copy of the Transit Police Training Curriculum as of December 5, 2018. Based on this document, Metro's training curriculum covers the topics listed in the contract.

Specific information on the compliance with the contract requirement that all contracted law enforcement personnel attend this training is provided under the Personnel and Training Requirements in Section E: Compliance with Specific Contract Requirements Section of this report.

The Metro SSLE Department should continue to ensure Community Policing training is provided to contracted law enforcement personnel and update the curriculum to reflect the Metro Community Policing Plan when complete.

E. Compliance with Specific Contract Requirements

The contracts with the three law enforcement agencies each contain specific requirements related to personnel and training, billing, required reports, and other contract requirements.

Overview of Law Enforcement Contract Requirements

Each of these requirements are outlined as follows.

Personnel and Training Requirements (Section 1.2)

Section 1.2 of each contract provides specific requirements for the personnel assigned to provide service to Metro, including the training and experience of these personnel. Each of the law enforcement services contracts provides specific requirements for the personnel assigned under the contract. The following Exhibit 14 shows the personnel and training contract requirements included in each of the three law enforcement contracts.

	Exhibit 14 Personnel and Training Requirements in Law Enforcement Contracts			
	Contract Requirements	**LAPD**	**LASD**	**LBPD**
1	Each sworn law enforcement officer/supervisor assigned to Metro must hold an active (Basic, Intermediate, Advanced or Supervisory) California POST Peace Officer's Certificate.	X	X	X
2	Command level officers must hold an active Management or Executive POST Peace Officer's Certificate.	X	NA	X
3	All supervisors and managers must have completed department training equivalent to supervisory and/or advanced POST courses.	NA	X	NA
4	Only POST certified personnel are authorized to provide law enforcement services.	X	X	X
5	Personnel must have completed their probationary period.	X	NA	X
6	Personnel must have a minimum of eighteen months of law enforcement experience.	X	NA	X

	Exhibit 14 Personnel and Training Requirements in Law Enforcement Contracts			
	Contract Requirements	**LAPD**	**LASD**	**LBPD**
7	Personnel must have no current duty restrictions.	X	NA	X
8	All Contractor personnel must attend a Metro safety training immediately following the issuance of a Notice to Proceed. After Notice to Proceed, any new personnel of the Contractor will be required to attend this Metro safety training.	X	X	X
9	Within the first six months of assignment, all law enforcement personnel must complete a four-hour training course in Transit Policing.	X	X	X

To determine compliance with these requirements by each of the contracted law enforcement agencies, we selected 30 sworn officers assigned to LA Metro by each of the three Contractors and determined whether law enforcement personnel met the following contract requirements:

a. Each sworn law enforcement officer/supervisor assigned to Metro hold an active California POST (Peace Officer's Certificate).

b. Command level officers hold an active Management or Executive POST Peace Officer's certificates (not required for LASD).

c. Only POST certified personnel are providing law enforcement services.

d. Personnel assigned to the contract:

- Completed their probationary period (not required for LASD);

- Have a minimum of 18 months of law enforcement experience (not required for LASD);

- Have no current duty restrictions (not required for LASD).

e. Personnel assigned to the contract attended the Metro's safety training within the first 6 months, and completed other training required by the contract.

Billing (Section 7.0)

Each contract for law enforcement services includes specific requirements regarding billing for services provided including providing specific supporting documentation. The

following Exhibit 15 shows the billing contract requirements included in each of the three law enforcement contracts.

	Exhibit 15 **Billing Requirements in Law Enforcement Contracts**			
	Contract Requirements	**LAPD**	**LASD**	**LBPD**
1	The Contractor's monthly invoice shall be based upon and reflect the actual services provided.	X	NA	X
2	The billings must be accompanied by supporting documentation, to include, but shall not be limited to, daily summary of assignments and hours worked and payroll records.	X	NA	X
3	Contractor shall be paid based on actual units of service performed on a daily basis, in accordance with the agreed upon deployment plan/schedule multiplied by the actual fully burdened rate of each personnel deployed in accordance with the Exhibit B of the contract.	X	NA	X
4	Exhibit B: Contractor shall submit for approval of Metro, a list of maximum fully burdened hourly rates for each labor classification as follows: • Sworn Field Personnel (Overtime) • Management/Field Supervisory and Administrative Personnel	X	NA	X
5	The Contractor's monthly invoice shall be calculated as the monthly pro-rata portion of the annual firm fixed rate as specified in the applicable LASD's SH-AD 575 Deployment of Personnel Form. For each job position that did not meet the service levels promised on the Form 575, a credit shall be provided to Metro using the annual estimated cost per position per SH-AD575 divided by 12 months and number of day for the month, multiplied by number of days the position remained unfilled in whole or in part.	NA	X	NA

To determine compliance with these requirements by each of the contracted law enforcement agencies, we:

- Determined whether the total amount billed and paid during FY18 is consistent with the cost limits specified in the contract for FY18 for each contract.

- Reviewed Contractor billings for two months (April and May 2018) and determined whether:

  o Invoices are supported by documentation such as daily summary of assignments and hours worked and payroll records (not applicable for LASD).

  o Invoices were based on actual services provided.

  o Billing rates were consistent with contract terms.

Required Reports (Section 2.1)

Each of the law enforcement services contracts provides specific requirements for the reports to be provided under the contract. The following exhibit shows the contract report requirements included in each of the three law enforcement contracts.

	Exhibit 16 **Reporting Requirements in Law Enforcement Contracts**			
	Required Reports	**LAPD**	**LASD**	**LBPD**
1	Weekly schedule for each watch or shift. Must include each employee's name, actual hours worked, assignment and rank.	X	X	X
2	Daily summary of work activity for each employee.	X	NA	NA
3	Watch Commander Summary of Major Events of the Day.	NA	NA	X
4	Monthly summary of crime activity, citations issued, arrests made.	X	X	X
5	Monthly summary of commendations and complaints.	X	X	X
6	The number of cases referred for follow-up investigation and the subsequent disposition.	X	X	NA

Exhibit 16 Reporting Requirements in Law Enforcement Contracts				
7	Monthly Report on the number of Part 1 crime cases referred for follow-up investigation and the subsequent disposition.	NA	NA	X
8	After-Action Reports following special operations, emphasis details and/or major incidents.	X	X	X
9	Annual Community Policing Plan.	X	X	X
10	Monthly summary of Problem-Oriented Policing projects.	X	X	X
11	Law Enforcement Sensitive Reports (distribution to Metro's CEO, DCEO, COO, Chief of Risk Safety and Asset Management and Chief of System Security and Law Enforcement).	X	X	NA
12	Executive Summary of Major Events/Incidents on the Metro System (distribution to Metro's CEO, DCEO, COO, Chief of Risk Safety and Asset Management, and Chief of System Security and Law Enforcement).	NA	NA	X

To determine compliance with these requirements by each of the contracted law enforcement agencies, we:

- Determined whether each Contractor provided Metro with the following required reports in a timely manner, with complete information, and in a format that allows Metro to determine the calculation of reported figures:

  o Weekly schedule for each watch or shift.

  o Daily summary of work activity for each employee.

  o Monthly summary of crime activity, citations issued, and arrests made.

  o Monthly summary of commendations and complaints.

  o Number of cases referred for follow-up investigation and the subsequent disposition.

- o After-Action reports following special operations, emphasis details and/or major incidents.

- o Annual Community Policing Plan.

- o Monthly summary of Problem – Oriented Policing projects.

- o Law Enforcement Sensitive Reports.

- Determined whether each Contractor provided Metro with complete and timely data to measure:

  - o How assets are assigned and tracked using GPS.

  - o The time/date/category/disposition of calls for service.

  - o Incident response times.

  - o Ratio of proactive versus dispatched activity.

  - o Number of criminal citations/infractions/violations issued.

  - o Number of misdemeanor and felony arrests.

  - o Real Time Crime analysis data.

- Determined whether Metro has provided Contractor personnel with Mobile Phone Validators, Metro Transit Watch tools, Mobile Video Surveillance tools, and access to video feeds where possible. Evaluate whether Contractor personnel are utilizing these tools, or whether any other tools are needed.

- Evaluated whether each Contractor has the necessary tools to communicate with other police/fire agencies, investigate crimes and accidents, prepare reports, and analyze and predict crime trends. Are their methods effective and adequate?

- Reviewed the adequacy of protocols that Metro has developed with each Contractor (LAPD, LASD, and LBPD) for dispatching nonemergency service calls that are not appropriate for the 911 system.

Other Contract Requirements

Each contract for law enforcement services includes additional specific requirements. To determine compliance with these requirements by each of the contracted law enforcement agencies, we:

- Determined whether the Contractor provided the equipment in the quantities listed in Exhibit E of each contract (such as information technology, communication, and field equipment and vehicles).

- Determined whether Metro has an adequate process to verify that the Contractor provides the required equipment/vehicles (not required for LASD and LBPD).

- Evaluated threat analyses and strategies identified by each Contractor to address security threats.

- Determined whether the Contractors responded timely to requests for K9 explosive detection services.

- Determined whether the Contractors responded timely to requests for law enforcement presence during fare enforcement and passenger screening operations.

- Determined whether the Contractors adequately collaborated with social service agencies to address the impact of homelessness on the transit system.

Los Angeles Police Department (LAPD) Contract Compliance

The following sections provide information on the LAPD's compliance with contract requirements.

LAPD Personnel and Training Requirements Compliance

LAPD provided a list of 5,623 personnel names assigned to the Metro contract. Of the 5,623 names, 5,597 were sworn personnel and 26 were reserve personnel. We randomly selected 30 sworn officers' names and requested LAPD to provide documentation indicating that law enforcement personnel met the contract requirements.

Finding 8: LAPD was not in compliance with two of the contract requirements related to personnel and training:

- **Command level officers must hold an active Management or Executive POST Peace Officer's certificate.**

- **All law enforcement personnel must complete a four-hour training course in Transit Policing within the first six months of assignments.**

According to Section 1.2 of the contract, command level officers must hold an active Management or Executive POST Peace Officer's Certificate. Based on the information that LAPD provided, 4 of the selected 5 command level officers (Deputy Chief, Commander, Lieutenant 1 and Lieutenant 2) were in compliance by holding an active Management POST Peace Officer's certificate. One of the selected 5 command level officers (Captain 3) held an active Supervisory POST Peace Officer's certificate instead of the required Management or Executive POST Peace Officer's Certificate.

Also, Section 1.2 of the contract required all law enforcement personnel to complete a four-hour training course in Transit Policing within the first six months of assignments. Based on the information that LAPD provided, 1 out of 30 selected personnel did not attend this training. Twenty-nine of 30 of the selected personnel attended the Transit Policing Training (TPT) on various training dates from August 24, 2018 to March 8, 2019. According to LAPD, the one law enforcement personnel who did not attend this training within the first six months of assignment was because the training was not available. LAPD indicated that the training was made available on August 23, 2018.

Exhibit 17 on the following page summarizes the results of our review.

Exhibit 17 Los Angeles Police Department Compliance with Contract Personnel and Training Requirements			
Contract Requirements	**Compliance**		**Comments**
	Yes	**No**	
1. Each sworn law enforcement officer/supervisor assigned to Metro must hold an active Basic, Intermediate, Advanced or Supervisory California POST Peace Officer's Certificate.	X		
2. Command level officers must hold an active Management or Executive POST Peace Officer's certificate.		X	Captain 3 - Supervisory POST Peace Officer's certificate.
3. Only Post certified personnel are authorized to provide law enforcement services.	X		
4. Personnel assigned to the contract completed their probationary period.	X		
5. Personnel assigned to the contract have a minimum of 18 months of law enforcement experience.	X		
6. Personnel assigned to the contract have no current duty restrictions.	X		
7. Personnel assigned to the contract completed Metro's Safety Training.	X		
8. Personnel assigned to the contract completed training course in Transit Policing.		X	1 out of 30 or 3.33% of the selected personnel have not completed the Transit Policing Training.

Recommendation 8:

A. **LAPD should continue monitoring the contract requirements to ensure all personnel meet the required certification and complete the transit policing training before working on any Metro assignments.**

B. **Metro's SSLE Department should continue monitoring the contract requirements for qualifications and training of personnel to ensure compliance.**

LAPD Billing Requirements Compliance

On March 1, 2017, Metro entered a five-year firm fixed unit rate contract with LAPD based on LAPD's proposal dated February 21, 2017, for a not-to-exceed amount of $369,330,499. The exhibit below summarizes the amount estimated for each year.

Exhibit 18	
Los Angeles Police Department Contract Amounts for Each Contract Year	

	Amount
Year 1	$ 70,098,520
Year 2	69,495,306
Year 3	73,652,923
Year 4	76,531,010
Year 5	79,552,740
Total	$ 369,330,499

Observation: The total amount billed and paid to LAPD for FY 2018 did not exceed the estimated cost specified in the contract for Year 1.

For Fiscal Year 2018 (FY 2018), the total amount billed and paid to LAPD was $68,848,044. Thus, the total amount billed and paid for FY 2018 did not exceed the estimated cost of $70,098,520. The exhibit below summarizes the contract amount and billing and payment amount for year 1.

Exhibit 19
Los Angeles Police Department Contract Amount and
Billing And Payment Amount for FY 2018

Exhibit 19 Los Angeles Police Department Contract Amount and Billing And Payment Amount for FY 2018		
		Year 1
Contract Amount	$	70,098,520
Billing and Payment		68,848,044
Difference	$	1,250,476

If the LAPD ever anticipates exceeding the estimated cost of the contract, they should inform Metro before incurring any costs. Metro's SSLE Department should continue monitoring the billing, payment and contract amount to ensure that costs do not exceed the contract amount.

Finding 9: Invoices submitted to Metro were based on actual services provided and supported by daily summary of assignments and hours worked using the cost data from the payroll system. However, actual payroll records were not submitted with the invoices as required.

According to Section 7.0 of the SOW in the contract, the Contractor's monthly invoice shall be based on actual services provided and supported by daily summary of assignments and hours worked and payroll records.

We reviewed LAPD's billing for two invoices (invoice no. 18MTADP0411 and 18MTADP0512). Invoice No. 18MTADP0411 is for period from April 15, 2018 to May 12, 2018 in the amount of $4,748,089.82. Invoice No. 18MTADP0512 is for the period from May 13, 2018 to June 9, 2018 in the amount of $4,915,288.17. For each of these two invoices, LAPD submitted 19 spreadsheets detailing the daily hours and costs of each employee for each type of cost classifications and locations of the services. Per LAPD, the daily hours and costs billed for each employee were based on actual payroll data exported from their payroll system. Actual payroll records for each employee were not submitted with the invoices.

Recommendation 9:

A. **LAPD should submit the required payroll records with the monthly invoice.**

B. **Metro should continue to monitor LAPD's billings to ensure all the required supporting documents are submitted with the invoices.**

Finding 10: For overtime charges, we were unable to determine whether the billing rates exceeded the maximum fully burdened hourly rates because LAPD's list of maximum fully burdened hourly rates was not in compliance with the contract requirements.

According to the contract, ninety (90) days prior to the start of each fiscal year, LAPD shall submit a list of maximum fully burdened hourly rates to Metro for approval. This list shall include the maximum hourly direct labor rate and overhead rate for each labor classification for straight time and overtime. Also, the contract stated that in no case shall the billing rate for each personnel exceed the maximum fully burdened rate set for each labor classification.

On November 30, 2017, LAPD submitted to Metro a list of personnel rates including the calculation of the maximum fully burdened hourly rate for each labor classification for Fiscal Year 2017-2018. We reviewed this list and noted that the maximum fully burdened hourly rate for each labor classification was not in compliance with the contract requirements as follows:

- LAPD calculated the maximum hourly direct labor rate for each labor classification using the maximum hourly direct labor rate from Fiscal Year 2016-2017 plus a 4% increase. However, the contract stated that the maximum escalation rate for base year 1 was 0%.

- LAPD did not include the maximum fully burdened hourly rates for each labor classification for overtime.

For each of the two invoices (invoice No. 18MTADP0411 and 18MTADP0512) selected for testing, we attempted to compare the hourly rates billed to the list of maximum fully burdened hourly rates that LAPD submitted to Metro on November 30, 2017. Since this list did not include the maximum fully burdened hourly rates for overtime, we were unable to determine whether the billing rates for overtime exceeded the maximum fully burdened hourly rates for each labor classification. Based on the two sample invoices, the direct labor cost for overtime was $6,255,471.25, which is approximately 85.04% of the total direct labor costs billed.

Exhibit 20 on the following page summarizes the direct labor cost billed for straight time and overtime for the two sample invoices.

Exhibit 20
Los Angeles Police Department Direct Labor Costs Billed

	18MTADP0411	18MTADP0512	Total	Percentage
Direct Labor - ST	$ 547,497.67	$ 552,580.62	$1,100,078.29	14.96%
Direct Labor - OT	3,064,640.39	3,190,830.86	6,255,471.25	85.04%
Total	$ 3,612,138.06	$ 3,743,411.48	$7,355,549.54	100.00%

Recommendation 10:

A. LAPD should submit the list of maximum fully burdened hourly rates for each labor classification for overtime in accordance with the contract requirements. Also, the escalation rate included in the calculation of the maximum fully burdened hourly rates should not exceed the maximum escalation rate stipulated in the contract.

B. Metro's SSLE Department should work with LAPD to ensure that the list of maximum fully burdened hourly rates comply with the contract requirements. Metro should also review the billing rates for overtime for all invoices to determine the extent of overbillings for FY 2018.

Finding 11: Eight labor classifications on two invoices were not found in the required list of maximum fully burdened hourly rates. The amount billed for these labor classifications totaled $281,400.77.

As mentioned previously, according to the contract, LAPD shall submit a list of maximum fully burdened hourly rates to Metro for approval that includes the maximum hourly direct labor rate and overhead rate for each labor classification for straight time and overtime. Also, the contract stated that in no case shall the billing rate for each personnel exceed the maximum fully burdened rate set for each labor classification.

For each of the two invoices (invoice No. 18MTADP0411 and 18MTADP0512) selected for testing, we compared the hourly rates billed to the list of maximum fully burdened hourly rates that LAPD submitted to Metro on November 30, 2017. Based on our review, eight labor classifications were not found in the required list of maximum fully burdened hourly rates. The total amount billed for these eight labor classifications was $281,400.77.

Exhibit 21 below summarizes the amount billed for the classifications not found in the required list of maximum fully burdened hourly rates.

Exhibit 21
Los Angeles Police Department Amount Billed for Each Labor Classification
Not found in the List of Maximum Fully Burdened
Hourly Rates

Class CD	18MTADP0411	18MTADP0512	Total
1223-0	$ 3,137.30	$ 2,012.72	$ 5,150.02
2207-1	330.04	165.02	$ 495.06
2207-2	29,848.31	28,697.89	$ 58,546.20
2207-3	62,083.82	60,710.96	$ 122,794.78
2209-1	1,502.24	1,614.84	$ 3,117.08
2214-C	2,863.81	1,204.52	$ 4,068.33
3711-5	18,614.40	33,036.84	$ 51,651.24
9184-0	8,189.59	27,388.47	$ 35,578.06
Total	$ 126,569.51	$ 154,831.26	$ 281,400.77

Recommendation 11:

A. **LAPD should submit the list of maximum fully burdened hourly rates for all labor classifications in accordance with the contract requirements. For any additional labor classifications not identified in the list of maximum fully burdened hourly rate, LAPD should submit a revised list to Metro for approval prior to incurring the cost.**

B. **Metro's SSLE Department should continue to monitor LAPD's billings to ensure only the approved labor classifications are billed and included in the list of maximum fully burdened hourly rates. Metro should also review the billing rates for straight time for all invoices to determine the extent of overbillings.**

Finding 12: We identified a total amount of $3,874.99 as overbilled and overpaid to LAPD.

For each of the two invoices (invoice No. 18MTADP0411 and 18MTADP0512) selected for testing, we compared the hourly rates billed to the approved list of maximum fully burdened hourly rates that LAPD submitted to Metro on November 30, 2017. We found that that the fully burdened hourly rate that LAPD billed for straight time exceeded the maximum fully burdened hourly rate for five labor classifications. Also, we noted that

there are costs billed for classifications showing zero labor hours. We identified a total amount of $3,874.99 as overbilled and overpaid to LAPD.

The exhibit below summarizes the overbilled and overpaid amount for the labor classification with rate differences and zero hours.

	Billed Rate	Maximum Rate	Rate Difference	Hour	Overbilled/ Overpaid Amount
CSC/G					
invoice no. 18MTADP0411					
22443	$243.20	$ 243.07	$ 0.13	160	$ 20.80
22510	$271.06	$ 270.93	$ 0.13	160	$ 20.80
22621	$311.72	$ 311.56	$ 0.16	160	$ 25.60
Various				0	$ 1,781.16
				Subtotal	$ 1,848.36
invoice no. 18MTADP0512					
11160	$ 68.58	$ 63.88	$ 4.70	4	$ 18.80
11172	$ 82.54	$ 80.97	$ 1.57	4	$ 6.28
22443	$243.20	$ 243.07	$ 0.13	160	$ 20.80
22510	$271.06	$ 270.93	$ 0.13	160	$ 20.80
22621	$311.72	$ 311.56	$ 0.16	160	$ 25.60
Various				0	$ 1,934.34
				Subtotal	$ 2,026.62
				Total	$ 3,874.99

Exhibit 22 — Los Angeles Police Department Overbilled and Overpaid Amount due to Labor Classification With Rate Difference And Zero Hours

Recommendation 12:

    A. LAPD should return the overbilled and overpaid amount of $3,874.99 to Metro.

    B. Metro's SSLE Department should continue monitoring LAPD's billings to identify and resolve billing discrepancies.

Finding 13: LAPD invoiced an overhead rate of 12.76% for overtime hours that was unsupported by adequate documentation.

For straight time indirect cost overhead, LAPD billed Metro using CAP 38 rates of 77.48% for civilian and 157% for sworn personnel. For overtime indirect cost overhead, LAPD billed 12.76% for sworn field personnel. A copy of Memorandum No. 17-016 dated

August 30, 2017 was provided to support the Federal Government's approved Cost Allocation Plan (CAP) 38 indirect cost rates of 77.48% and 157%.

According to the instructions for CAP 38, these rates are to be applied only to straight time for full time gross salaries. For rates applicable to part time or overtime salaries, LAPD needs to contact the CAP staff. No documentation was provided to support the overtime overhead rate of 12.76%. The overtime overhead rate of 12.76% was not included in the list of maximum fully burdened hourly rates that LAPD submitted to Metro on November 30, 2017.

The exhibit below summarizes the amount billed for overtime indirect cost overhead for the two invoices selected for testing.

Exhibit 23
Los Angeles Police Department Amount Billed for
Overtime Indirect Cost Overhead

Invoice No.	18MTADP0411	18MTADP0512	Total
Sworn Field Personnel (Overtime)			
Direct Labor (Q53)	$ 2,837,742.25	$ 2,902,159.77	$5,739,902.02
Overhead Rate 12.76%	362,095.91	370,315.59	732,411.50
Total	$ 3,199,838.16	$ 3,272,475.36	$6,472,313.52

Recommendation 13:

   A. LAPD should submit the prevailing Cost Allocation Plan (CAP) rate together with the list of maximum fully burdened hourly rates for overtime.

   B. Metro's SSLE Department should continue to monitor LAPD's billings to ensure the overtime overhead rate billed was based on the CAP overhead rate approved by the Federal Government in effect at the time the work was performed.

LAPD Compliance with Required Reports

We requested Metro to provide the reports with date received showing that LAPD submitted the required reports in a timely manner, with adequate information, and in a format that allows Metro to determine the calculation of reported figures.

Finding 14: LAPD met 8 out of 9 contract requirements for submitting required reports to Metro. The reports were submitted with adequate information and in a format that allows Metro to determine the calculation of the reported figures. However, no information was provided as to when these reports were submitted to Metro so we were unable to determine if the reports were submitted on time in accordance with the contract.

Metro provided various reports including Watch Commander's Daily Reports for April 10, 2018 and May 17, 2018, Weekly After-Action Reports for April 2018 and May 2018, Work Summary Report for April 2018 and May 2018, Strategic Plan for 2017-2019, and KPI Reports for April 2018 and May 2018. No information was provided as to when these reports were submitted to Metro.

We reviewed all the reports provided and found that LAPD met 8 out of the 9 contract requirement for required reports. These eight reports were submitted with adequate information and in a format that allows Metro to determine the calculation of the reported figures. The month summary of Problem-Oriented Policing projects was not provided.

Exhibit 24 below summarizes the required reports and the results of our review.

	Exhibit 24 Los Angeles Police Department Compliance with Contract Reporting Requirements		
	Required Reports	**Compliance**	**Comments**
1	Weekly schedule for each watch or shift. Must include each employee's name, actual hours worked, assignment and rank.	Yes	Daily schedule for each watch was included in the submission of Watch Commander's Daily Report, not weekly. Daily Worksheet Portrait included each employee's name, actual hours worked, assignment and rank.
2	Daily summary of work activity for each employee.	Yes	Daily Activity Log included employee name, work date, start time, end time and work hours.
3	Monthly summary of crime activity, citations issued, arrests made.	Yes	

<table>
<tr><td colspan="4" align="center">Exhibit 24
Los Angeles Police Department Compliance with Contract
Reporting Requirements</td></tr>
<tr><td>4</td><td>Monthly summary of commendations and complaints.</td><td>Yes</td><td></td></tr>
<tr><td>5</td><td>The number of cases referred for follow-up investigation and the subsequent disposition.</td><td>Yes</td><td>TSB Significant Arrests.</td></tr>
<tr><td>6</td><td>After-Action Reports following special operations, emphasis details and/or major incidents.</td><td>Yes</td><td>Weekly After-Action Report.</td></tr>
<tr><td>7</td><td>Annual Community Policing Plan.</td><td>Yes</td><td>Strategic Plan for fiscal years 2017-2019.</td></tr>
<tr><td>8</td><td>Monthly summary of Problem-Oriented Policing projects.</td><td>No</td><td>No information provided.</td></tr>
<tr><td>9</td><td>Law Enforcement Sensitive Reports (distribution to Metro's CEO, DCEO, COO, Chief of Risk Safety and Asset Management and Chief of System Security and Law Enforcement)</td><td>Yes</td><td>This report refers to "after action reports and intelligence briefings". Chief of System Security and Law Enforcement confirming that he has access to the information but no copies were provided.</td></tr>
</table>

Recommendation 14:

A. **LAPD should submit to Metro in a timely manner the monthly Summary of Problem-Oriented Policing projects.**

B. **Metro's SSLE Department should continue to monitor LAPD's submission of reports and stamp the date received on reports to ensure all the required reports are submitted in a timely manner and with complete information to allow Metro to determine the calculation of the reported figures.**

LAPD Equipment Requirements Contract Compliance

Section 5.0 of the contract required LAPD to provide the equipment as listed in Exhibit E. There are four categories listed in the Exhibit E. The four categories listed below are the property that LAPD is required to provide. Each category listed out the items needed.

- A. Information Technology (IT) Equipment
- B. Communication Equipment
- C. Vehicles
- D. Field Equipment

Finding 15: LAPD did not provide the equipment in the quantities listed in Exhibit E of the contract.

- **Metro does not have an adequate process to verify that LAPD provides the required equipment and vehicles.**

- **Computers provided by LAPD are not listed in the Exhibit E of the contract.**

- **The Vehicles provided by LAPD are not consistent with the quantity listed in the Exhibit E of the contract.**

According to Metro, the equipment and vehicles provided by LAPD has been tracked on Excel spreadsheets. Metro provided one spreadsheet of a list of computers with Metro tag numbers and another spreadsheet for shop inventory. We compared the items and quantities listed in these two spreadsheets to Exhibit E.

We found that the computers that LAPD provided were not listed in Exhibit E. For vehicles, we found that the quantities provided did not agree with the quantities listed in Exhibit E. No data was provided for IT equipment, communication equipment, and field equipment. Thus, we determined that Metro does not have an adequate process to verify that LAPD provided the required equipment and vehicles.

Based on the list of computers with Metro tag numbers, LAPD provided 135 computers. Of the 135 computers, 126 computers had the asset tag number, Metro tag number, serial number, make, and model. Nine (9) of the 135 computers had only the asset tag number and Metro tag number. We attempted to compare the computer and quantity listed in the spreadsheet to Exhibit E. We found that the computers provided were not listed in Exhibit E of the contract.

Based on the list of shop inventory that Metro provided, we found that LAPD did not provide the vehicles in the quantities listed in Exhibit E of the contract. Exhibit 25 on the following page summarizes the required quantities compared to the quantities provided.

Exhibit 25
Los Angeles Police Department
Comparison of Contracted and Provided Equipment

Vehicles Item	Quantity Per Contract	Quantity Provided by LAPD	Difference
1. BW-MFF	21		
2. BW-Patrol	48		
Subtotal - BW	69	60	9
3. Dual Purpose	6	9	-3
4. Motor Pool	5	No Data	
5. Plain (un-marked)	1	6	-5
6. Undercover	3	No Data	

Recommendation 15:

   A. LAPD should provide the equipment in the quantities listed in Exhibit E of the contract or Metro should amend Exhibit E of the contract.

   B. Metro's SSLE Department should continue to monitor LAPD's equipment to ensure the quantities listed in Exhibit E of the contract are properly provided and in a timely manner.

Other Contract Areas

LAPD was responsive and supportive in evaluating and developing strategies to address security threats, requests for K9 explosive detection services, requests for law enforcement presence during fare enforcement and passenger screening operations, and in addressing the impact of homelessness on the transit system based on discussions with Metro's SSLE Department.

Los Angeles County Sheriff's Department (LASD) Contract Compliance

The following sections provide information on the LASD's compliance with contract requirements.

LASD Compliance with Personnel and Training Requirements

LASD provided a list of 228 sworn officers' names assigned to Metro. We randomly selected 30 sworn officers' names and requested LASD to provide documentation indicating that law enforcement personnel met the contract requirements.

Finding 16: LASD was not in compliance with two of the contract requirements related to personnel and training:

- **All Personnel must attend a Metro's Safety Training immediately following the issuance of a Notice to Proceed.**

- **All law enforcement personnel must complete a four-hour training course in Transit Policing within the first six months of assignments.**

According to LASD, 27 of the 30 personnel selected had attended the Metro's safety training course, and 3 deputies did not complete this training. For the Transit Policing Training, 6 of the 30 or 20% of the personnel selected have not attended the Metro Transit Policing training. These personnel did not attend the safety training and Transit Policing training because they either have not yet started working at Transit Services Bureau or have been off work for an extended time. Twenty-four out of 30 or 80% of the selected personnel attended the Transit Policing Training on various training dates from September 14, 2018 to March 5, 2019. According to LASD, the law enforcement personnel did not attend this training within the first six months of assignments because the training was not yet available. However, LASD indicated that the training was made available on February 18, 2018.

Exhibit 26 below summarizes the results of our review.

Exhibit 26 Los Angeles Sheriff's Department Compliance with Contract Personnel and Training Requirements			
Contract Requirements	**Compliance**		**Comments**
	Yes	**No**	
1. Each sworn law enforcement officer/supervisor assigned to Metro hold an active California POST	X		

Exhibit 26 Los Angeles Sheriff's Department Compliance with Contract Personnel and Training Requirements			
Contract Requirements	**Compliance**		**Comments**
	Yes	**No**	
(Peace Officer's Certificate).			
2. All supervisors and managers must have completed department training equivalent to supervisory and/or advanced POST courses.	X		All sergeants and lieutenants selected have Advanced POST certificates.
3. Only POST certified personnel are authorized to provide law enforcement services.	X		
4. Personnel assigned to the contract completed Metro's Safety Training.		X	3 out of 30 or 10% of the selected personnel had not completed the Safety Training.
5. Personnel assigned to the contract completed training course in Transit Policing.		X	6 out of 30 or 20% of the selected personnel had not completed the Transit Policing Training.

Recommendation 16:

A. LASD should continue monitoring the contract requirements to ensure all personnel complete the safety training and transit policing training before working on any Metro assignments.

B. Metro's SSLE Department should continue monitoring the contract requirements for qualifications and training of personnel to ensure compliance with the contract.

LASD Compliance with Billing Requirements

On September 1, 2017, Metro entered into a five-year firm fixed unit rate contract with LASD for a not-to-exceed amount of $246,270,631. There is no detailed breakdown in

the contract for the not to exceed amount of $246,270,631. However, the estimated cost for year 1 (FY 2018) was $41,586,561.

Observation: The total amount billed and paid for FY 2018 to LASD did not exceed the estimated cost specified in the contract for Year 1.

For FY 2018, the total amount billed and paid to LASD was $41,114,094. Thus, the total amount billed and paid for FY 2018 did not exceed the estimated cost of $41,586,561. The exhibit below summarizes the contract amount and billing and payment amount for year 1.

Exhibit 27 Los Angeles Sheriff's Department Contract Amount and Billing And Payment Amount For FY 2018	
	Year 1
Contract Amount	$ 41,586,561
Billing and Payment	41,114,094
Difference	$ 472,467

If LASD ever anticipates that they may exceed the estimated cost in the contract, they should inform Metro in a timely manner before incurring any cost. Metro's SSLE Department should continue monitoring the billing, payment and contract amount to ensure that costs do not exceed the contract amount.

Observation: Except for the credit amount understatement of $1,699.68 (discussed in the next section), the billing rates were in compliance with Metro's approved rates. Invoices were based on actual services provided and supported by Payment Certification, the Service Level and Billing Status Reports, and the Patrol Compliance Reports.

According to Section 7.0 of the Statement of Work in the contract, the Contractor's monthly invoice shall be calculated as the monthly pro-rata portion of the annual firm fixed rate as specified in the applicable LASD's SH-AD 575 Deployment of Personnel Form.

We reviewed LASD's billing for two invoices (April 2018 and May 2018). The April invoice was for the period April 1, 2018 to April 30, 2018. The May invoice was for the period May 1, 2018 to May 31, 2018. For each of these two invoices, we compared the annual and monthly rates billed to the annual firm fixed rate specified in the contract. We found that the annual rate and monthly rate for each level of services were properly computed in accordance with the contract requirement. Invoices were based on actual services and

supported by payment certification, service level and billing status reports and patrol compliance reports.

Metro's SSLE Department should continue monitoring LASD's billings to ensure the billing rates and supporting documents are in compliance with the contract.

Finding 17: The billing rate for the credit amount was not in compliance with Metro's approved rate.

For the month of May, a credit amount of $149,701.16 was included in the invoice to refund Metro for the overbilling of two positions, Team Leader and Access Services Investigator. This overbilling was discovered when LASD's Contract Law Enforcement Bureau completed its internal audit and discovered that LASD overbilled Metro for a Team Leader position for 7 months and an Access Services Investigator for 4 months due to the key overhead positions being unfilled and the job duties for these positions were not completed. The credit amount was calculated using the monthly rate of $12,551.96 for Team Leader and $15,459.36 for Access Services Investigator. These monthly rates were determined by reducing personnel in the Transit Cost Model to determine the overhead monthly salaries for each of these positions.

We found that the monthly rates used for the calculation of the credit amount were not in compliance with the contract. According to the contract, for each job position that did not meet the service levels promised on the Form 575, a credit shall be provided to Metro using the annual estimated cost per position per SH-AD575 divided by 12 months and number of days for the month, multiplied by the number of days the position remained unfilled in whole or in part. For the Access Services Investigator, the annual estimated cost per SH-AD575 was $190,611.35 divided by 12 months would be $15,884.28 per month. Thus, the credit amount in the May invoice was understated by $1,699.68. There was no annual estimated cost for the Team Leader position in the SH-AD575.

Exhibit 28 on the following page summarizes the calculation of the rate difference and cost difference for the Access Services Investigator.

Exhibit 28
Los Angeles Sheriff's Department Rate and Cost Differences
For Access Services Investigator

Description	Amount
Monthly Rate (May Invoice)	$ 15,459.36
Monthly Rate (SH-AD575)	$ 15,884.28
Rate Difference	$ (424.92)
No. of Month	4
Cost Difference	$ (1,699.68)

Recommendation 17:

A. **LASD should issue an additional credit amount of $1,699.68 to Metro.**

B. **Metro's SSLE Department should continue monitoring LASD's billings to ensure each job position meets the service levels promised on Form 575 and the billing rates are in compliance with the contract.**

LASD Compliance with Reporting Requirements

We requested Metro to provide the reports with the date received showing that LASD submitted the required reports in a timely manner, with adequate information, and in a format that allows Metro to determine the calculation of reported figures.

Finding 18: LASD met 7 out of 8 contract requirements for required reports. The reports were submitted in a timely manner, with adequate information, and in a format that allows Metro to determine the calculation of the reported figures.

Metro provided various email submissions from LASD including attachments of KPI data and monthly reporting requirements for July 2017 to June 2018. Daily Report, AM Scheduling, PM Scheduling and EM (night shift) Scheduling were also provided for April 8, 2018. We reviewed all the emails and reports provided and found that LASD met 7 out of the 8 contract requirement for required reports. These reports were submitted in a timely manner with adequate information and in a format that allows Metro to determine the calculation of the reported figures. LASD did not submit a report for the number of cases referred for follow-up investigation and the subsequent disposition.

Exhibit 29 on the following page summarizes the required reports and the results of our review.

	Exhibit 29 **Los Angeles Sheriff's Department Compliance with Contract** **Reporting Requirements**		
	Required Reports	**Compliance**	**Comments**
1	Weekly schedule for each watch or shift. Must include each employee's name, actual hours worked, assignment and rank.	Yes	Daily schedules for each shift (AM, PM, and EM reports) were submitted to Metro. These reports showed each employee's name, actual hours worked, assignment and rank.
2	Monthly summary of crime activity, citations issued, arrests made.	Yes	
3	Monthly summary of commendations and complaints.	Yes	
4	The number of cases referred for follow-up investigation and the subsequent disposition.	No	Per LASD, they had been requesting for clarification from Metro on the item but received no response.
5	After-Action Reports following special operations, emphasis details and/or major incidents.	Yes	
6	Annual Community Policing Plan.	Yes	LASD did not submit the Annual Community Policing Plan. However, LASD indicated that they participated in the completion of the Annual Community Policing Plan with LAPD, LBPD, and Metro.
7	Monthly summary of Problem-Oriented Policing projects.	Yes	

Exhibit 29 **Los Angeles Sheriff's Department Compliance with Contract** **Reporting Requirements**		
8	Law Enforcement Sensitive Reports (distribution to Metro's CEO, DCEO, COO, Chief of Risk Safety and Asset Management and Chief of System Security and Law Enforcement).	Yes	This report refers to "after action reports and intelligence briefings". Chief of System Security and Law Enforcement confirming that he has access to the information but no copies were provided.

Recommendation 18:

A. **LASD should submit to Metro in a timely manner the report for the number of cases referred for follow-up investigation and the subsequent disposition.**

B. **Metro's SSLE Department should work with LASD to resolve any issues regarding the required reports. Also, Metro should continue monitoring LASD's submission of reports to ensure all the required reports were submitted in a timely manner and with complete information to allow Metro to determine the calculation of the reported figures.**

Other contract Areas

LASD was responsive and supportive in evaluating and developing strategies to address security threats, requests for K9 explosive detection services, requests for law enforcement presence during fare enforcement and passenger screening operations, and in addressing the impact of homelessness on the transit system based on discussions with Metro's SSLE Department.

Long Beach Police Department (LBPD) Contract Compliance

The following sections provide information on the LBPD's compliance with contract requirements.

LBPD Compliance with Personnel and Training Requirements

LBPD provided a list of 480 sworn officers' names assigned to Metro. We randomly selected 30 sworn officers' names and requested LBPD to provide documentation indicating that law enforcement personnel met the contract requirements.

Finding 19: LBPD was not in compliance with the contract requirement for Transit Policing Training.

According to Section 1.2 of the contract, all law enforcement personnel must complete a four-hour training course in Transit Policing within the first six months of assignment. Based on the information provided by LBPD, 1 out of 30 of the selected personnel had not completed this training. Twenty-nine out of 30 of the selected personnel attended the Transit Policing Training on various training dates from August 10, 2018 to February 28, 2019. According to LBPD, the law enforcement personnel did not attend this training within the first six months of assignments because the training was not yet available. LBPD indicated that the training was made available on February 16, 2018.

Exhibit 30 below summarizes the results of our review.

Exhibit 30 Long Beach Police Department Compliance with Contract Personnel and Training Requirements			
Contract Requirements	**Compliance**		**Comments**
	Yes	**No**	
1. Each sworn law enforcement officer/supervisor assigned to Metro hold an active California POST (Peace Officer's Certificate).	X		
2. Command level officers hold an active Management or Executive POST Peace Officer's certificates.	X		The following command level officers hold an active Management POST Peace Officer's certificates: Deputy Chief, Commander, and Lieutenant.

Exhibit 30 Long Beach Police Department Compliance with Contract Personnel and Training Requirements			
Contract Requirements	**Compliance**		**Comments**
	Yes	**No**	
3. Only Post certified personnel are authorized to provide law enforcement services.	X		
4. Personnel assigned to the contract completed their probationary period.	X		
5. Personnel assigned to the contract have a minimum of 18 months of law enforcement experience.	X		
6. Personnel assigned to the contract have no current duty restrictions.	X		1 out of 30 selected personnel had current duty restriction. Per LBPD, this Officer had no duty restriction when he worked Metro overtime.
7. Personnel assigned to the contract completed Metro's Safety Training.	X		
8. Personnel assigned to the contract completed training course in Transit Policing.		X	1 out of 30 or 3.33% of the selected personnel had not completed this training.

Recommendation 19:

    A. LBPD should ensure all personnel have completed the transit policing training before working on any Metro assignments.

B. Metro's SSLE Department should monitor the contract requirements for qualifications and training of personnel to ensure compliance.

LBPD Compliance with Billing Requirements

On March 23, 2017, Metro entered into a five-year firm fixed unit rate contract with LBPD for a not-to-exceed amount of $30,074,628. The exhibit below summarizes the amount estimated for each year.

Exhibit 31 Long Beach Police Department Contract Amount Proposed for Each Contract Year	
	Amount
Year 1	$ 5,459,271
Year 2	5,517,674
Year 3	5,959,087
Year 4	6,316,633
Year 5	6,821,963
Total	$ 30,074,628

Finding 20: The total amount billed and paid for FY 2018 exceeded the estimated cost specified in the contract for Year 1.

For FY 2018, the total amount billed and paid to LBPD was $6,344,849. Thus, the total amount billed and paid for FY 2018 exceeded the estimated cost in the contract of $5,459,271 by $885,578 for Year 1, see exhibit below for details.

Exhibit 32 Long Beach Police Department Difference Between Contract Amount and Amount Billed and Paid for FY 2018	
	Year 1
Contract Amount	$ 5,459,271
Billing and Payment	6,344,849
Difference	$ (885,578)

Recommendation 20:

A. LBPD should inform Metro of the amount expected to exceed the estimated cost specified in the contract for each year before incurring the costs.

B. Metro's SSLE Department should continue monitoring LBPD's billings, payments and contract amount to ensure that costs do not exceed the contract amount.

Finding 21: Invoices were based on actual services provided and supported by bi-weekly Work Hour Detail Schedules and partial Daily Metro Cost schedules along with Regular Overtime Reports and Employee Time Records. Daily summary of assignments for all hours worked and payroll records were not submitted with the invoices.

According to Section 7.0 of the Statement of Work in the contract, the Contractor's monthly invoice shall be based on actual services under the terms of the contract. The billings must be accompanied by supporting documentation, to include but shall not be limited to, daily summary of assignments and hours worked and payroll records.

We reviewed LBPD's billing for two invoices (April 2018 and May 2018). The April invoice was for two pay periods ending March 30, 2018 and April 13, 2018 in the amount of $471,008.58. The May invoice was for two pay periods ending April 27, 2018 and May 11, 2018 in the amount of $467,869.88. For each of these two invoices, LBPD submitted a Work Hour Detail schedule by pay period. Daily summary of assignments for all hours worked and payroll records were not submitted with the invoices.

The exhibit below summarizes the costs billed for April 2018 and May 2018.

Exhibit 33 Long Beach Police Department Costs Billed for April 2018 and May 2018		
Description	April 2018	May 2018
Personnel Cost		
Operational	$319,236.48	$317,264.34
Administrative	42,229.54	46,016.64
Total Before Indirect Cost Overhead	361,466.02	363,280.98
Indirect Cost Overhead - 25%	90,366.51	90,820.25
Total Personnel Cost	451,832.53	454,101.23
Equipment Cost	15,340.84	11,014.92
Indirect Cost Overhead - 25%	3,835.21	2,753.73
Total Equipment Cost	19,176.05	13,768.65
Total Amount Billed	$471,008.58	$467,869.88

Recommendation 21:

    A. LBPD should submit the daily summary of assignments for all hours worked and payroll records with the invoices.

    B. Metro's SSLE Department should continue monitoring LBPD's billings to ensure all the required supporting documents were submitted with the invoices.

Finding 22: We identified a total amount of $14,643.89 as overbilled and overpaid to LBPD.

On August 28, 2017, Metro's Contract Administration Manager sent an email to LBPD for the revised schedule of approved Maximum Fully Burdened Rate for Fiscal Year 2017/2018. This schedule listed the maximum hourly direct labor rate, indirect overhead rate of 25% and administrative overhead rate of 9.6% for each labor category. According to the email, invoices shall be billed based on the actual hourly direct labor rate of each personnel plus the applicable indirect overhead rate and administrative overhead rate. In no instance shall the fully burdened hourly rate for

each personnel exceed the maximum fully burdened hourly rate approved for each labor category.

For each of the two invoices (April 2018 and May 2018) that we selected for testing, we compared the hourly rates billed to the list of maximum fully burdened rates that Metro approved on August 28, 2017. We found that that the fully burdened hourly rate that LBPD billed to Metro exceeded the approved maximum fully burdened hourly rate for three labor categories (Lieutenant, Officer, and Sergeant). In addition, we found one labor category (Police Corporal) that LBPD billed was not listed in the approved maximum fully burdened hourly rate. We identified a total amount of $14,643.89 as overbilled and overpaid to LBPD.

The exhibit below summarizes the labor category with the hourly rate and cost difference.

Exhibit 34 Long Beach Police Department Labor Categories with Hourly Rate and Cost Differences								
Pay Period	Category	Billed Hours (a)	Billed Labor Cost (b)	Overhead Rate 25% (c)	Billed Total Cost (d=b+c)	Calculated Hourly Rate (e=d/a)	Maximum Fully Burdened Rate (f)	Rate Difference (g=e-f)	Overbilled/ Overpaid (g*a)
3/30/2018	Corporal	20.00	$ 1,931.40	$ 482.85	$ 2,414.25	$ 120.71	None	$ 120.71	$ 2,414.25
4/13/2018	Corporal	10.00	$ 917.73	$ 229.43	$ 1,147.16	$ 114.72	None	$ 114.72	$ 1,147.16
3/30/2018	Lieutenant	53.00	$ 7,650.76	$ 1,912.69	$ 9,563.45	$ 180.44	$ 178.84	$ 1.60	$ 84.93
4/13/2018	Lieutenant	75.00	$10,762.90	$ 2,690.73	$13,453.63	$ 179.38	$ 178.84	$ 0.54	$ 40.62
4/13/2018	Officer	97.50	$ 9,742.58	$ 2,435.65	$12,178.23	$ 124.90	$ 124.05	$ 0.85	$ 83.35
3/30/2018	Sergeant	85.00	$10,705.24	$ 2,676.31	$13,381.55	$ 157.43	$ 155.74	$ 1.69	$ 143.65
4/13/2018	Sergeant	50.00	$ 7,064.01	$ 1,766.00	$ 8,830.01	$ 176.60	$ 155.74	$ 20.86	$ 1,043.01
							Subtotal - April Invoice		4,956.98
4/27/2018	Corporal	25.00	$ 1,833.87	$ 458.47	$ 2,292.34	$ 91.69	None	$ 91.69	$ 2,292.34
4/27/2018	Corporal	20.00	$ 1,929.13	$ 482.28	$ 2,411.41	$ 120.57	None	$ 120.57	$ 2,411.41
5/11/2018	Corporal	10.00	$ 964.53	$ 241.13	$ 1,205.66	$ 120.57	None	$ 120.57	$ 1,205.66
4/27/2018	Officer	48.00	$ 5,420.00	$ 1,355.00	$ 6,775.00	$ 141.15	$ 124.05	$ 17.10	$ 820.60
4/27/2018	Officer	24.00	$ 3,641.32	$ 910.33	$ 4,551.65	$ 189.65	$ 124.05	$ 65.60	$ 1,574.45
5/11/2018	Officer	77.50	$ 7,839.09	$ 1,959.77	$ 9,798.86	$ 126.44	$ 124.05	$ 2.39	$ 184.99
4/27/2018	Sergeant	60.00	$ 8,073.21	$ 2,018.30	$10,091.51	$ 168.19	$ 155.74	$ 12.45	$ 747.11
5/11/2018	Sergeant	70.00	$ 9,081.72	$ 2,270.43	$11,352.15	$ 162.17	$ 155.74	$ 6.43	$ 450.35
							Subtotal - May Invoice		$ 9,686.91
							Total - April and May Invoices		$14,643.89

Recommendation 22:

A. LBPD should return to Metro the overbilled and overpaid amount of $14,643.89.

B. Metro's SSLE Department should continue to monitor LBPD's billings to ensure only the approved labor classifications are billed and included in the list of maximum fully burdened hourly rates. Metro should also review the billing rates for all invoices to determine the extent of overbilling for FY2018.

Finding 23: The billing methodology for equipment cost was not in compliance with the contract agreement.

For April 2018 and May 2018 invoices, LBPD billed the costs for supplies and equipment, fleet, and technology services as equipment cost using monthly actuals plus an additional 25% of the actual cost as indirect cost overhead. This methodology was not in compliance with the contract. According to Section CP-01 of the contract, cost of vehicles, equipment, supplies including uniforms and other items needed by law enforcement personnel in the performance of the Statement of Work should be included in the maximum fully burdened hourly rate as equipment/supplies overhead cost. Equipment/supplies overhead cost shall be computed using an hourly direct labor rate plus indirect overhead cost times equipment/supplies overhead rate. Since LBPD used a different billing methodology than the methodology required by the contract, LBPD billed Metro $21,571.99 less than if the contract method had been used.

The exhibit below summarizes the cost impact using LBPD's billing methodology vs. contract required billing methodology for equipment cost for April 2018 and May 2018 invoices.

Exhibit 35 Long Beach Police Department Cost Impact for Equipment Cost for April 2018 and May 2018			
Description	April 2018	May 2018	Total
Amount billed by LBPD for personnel cost and equipment cost (a)	$471,008.58	$467,869.88	$938,878.46
Amount calculated using the contract required methodology (b)	$481,625.24	$478,825.20	$960,450.45
Difference (a-b)	$ (10,616.66)	$ (10,955.32)	$ (21,571.99)

Recommendation 23: Metro's SSLE Department should review the billing methodology specified in the contract for equipment cost and determine whether the contract should be amended.

LBPD Compliance with Contract Reporting Requirements

We requested Metro to provide the reports with the date received showing that LAPD submitted the required reports in a timely manner, with adequate information, and in a format that allows Metro to determine the calculation of reported figures.

Finding 24: LBPD met 8 out of 9 contract requirements for required reports. The reports were submitted with adequate information and in a format that allows Metro to determine the calculation of the reported figures. No information was provided as to when these reports were submitted to Metro so we were unable to determine if the reports were submitted to Metro on time.

Metro provided various reports including monthly summary schedules and weekly deployment summary for July 2017 to June 2018. Weekly deployment summary and daily summary were also provided with the billings for April 2018 and May 2018. No information was provided as to when the monthly reports were submitted to Metro. We reviewed all the reports provided and found that LBPD met 8 out of the 9 contract requirement for required reports. These reports were submitted with adequate information and in a format that allows Metro to determine the calculation of the reported figures. LBPD did not submit the after action reports following special operations, emphasis details and/or major incidents because of on-going litigation.

Exhibit 36 below summarizes the required reports and the results of our review.

Exhibit 36 Long Beach Police Department Compliance with Contract Reporting Requirements			
	Required Reports	**Compliance**	**Comments**
1	Weekly schedule for each watch or shift. Must include each employee's name, badge number, actual hours worked, assignment and rank.	Yes	Weekly Deployment Summary included each employee's name, badge number, actual hours worked, assignment and rank.
2	Watch Commander Summary of Major Events of the Day.	Yes	Daily Summary included significant events of the day.

	Exhibit 36 Long Beach Police Department Compliance with Contract Reporting Requirements		
	Required Reports	**Compliance**	**Comments**
3	Monthly summary of crime activity, citations issued, arrests made.	Yes	
4	Monthly summary of commendations and complaints.	Yes	
5	Monthly Report on the number of Part 1 crime cases referred for follow-up investigation and the subsequent disposition.	Yes	
6	After-Action Reports following special operations, emphasis details and/or major incidents.	No	Reports not provided. Per LBPD, major incident after action reports cannot be provided because of an on-going litigation.
7	Annual Community Policing Plan.	Yes	No Annual Community Policing Plan. Per LBPD, Metro SSLE Department developed a joint community policing plan.
8	Monthly summary of Problem-Oriented Policing projects.	Yes	
9	Executive Summary of Major Events/Incidents on the Metro System (distribution to Metro's CEO, DCEO, COO, Chief of Risk Safety and Asset Management and Chief of System Security and Law Enforcement).	Yes	This report refers to "after action reports and intelligence briefings". Chief of System Security and Law Enforcement confirmed that he has access to the information but no copies were provided.

	Metro Office of the Inspector General	Final Report
M	*Metro Office of the Inspector General*	*Final Report*
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Recommendation 24: Metro's SSLE Department should continue monitoring LBPD's submission of reports to ensure all the required reports are submitted in a timely manner and with complete information to allow Metro to determine the calculation of the reported figures.

Other Contract Areas

LBPD was responsive and supportive in evaluating and developing strategies to address security threats, requests for K9 explosive detection services, requests for law enforcement presence during fare enforcement and passenger screening operations, and in addressing the impact of homelessness on the transit system based on discussions with Metro's SSLE Department.

F. Fare and Code of Conduct Compliance Enforcement

Enforcing fare compliance on the Metro system, as well as the Metro Customer Code of Conduct is a key element of Metro's safety and security mission. Currently, this mission is primarily the role of Metro Security but is also performed by contracted law enforcement personnel. To review Metro fare and code of conduct compliance enforcement we:

- Determined the number of fare validation checks (report by month, rail line, and compare to target)

- Summarized the total number of citations issued in FY 2018 and compared with the total number of citations issued in prior years.

- Determined whether performance indicators or metrics were developed for Metro's transit security and fare compliance functions.

Code of Conduct and Parking Enforcement and Citations

Exhibit 37 on the following page shows the citations for Metro Code of Conduct violations, including those related to transit fares. As this exhibit shows, the vast majority (98%) of the citations for Metro Code of Conduct violations are issued by Metro Security. This demonstrates the substantial change in the responsibility for fare and code of conduct enforcement from contracted law enforcement to Metro Security.

Parking enforcement is also an important function to ensure safety and that vehicles do not interfere with Metro bus and rail operations. Exhibit 38 shows the citations for parking violations issued by Metro Security and each of the contracted law enforcement agencies. As this exhibit shows, Metro Security issued the largest number of parking citations (49%), while the LASD issued a substantial number (43%) as well.

Exhibit 37					
Citations for Metro Code of Conduct Violations FY 2018 by Agency					
Code Of Conduct Violation	**Metro Security**	**LA Police**	**LA Sheriff**	**Long Beach Police**	**Totals**
Blocking An Isle Elevator Escalator Etc.	3				3
Board Thru Rear Bus Door To Avoid Payment Of Fare	1				1
Boarding Without Proof Of Payment	7,945	26	55	1	8,027
Bypassing Fare Gates Or Fare Collection Machines	745	9	8		762
Creating Disruptive Noise	20				20
Disturbing Others By Noise	73	6	3		82
Drinking Alcohol	16	15	2		33
Duplicate Or Counterfeit Fare Media	6				6
Eating Drinking Smoking	345	14	31		390
Enter Metro When Excluded Or When Prior Fines Due	1				1
Failure To Obey Signs	168	3	12		183
False Representation To Obtain Reduced Fare	406				406
Fare Evasion	30,002	133	61	10	30,206
Feet/Shoes On Seats	9		1		10
Graffiti	4	3			7
Graffiti / Remove Damage Or Tamper Metro Poster	2				2
Inval Coin Currncy In Fare Box Or Collect Device	2				2
Littering	368	4	1		373
Loitering In Metro Facilities Or Vehicle	20	11	7		38
Misuse Of Disc. Fare Media Or Fail To Prove Elgble	480				480
Misuse Of Fare Media	600				600
Obstructing Or Impeding Flow Of Metro Veh	2				2
Occupying More Than One Seat	279	2	3		284
Operating Stopping Or Parking A Veh In Rsvd Spc	1				1
Playing Sound Device	8				8
Post Signs Stickers Metro Facilities Or Vehicles	5				5
Preventing A Door From Closing	1				1
Prohibited Bicycle	1				1
Proof Of Payment	9	1			10
Reclining On Placing Objs On Or Blocking Seats	7				7
Refusal To Show Proof Of Payment	33		1		34
Riding Bicycles And Skateboards	80	2	12		94
Sale/Peddling Of Goods/Services	7	2	2		11
Soliciting In A Metro Facility Or Vehicle	3				3
Soliciting Lewd Conduct	1				1
Spitting	36		2		38
Throw Obj At A Patron Metro Rep. Facility Or Veh		1			1
Unsafe Conduct Metro Vehicles Or Metro Facilities	3				3
Urinate Or Defecate Except In A Lavatory	31	6	1		38
Willfully Blocking Or Impeding Movement Of Persons	5	2			7
Willfully Interfere With Operation Of Metro Veh	1				1
Warning	22,360	25	131		22,516
Total	64,786	374	931	11	66,102
Percentage by Agency	98%	1%	1%	0%	100%

Exhibit 38 **Citations for Parking Violations for FY 2018 by Agency**					
Parking Violation	**Metro Security**	**LA Police**	**LA Sheriff**	**Long Beach Police**	**Totals**
Access Park Spaces Designated For Disabled	26	1	2		29
Blocking Fire Lane			4		4
Blocking Street Or Access	2				2
Bus Loading Zones	222		19		241
Car Share Or Vanpool Authorization Required	1				1
Disabled No Visible Placard Or Plate			1		1
Display Altered Counterfeit Or Expired Permit	1				1
Double Parking	11				11
Electric Vehicle Parking Spaces			1		1
Exceeding Posted Time Limit	4				4
Failure To Obey Signs	274	1	16		291
Failure To Obey Signs/Curb Markings	1	1	5		7
Failure To Properly Display The Permit As Instruct	5				5
Failure To Properly Register Vehicle License Plate	2	21	2		25
Illegal Parking At Fire Hydrant	1				1
Illegal Parking In Red Zones	39	2	4		45
Illegal Parking Outside Of A Defined Parking Space	35	1	20		56
Illegal Parking In Kiss & Ride Space/Pssngr Load Zone	1				1
No Front Plate	2	15	73		90
No Front Plates	1		1		2
No Parking Anytime/Posted Hours		2			2
Parking In A Permit Parking Spaces Without A Permit	3	7	1		11
Parking In Bus Loading		1	6		7
Parking In Red Zone			1		1
Parking Loading Zones (Commercial)		2			2
Parking Space Markings	1		11		12
Parking Within Marked Bicycle Lanes	1				1
Peak Hour Traffic Zones		1			1
Tabs	21	14	62		97
Transient Daily Or Preferred Monthly Parking Perm	11		1		12
Unregistered Vehicle	2	33	357		392
Vehicle Exceeds Load Size Limit					0
Vehicle Parked Seventy Two Or More Hours	11	2	3		16
Warning	11	5	4		20
Totals	691	109	598		1,398
Percentage by Agency	49%	8%	43%	0%	100%

Exhibit 39 shows the trend in citations issued over the past six years. As this exhibit shows, the number of citations issued increased substantially (162%) between FY 2017 and FY 2018. Total citations are 35% below the level for FY 2013.

Exhibit 39			
Citations for Metro Code of Conduct Violations FY 2013 to FY 2018			
Year	Citations Issued	Annual Change	Cumulative Change
FY 2013	100,937		
FY 2014	82,892	-18%	-18%
FY 2015	58,102	-30%	-42%
FY 2016	29,524	-49%	-71%
FY 2017	25,218	-15%	-75%
FY 2018	66,102	162%	-35%
FY 2018 totals include 22,516 formal warnings issued.			

This increase in citations is likely attributable to the completion of the transition in responsibility for Code of Conduct enforcement from contracted law enforcement agencies to Metro Security.

Performance Indicators for Metro Security

The role and responsibilities of Metro Security have expanded substantially over the past few years and now includes primary responsibility for enforcing Metro's Code of Conduct on the system, including fare enforcement. Given this, it is important that Metro Security have an effective accountability system, including meaningful performance indicators.

Finding 25: The SSLE Department plans to develop performance indicators for Metro Security during 2019.

The SSLE Department reports they will be developing Key Performance Indicators (KPI) for Metro Security during 2019.   These KPI will cover two key areas: Fare Enforcement and Critical Infrastructure Protection.   The fare enforcement KPI will focus on effective strategies to increase fare compliance. The critical infrastructure KPI will focus on assessing and mitigating security threats to the transits system and its critical structures.

Recommendation 25: The SSLE Department should continue and complete efforts to develop key performance indicators for Metro Security during FY 2019.

Appendix A: Comparison of Reported Crime on Rail Lines, Bus and Union Station

Exhibit 40 Metro Blue Line Comparison of Reported Crime FY 2015 to FY 2018								
Crime	FY 2015	FY 2016	Change	FY 2017	Change	FY 2018	Change	Total Change
Reported Part 1 Violent Crime								
Homicide	1	1	0%	0	-100%	1	0%	0%
Rape	1	1	0%	0	-100%	3	0%	200%
Robbery	77	114	48%	109	-4%	59	-46%	-23%
Agg Assault	83	66	-20%	58	-12%	45	-22%	-46%
Agg Assault on Op	0	0	0%	0	0%	0	0%	0%
Totals	162	182	12%	167	-8%	108	-35%	-33%
Ridership (Millions)	26.4	24.4	-8%	23.7	-3%	21.3	-10%	-19%
Per 1 Million Riders	6.13	7.47	22%	7.05	-6%	5.07	-28%	-17%
Per Day	0.44	0.50	14%	0.46	-8%	0.30	-36%	-33%
Reported Part 1 Property Crime								
Crime	FY 2015	FY 2016	Change	FY 2017	Change	FY 2018	Change	Total Change
Burglary	0	0	0	2	0%	7	250%	NA
Larceny-Theft	183	149	-19%	150	1%	128	-15%	-30%
Grand Theft Auto	29	26	-10%	21	-19%	13	-38%	-55%
Arson	3	4	33%	0	-100%	1	0%	-67%
Totals	215	179	-17%	173	-3%	149	-14%	-31%
Ridership (Millions)	26.4	24.4	-8%	23.7	-3%	21.3	-10%	-19%
Per 1 Million Riders	8.14	7.34	-10%	7.30	-1%	7.00	-4%	-14%
Per Day	0.59	0.49	-17%	0.47	-4%	0.41	-13%	-31%
Reported Part 2 Crime								
Crime	FY 2015	FY 2016	Change	FY 2017	Change	FY 2018	Change	Total Change
Battery	79	91	15%	85	-7%	96	13%	22%
Battery on Op	0	0	0%	1	NA	0	-100%	0%
Sex Offenses	17	13	-24%	14	8%	9	-36%	-47%
Weapons	21	31	48%	34	10%	31	-9%	48%
Narcotics	113	93	-18%	97	4%	90	-7%	-20%
Trespassing	73	75	3%	20	-73%	14	-30%	-81%
Vandalism	44	67	52%	34	-49%	24	-29%	-45%
Totals	347	370	7%	285	-23%	264	-7%	-24%
Ridership (Millions)	26.4	24.4	-8%	23.7	-3%	21.3	-10%	-19%
Per 1 Million Riders	13.14	15.18	16%	12.03	-21%	12.39	3%	-6%
Per Day	0.95	1.01	7%	0.78	-23%	0.72	-8%	-24%
Source: Analysis of crime reported by LASD for FYs 2015 to 2017, and reported by LAPD, LASD, and LBPD for FY 2018								

Exhibit 41 **Metro Green Line** **Comparison of Reported Crime FY 2015 to FY 2018**							
Crime	FY 2015	FY 2016	Change	FY 2017	Change	FY 2018	Change	Total Change

Reported Part 1 Violent Crime

Crime	FY 2015	FY 2016	Change	FY 2017	Change	FY 2018	Change	Total Change
Homicide	0	0	NA	2	NA	0	0%	NA
Rape	1	1	0%	2	100%	3	50%	200%
Robbery	85	95	12%	82	-14%	51	-38%	-40%
Agg Assault	16	31	94%	33	6%	12	-64%	-25%
Agg Assault on Op	0	0	0%	0	0%	0	0%	0%
Totals	102	127	25%	119	-6%	66	-45%	-35%
Ridership (Millions)	12.4	11.7	-6%	10.3	-12%	9.6	-7%	-23%
Per 1 Million Riders	8.22	10.85	32%	11.55	6%	6.88	-40%	-16%
Per Day	0.28	0.35	25%	0.33	-5%	0.18	-45%	-35%

Reported Part 1 Property Crime

Crime	FY 2015	FY 2016	Change	FY 2017	Change	FY 2018	Change	Total Change
Burglary	0	1	0	1	0%	2	100%	NA
Larceny-Theft	160	144	-10%	97	-33%	51	-47%	-68%
Grand Theft Auto	66	55	-17%	41	-25%	11	-73%	-83%
Arson	0	1	NA	0	-100%	1	NA	NA
Totals	226	201	-11%	139	-31%	65	-53%	-71%
Ridership (Millions)	12.4	11.7	-6%	10.3	-12%	9.6	-7%	-23%
Per 1 Million Riders	18.20	17.18	-6%	13.50	-21%	6.77	-50%	-63%
Per Day	0.62	0.55	-11%	0.38	-31%	0.18	-53%	-71%

Reported Part 2 Crime

Crime	FY 2015	FY 2016	Change	FY 2017	Change	FY 2018	Change	Total Change
Battery	45	35	-22%	27	-23%	29	7%	-36%
Battery on Op	0	0	0%	0	NA	0	NA	NA
Sex Offenses	6	5	-17%	5	0%	4	-20%	-33%
Weapons	11	3	-73%	8	167%	11	38%	0%
Narcotics	53	25	-53%	26	4%	21	-19%	-60%
Trespassing	19	9	-53%	3	-67%	1	-67%	-95%
Vandalism	44	31	-30%	31	0%	17	-45%	-61%
Totals	178	108	-39%	100	-7%	83	-17%	-53%
Ridership (Millions)	26.4	11.7	-56%	10.3	-12%	9.6	-7%	-64%
Per 1 Million Riders	6.74	9.23	37%	9.71	5%	8.65	-11%	28%
Per Day	0.49	0.30	-39%	0.27	-9%	0.23	-16%	-53%

Source: Analysis of crime reported by LASD for FYs 2015 to 2017, and reported by LAPD, LASD, and LBPD for FY 2018

Exhibit 42 Metro Expo Line Comparison of Reported Crime FY 2015 to FY 2018							
Crime	**FY 2015**	**FY 2016**	**Change**	**FY 2017**	**Change**	**FY 2018**	**Change**	**Total Change**
Reported Part 1 Violent Crime							
Homicide	0	0	NA	0	NA	0	0%	NA
Rape	0	0	NA	0	NA	0	0%	NA
Robbery	28	28	0%	57	104%	46	-19%	64%
Agg Assault	16	14	-13%	21	50%	20	-5%	25%
Agg Assault on Op	0	0	0%	0	0%	0	0%	0%
Totals	44	42	-5%	78	86%	66	-15%	50%
Ridership (Millions)	9.9	10.7	8%	17.1	60%	19.2	12%	93%
Per 1 Million Riders	4.43	3.93	-11%	4.56	16%	3.44	-25%	-22%
Per Day	0.12	0.12	0%	0.21	75%	0.18	-14%	50%
Reported Part 1 Property Crime							
Crime	**FY 2015**	**FY 2016**	**Change**	**FY 2017**	**Change**	**FY 2018**	**Change**	**Total Change**
Burglary	0	0	0	1	0%	0	-100%	NA
Larceny-Theft	131	68	-48%	146	115%	164	12%	25%
Grand Theft Auto	6	8	33%	1	-88%	0	-100%	-100%
Arson	0	0	NA	0	NA	0	NA	NA
Totals	137	76	-45%	148	95%	164	11%	20%
Ridership (Millions)	9.9	10.7	8%	17.1	60%	19.2	12%	93%
Per 1 Million Riders	13.81	7.10	-49%	8.65	22%	8.54	-1%	-38%
Per Day	0.38	0.21	-45%	0.41	95%	0.45	10%	18%
Reported Part 2 Crime							
Crime	**FY 2015**	**FY 2016**	**Change**	**FY 2017**	**Change**	**FY 2018**	**Change**	**Total Change**
Battery	16	14	-13%	32	129%	47	47%	194%
Battery on Op	0	0	0%	0	NA	1	NA	NA
Sex Offenses	0	5	NA	11	120%	9	-18%	NA
Weapons	7	1	-86%	1	0%	2	100%	-71%
Narcotics	16	7	-56%	9	29%	4	-56%	-75%
Trespassing	7	4	-43%	2	-50%	2	0%	-71%
Vandalism	29	12	-59%	14	17%	3	-79%	-90%
Totals	75	43	-43%	69	60%	68	-1%	-9%
Ridership (Millions)	9.9	10.7	8%	17.1	60%	19.2	12%	93%
Per 1 Million Riders	7.56	4.02	-47%	4.04	1%	3.54	-12%	-53%
Per Day	0.21	0.12	-43%	0.19	58%	0.19	0%	-9%
Source: Analysis of crime reported by LASD for FYs 2015 to 2017, and reported by LAPD, LASD, and LBPD for FY 2018							

Exhibit 43 Metro Red Line Comparison of Reported Crime FY 2015 to FY 2018							
Crime	**FY 2015**	**FY 2016**	**Change**	**FY 2017**	**Change**	**FY 2018**	**Change**	**Total Change**
Reported Part 1 Violent Crime							
Homicide	0	0	NA	1	NA	0	0%	NA
Rape	0	2	NA	3	50%	2	33%	NA
Robbery	43	52	21%	46	-12%	55	20%	28%
Agg Assault	76	51	-33%	57	12%	30	-47%	-61%
Agg Assault on Op	0	0	0%	0	0%	0	0%	0%
Totals	119	105	-12%	107	2%	87	-19%	-27%
Ridership (Millions)	47.7	46.0	-4%	45.6	-1%	43.8	-4%	-8%
Per 1 Million Riders	2.49	2.28	-8%	2.35	3%	1.99	-15%	-20%
Per Day	0.33	0.29	-12%	0.29	0%	0.24	-18%	-27%
Reported Part 1 Property Crime							
Crime	**FY 2015**	**FY 2016**	**Change**	**FY 2017**	**Change**	**FY 2018**	**Change**	**Total Change**
Burglary	2	1	-50%	3	200%	0	-100%	-100%
Larceny-Theft	133	120	-10%	98	-18%	160	63%	20%
Grand Theft Auto	5	10	100%	7	-30%	13	86%	160%
Arson	0	0	NA	2	NA	0	-100%	NA
Totals	140	131	-6%	110	-16%	173	57%	24%
Ridership (Millions)	47.7	46.0	-4%	45.6	-1%	43.8	-4%	-8%
Per 1 Million Riders	2.93	2.85	-3%	2.41	-15%	3.95	64%	35%
Per Day	0.38	0.36	-6%	0.30	-16%	0.47	58%	24%
Reported Part 2 Crime							
Crime	**FY 2015**	**FY 2016**	**Change**	**FY 2017**	**Change**	**FY 2018**	**Change**	**Total Change**
Battery	105	98	-7%	112	14%	188	68%	79%
Battery on Op	0	0	0%	0	NA	0	NA	NA
Sex Offenses	25	23	-8%	27	17%	38	41%	52%
Weapons	15	7	-53%	11	57%	0	-100%	-100%
Narcotics	120	66	-45%	75	14%	0	-100%	-100%
Trespassing	35	34	-3%	31	-9%	24	-23%	-31%
Vandalism	30	30	0%	22	-27%	22	0%	-27%
Totals	330	258	-22%	278	8%	272	-2%	-18%
Ridership (Millions)	47.7	46.0	-4%	45.6	-1%	43.8	-4%	-8%
Per 1 Million Riders	6.92	5.61	-19%	6.10	9%	6.21	2%	-10%
Per Day	0.90	0.71	-22%	0.76	8%	0.75	-2%	-18%
Source: Analysis of crime reported by LASD for FYs 2015 to 2017, and reported by LAPD, LASD, and LBPD for FY 2018							

Exhibit 44 Metro Gold Line Comparison of Reported Crime FY 2015 to FY 2018							
Crime	FY 2015	FY 2016	Change	FY 2017	Change	FY 2018	Change	Total Change
Reported Part 1 Violent Crime							
Homicide	0	1	NA	0	-100%	0	0%	NA
Rape	0	1	NA	0	-100%	1	0%	NA
Robbery	14	14	0%	13	-7%	15	15%	7%
Agg Assault	19	15	-21%	15	0%	9	-40%	-53%
Agg Assault on Op	0	0	0%	0	0%	0	0%	0%
Totals	33	31	-6%	28	-10%	25	-11%	-24%
Ridership (Millions)	14.0	15.4	10%	16.6	8%	16.2	-2%	16%
Per 1 Million Riders	2.35	2.01	-14%	1.69	-16%	1.54	-9%	-34%
Per Day	0.09	0.08	-11%	0.08	0%	0.07	-14%	-22%
Reported Part 1 Property Crime							
Crime	FY 2015	FY 2016	Change	FY 2017	Change	FY 2018	Change	Total Change
Burglary	3	1	-67%	2	0%	0	-100%	-100%
Larceny-Theft	85	94	11%	56	-40%	54	-4%	-36%
Grand Theft Auto	11	14	27%	16	14%	9	-44%	-18%
Arson	0	0	NA	1	NA	0	-100%	NA
Totals	99	109	10%	75	-31%	63	-16%	-36%
Ridership (Millions)	14.0	15.4	10%	16.6	8%	16.2	-2%	16%
Per 1 Million Riders	7.06	7.08	0%	4.52	-36%	3.89	-14%	-45%
Per Day	0.27	0.30	10%	0.21	-30%	0.17	-18%	-36%
Reported Part 2 Crime							
Crime	FY 2015	FY 2016	Change	FY 2017	Change	FY 2018	Change	Total Change
Battery	26	30	15%	19	-37%	47	147%	81%
Battery on Op	0	0	0%	0	NA	0	NA	NA
Sex Offenses	7	6	-14%	16	167%	11	-31%	57%
Weapons	13	2	-85%	3	50%	1	-67%	-92%
Narcotics	38	18	-53%	19	6%	4	-79%	-89%
Trespassing	4	50	1150%	9	-82%	3	-67%	-25%
Vandalism	36	49	36%	42	-14%	21	-50%	-42%
Totals	124	155	25%	108	-30%	87	-19%	-30%
Ridership (Millions)	14.0	15.4	10%	16.6	8%	16.2	-2%	16%
Per 1 Million Riders	8.84	10.06	14%	6.51	-35%	5.37	-18%	-39%
Per Day	0.34	0.42	25%	0.30	-29%	0.24	-21%	-30%
Source: Analysis of crime reported by LASD for FYs 2015 to 2017, and reported by LAPD, LASD, and LBPD for FY 2018							

Exhibit 45 **Metro Bus Lines** **Comparison of Reported Crime FY 2015 to FY 2018**								
Crime	**FY 2015**	**FY 2016**	**Change**	**FY 2017**	**Change**	**FY 2018**	**Change**	**Total Change**
Reported Part 1 Violent Crime								
Homicide	0	1	0%	0	-100%	0	0%	0%
Rape	1	4	300%	0	-100%	5	0%	400%
Robbery	127	97	-24%	96	-1%	167	74%	31%
Agg Assault	143	139	-3%	107	-23%	94	-12%	-34%
Agg Assault on Op	30	18	-40%	20	11%	6	-70%	-80%
Totals	301	259	-14%	223	-14%	272	22%	-10%
Ridership (Millions)	334.8	320.7	-4%	276.7	-14%	280.8	1%	-16%
Per 1 Million Riders	0.90	0.81	-10%	0.81	0%	0.97	20%	8%
Per Day	0.82	0.71	-14%	0.61	-14%	0.75	22%	-10%
Reported Part 1 Property Crime								
Crime	**FY 2015**	**FY 2016**	**Change**	**FY 2017**	**Change**	**FY 2018**	**Change**	**Total Change**
Burglary	6	4	-33%	4	0%	2	-50%	-67%
Larceny-Theft	293	319	9%	293	-8%	315	8%	8%
Grand Theft Auto	19	14	-26%	13	-7%	21	62%	11%
Arson	0	2	NA	1	-50%	0	-100%	NA
Totals	318	339	7%	252	-26%	338	34%	6%
Ridership (Millions)	334.8	320.7	-4%	276.7	-14%	280.8	1%	-16%
Per 1 Million Riders	0.95	1.06	11%	0.91	-14%	1.20	32%	27%
Per Day	0.87	0.93	7%	0.69	-26%	0.93	34%	6%
Reported Part 2 Crime								
Crime	**FY 2015**	**FY 2016**	**Change**	**FY 2017**	**Change**	**FY 2018**	**Change**	**Total Change**
Battery	142	225	58%	189	-16%	323	71%	127%
Battery on Op	63	114	81%	83	-27%	73	-12%	16%
Sex Offenses	29	65	124%	46	-29%	75	63%	159%
Weapons	25	29	16%	19	-34%	5	-74%	-80%
Narcotics	126	73	-42%	79	8%	19	-76%	-85%
Trespassing	10	23	130%	6	-74%	6	0%	-40%
Vandalism	134	179	34%	144	-20%	63	-56%	-53%
Totals	529	708	34%	566	-20%	564	0%	7%
Ridership (Millions)	334.8	320.7	-4%	276.7	-14%	280.8	1%	-16%
Per 1 Million Riders	1.58	2.21	40%	2.05	-7%	2.01	-2%	27%
Per Day	1.45	1.94	34%	1.55	-20%	1.55	0%	7%
Source: Analysis of crime reported by LASD for FYs 2015 to 2017, and reported by LAPD, LASD, and LBPD for FY 2018								

Exhibit 46								
Union Station								
Comparison of Reported Crime FY 2015 to FY 2018								
Crime	**FY 2015**	**FY 2016**	**Change**	**FY 2017**	**Change**	**FY 2018**	**Change**	**Total Change**
Reported Part 1 Violent Crime								
Homicide	0	0	0%	0	0%	0	NA	NA
Rape	0	2	0%	0	-100%	2	NA	NA
Robbery	1	4	300%	1	-75%	0	-100%	-100%
Agg Assault	17	6	-65%	17	183%	9	-47%	-47%
Agg Assault on Op	0	0	0%	0	0%	0	NA	NA
Totals	18	12	-33%	18	50%	11	-39%	-39%
Ridership (Millions)	NA	NA	NA	NA	NA	NA	NA	NA
Per 1 Million Riders	NA	NA	NA	NA	NA	NA	NA	NA
Per Day	0.05	0.03	-40%	0.05	67%	0.03	-39%	-39%
Reported Part 1 Property Crime								
Crime	**FY 2015**	**FY 2016**	**Change**	**FY 2017**	**Change**	**FY 2018**	**Change**	**Total Change**
Burglary	5	5	0%	5	0%	0	-100%	-100%
Larceny-Theft	42	27	-36%	42	56%	55	31%	31%
Grand Theft Auto	2	1	-50%	2	100%	4	100%	100%
Arson	0	1	NA	0	-100%	0	NA	NA
Totals	49	34	-31%	49	44%	59	20%	20%
Ridership (Millions)	NA	NA	NA	NA	NA	NA	NA	NA
Per 1 Million Riders	NA	NA	NA	NA	NA	NA	NA	NA
Per Day	0.13	0.09	-31%	0.13	44%	0.16	20%	23%
Reported Part 2 Crime								
Crime	**FY 2015**	**FY 2016**	**Change**	**FY 2017**	**Change**	**FY 2018**	**Change**	**Total Change**
Battery	37	19	-49%	37	95%	36	-3%	-3%
Battery on Op	0	0	0%	0	NA	0	NA	NA
Sex Offenses	4	3	-25%	4	33%	5	25%	25%
Weapons	7	1	-86%	7	600%	0	-100%	-100%
Narcotics	36	10	-72%	36	260%	0	-100%	-100%
Trespassing	12	2	-83%	12	500%	9	-25%	-25%
Vandalism	4	7	75%	4	-43%	4	0%	0%
Totals	100	42	-58%	100	138%	54	-46%	-46%
Ridership (Millions)	NA	NA	NA	NA	NA	NA	NA	NA
Per 1 Million Riders	NA	NA	NA	NA	NA	NA	NA	NA
Per Day	0.27	0.12	-56%	0.27	125%	0.15	-44%	-44%
Source: Analysis of crime reported by LASD for FYs 2015 to 2017, and reported by LAPD, LASD, and LBPD for FY 2018								

Appendix B: Schedule of
Recommendations and Proposed Actions

	Exhibit 47 Metro Security Performance 2018 Review Recommendation Summary and Proposed Actions				
No.	**Recommendation**	**Staff Assigned**	**Agree or Disagree**	**Proposed Action**	**Completion Date Estimate**
1	The Metro SSLE Department should continue to work with contract law enforcement agencies to improve the complete and accurate reporting of crime that occurs on the Metro System.				
2	The Metro SSLE Department should continue to work to develop a more macro approach to oversight and monitoring of contracted law enforcement resources using the GPS function of the Mobile Phone Validators (MPV) assigned to contracted law enforcement personnel and the data generated from them.				
3	The Metro SSLE Department should consider providing more detailed information on reported crime to distinguish between violent crime and property and petty crime.				
4	The Metro SSLE Department should collect and report response time information for all three categories of calls for service.				
5	The Metro SSLE Department should use the GPS function and data generated to provide reliable and meaningful information on the amount of time contracted law enforcement officers spend on various parts of the Metro System.				
6	The Metro SSLE Department should work with the contract law enforcement agencies to review, revise and adopt Key Performance Indicators (KPI) including baseline or target levels of performance for each KPI.				

No.	Recommendation	Staff Assigned	Agree or Disagree	Proposed Action	Completion Date Estimate
7	The Metro SSLE Department should continue to develop the Metro Community Policing plan and ensure it includes: Specific training in Problem Oriented Policing for law enforcement personnel to assist Metro in addressing matters related to crime and disorder Attendance at community meetings and other events designed to foster Metro's relationship with the community Protocols to obtain feedback from bus and rail managers that will be used in the overall policing strategy				
8	A. LAPD should continue monitoring the contract requirements to ensure all personnel meet the required certification and complete the transit policing training before working on any Metro assignments. B. Metro SSLE Department should continue monitoring the contract requirements for qualifications and training of personnel to ensure compliance.				
9	A. LAPD should submit the required payroll records with the monthly invoice. B. Metro should continue to monitor LAPD's billings to ensure all the required supporting documents are submitted with the invoices				
10	A. LAPD should submit the list of maximum fully burdened hourly rates for each labor classification for overtime in accordance with the contract				

No.	Recommendation	Staff Assigned	Agree or Disagree	Proposed Action	Completion Date Estimate
	requirements. Also, the escalation rate included in the calculation of the maximum fully burdened hourly rates should not exceed the maximum escalation rate stipulated in the contract. B. Metro SSLE Department should work with LAPD to ensure that the list of maximum fully burdened hourly rates complied with the contract requirements. Metro should also review the billing rates for overtime for all invoices to determine the extent of overbillings for FY 2018.				
11	A. LAPD should submit the list of maximum fully burdened hourly rates for all labor classifications in accordance with the contract requirements. For any additional labor classifications not identified in the list of maximum fully burdened hourly rate, LAPD should submit a revised list to Metro for approval prior to incurring the cost. B. Metro SSLE Department should continue to monitor LAPD's billings to ensure only the approved labor classifications are billed and included in the list of maximum fully burdened hourly rates. Metro should also review the billing rates for straight time for all invoices to determine the extent of overbillings.				
12	A. LAPD should return the overbilled and overpaid amount of $3,874.99 to Metro.				

No.	Recommendation	Staff Assigned	Agree or Disagree	Proposed Action	Completion Date Estimate
	B. Metro SSLE Department should continue monitoring LAPD's billings to identify and resolve billing discrepancies.				
13	A. LAPD should submit the prevailing Cost Allocation Plan (CAP) rate together with the list of maximum fully burdened hourly rates for overtime. B. Metro SSLE Department should continue to monitor LAPD's billings to ensure the overtime overhead rate billed was based on the CAP overhead rate approved by the Federal Government in effect at the time the work was performed.				
14	A. LAPD should submit to Metro in a timely manner the monthly Summary of Problem-Oriented Policing projects. B. Metro's SSLE Department should continue to monitor LAPD's submission of reports and stamp the date received on reports to ensure all the required reports are submitted in a timely manner and with complete information to allow Metro to determine the calculation of the reported figures.				
15	A. LAPD should provide the equipment in the quantities listed in Exhibit E of the contract. B. Metro SSLE Department should continue to monitor LAPD's equipment to ensure the quantities listed in Exhibit E of the contract are properly provided and in a timely manner.				

No.	Recommendation	Staff Assigned	Agree or Disagree	Proposed Action	Completion Date Estimate
16	A. LASD should continue monitoring the contract requirements to ensure all personnel complete the safety training and transit policing training before working on any Metro assignments. B. Metro SSLE Department should continue monitoring the contract requirements for qualifications and training of personnel to ensure compliance with the contract.				
17	A. LASD should issue an additional credit amount of $1,699.68 to Metro. B. Metro SSLE Department should continue monitoring LASD's billings to ensure each job position meet the service levels promised on Form 575 and the billing rates are in compliance with the contract.				
18	A. LASD should submit to Metro in a timely manner the report for number of cases referred for follow-up investigation and the subsequent disposition. B. Metro SSLE Department should work with LASD to resolve any issues regarding the required reports. Also, Metro should continue monitoring LASD's submission of reports to ensure all the required reports were submitted in a timely manner and with complete information to allow Metro to determine the calculation of the reported figures.				
19	A. LBPD should continue monitoring the contract requirements to ensure all personnel have completed the				

No.	Recommendation	Staff Assigned	Agree or Disagree	Proposed Action	Completion Date Estimate
	transit policing training before working on any Metro assignments. B. Metro SSLE Department should continue monitoring the contract requirements for qualifications and training of personnel to ensure compliance.				
20	A. LBPD should inform Metro the amount expected to exceed the estimated cost specified in the contract for each year before incurring the costs. B. Metro SSLE Department should continue monitoring LBPD's billings, payments and contract amount to ensure that costs do not exceed the contract amount.				
21	A. LBPD should submit the daily summary of assignments for all hours worked and payroll records with the invoices. B. Metro SSLE Department should continue monitoring LBPD's billings to ensure all the required supporting documents were submitted with the invoices.				
22	A. LBPD should return to Metro the overbilled and overpaid amount of $14,643.89. B. Metro SSLE Department should continue to monitor LBPD's billings to ensure only the approved labor classifications are billed and included in the list of maximum fully burdened hourly rates. Metro should also review the billing rates for all invoices to determine the extent of overbillings for FY2018.				

No.	Recommendation	Staff Assigned	Agree or Disagree	Proposed Action	Completion Date Estimate
23	Metro SSLE Department should review the billing methodology specified in the contract for equipment cost and determine whether the contract should be revised.				
24	Metro SSLE Department should continue monitoring LBPD's submission of reports to ensure all the required reports are submitted in a timely manner and with complete information to allow Metro to determine the calculation of the reported figures.				
25	The SSLE Department should continue and complete efforts to develop key performance indicators for Metro Security during FY 2019.				

Metro

File Summary

Metro

File Number	Title	Current Status

2019-0481   **Informational Report**   **Agenda Ready**

RECEIVE AND FILE OIG report on Metro Security Performance Review Fiscal Year 2018.

Introduced: 6/6/2019   **Controlling Body:** Operations, Safety, and Customer Experience Committee

Meeting Date: 7/18/2019   **Sponsor(s):** Operations, Safety, and Customer Experience Committee and Executive Management Committee

Drafter: taylorm@metro.net

Office of the Inspector General
Metro Security Performance Review
Fiscal Year 2018

Metro Operations, Safety, and Customer Experience Committee

July 18, 2019

BCA Watson Rice, LLP

Background and Scope

1. Metro awarded three separate 5-year firm fixed unit rate contracts to the LAPD, the LASD, and the LBPD for transit law enforcement services in 2017.

2. The Metro Board directed the OIG to annually audit each law enforcement services contract.

3. The audit is to ensure that Metro is receiving the services it is paying for.

4. This report evaluates transit security performance provided by the three Contractors <u>and</u> Metro's Transit Security Department during FY 2018.

1. Reported Violent Crime decreased by 18% between FYs 2015 and 2018, with most of this decrease (14%), occurring between FYs 2017 and 2018.

2. Reported Property Crime decreased 15% between FYs 2015 and 2018, with a decrease of 16% occurring between FYs 2015 and 2017, and an increase of 1% occurring between FYs 2017 and 2018.

3. Rider perceptions of safety on the Metro Train system declined slightly and rider perceptions of safety on the Metro Bus system improved slightly between FYs 2015 and 2018.

Key Recommendations

There were 25 recommendations, but these are some key ones:

1. Improve the reporting of crime that occurs on the Metro System:

    A. More detailed information on reported crime to distinguish between violent crime and property and petty crime, and

    B. Report crimes related to the Metro System but handled by Non-Metro assigned personnel.

2. Strengthen oversight and monitoring of resources using the GPS function of the Mobile Phone Validators.

3. Review, revise, and adopt KPIs including baseline or target levels of performance.

4. Continue and expand monitoring and oversight of contract compliance, including:

    A. Reviewing invoices for potential overbilling,

    B. Enforcement of training requirements,

    C. Staying within budget, and

    D. Deployments that increase rider perceptions of safety.

5. Improve documentation to support billings.

6. Seek some refunds of small amounts due to Metro.

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

Board Report

File #: 2019-0481, **File Type:** Informational Report

Agenda Number: 26.

OPERATIONS, SAFETY, AND CUSTOMER EXPERIENCE COMMITTEE
EXECUTIVE MANAGEMENT COMMITTEE
JULY 18, 2019

SUBJECT: OFFICE OF THE INSPECTOR GENERAL REPORT ON METRO SECURITY
PERFORMANCE REVIEW FISCAL YEAR 2018

ACTION: RECEIVE AND FILE

RECOMMENDATION

RECEIVE AND FILE OIG report on Metro Security Performance Review Fiscal Year 2018.

ISSUE

On February 23, 2017, the Metro Board passed a motion directing that the Inspector General conduct an annual audit of each law enforcement services contract to determine how key performance indicators are measuring up against actual performance metrics. The audit is to ensure that Metro is receiving the services it is paying for.

BACKGROUND

In 2017, LACMTA (Metro) awarded three separate 5-year firm fixed unit rate contracts to the Los Angeles Police Department (LAPD), the Los Angeles County Sheriff's Department (LASD), and the Long Beach Police Department (LBPD) for transit law enforcement services to support day-to-day operations across Metro's entire service area.   Metro also directly employs transit security officers who perform fare checks and bus/rail patrolling.

DISCUSSION

A.   Trends in Crime, Perceptions of Safety, and Safety and Security Complaints

There are three key outcome measures that can be used to evaluate the effectiveness and trends of Metro's safety and security approach and program. These are the level of reported crime on the system, the perceptions of safety by users of the system, and the number of safety and security complaints made by users of the system.

Reported Crime

Total reported Violent Crime on the Metro System decreased by 18% between FY 2015 and FY 2018,

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with most of this decrease (14%), occurring between FY 2017 and FY 2018. Total reported Property Crime on the Metro System decreased 15% between FY 2015 and FY 2018, with a decrease of 16% occurring between FY 2015 and FY 2017, and an increase of 1% occurring between FY 2017 and FY 2018.

Obtaining complete and accurate reporting of crime that occurs on the Metro System continues to be challenging. This is partially due to the fact that the Metro System operates within multiple jurisdictions with their own law enforcement agencies who respond to, handle, and report crime that may not be reported to Metro.

In addition, in the LAPD service area of the Metro System, LAPD neighborhood patrol units respond to and handle many crimes that occur within the Metro System. An unknown number of these crimes are not reported to the LAPD Transit Policing Division and so are not tracked and reported to Metro.

We recommend the Metro System Security and Law Enforcement (SSLE) Department continue to work with contract law enforcement agencies to improve the complete and accurate reporting of crime that occurs on the Metro System.

Rider Perceptions of Safety

Perception of crime and disorder on the Metro System creates a risk to the confidence in safety held by passengers and Metro employees and poses a risk to the reputation of Metro as a safe and secure system. Passengers who perceive the system to be unsafe will not use the service, and therefore reduce the number of people using transit and Metro's ridership.

Based on Metro rider surveys conducted annually, rider perceptions of safety on the Metro Train system declined slightly and rider perceptions of safety on the Metro Bus system improved slightly between FY 2015 and FY 2018. These changes in perceptions of safety are small and within the margin of error for the survey. However, it is important to continue to monitor rider perceptions of safety on the Metro System and to develop strategies to address concerns and improve that perception.

Complaints Regarding Safety and Security

Another important indicator of the public or riders' perception of the safety of the Metro System is the number of complaints received regarding safety and security. During the period from FYs 2015 to 2018, rider complaints for the bus system regarding passenger safety or conduct issues were not among the top ten complaints. However, for the rail system, rider complaints regarding passenger safety or conduct issues were the second most common complaint of the top ten complaints for FYs 2015 to 2017. For FY 2018, complaints regarding passenger safety or conduct issues dropped to five of the top ten.

We recommend the SSLE Department continue to monitor rider survey results regarding perceptions of safety of riders on the Metro System and complaints regarding safety and passenger conduct issues and develop strategies to improve those perceptions and reduce complaints.

B.   Resource Monitoring and Oversight

The SSLE Department is charged with ongoing oversight of the contracted law enforcement services as well as the operations of Metro Security.

Audits of Contracted Law Enforcement Personnel Presence

Metro has and will continue to have a substantial investment in resources devoted to system safety and security. Ensuring that these resources are effectively and efficiently used is very important.

Oversight and monitoring of contracted law enforcement resources has been problematic. Metro has had some difficulty in ensuring that law enforcement personnel assigned to Metro are actually present and performing as assigned. Historically, Metro has not had an effective means of verifying the accuracy of staffing information provided by contract law enforcement, or of verifying that personnel charging time on the Metro contract are actually present and providing the contracted services.

Beginning with FY 2018, the SSLE Department implemented regular "audits" of law enforcement personnel to monitor consistency between personnel time reported and the invoiced costs. Beginning in September 2017, Metro also began conducting "field audits" of law enforcement personnel in addition to the comparison audits of information provided by contracted law enforcement agencies. These field audits involve taking the roster of law enforcement personnel assigned to work and verifying that those personnel are actually in the field and providing the contracted service. These field audits strengthen Metro's contract oversight and monitoring.

GPS Based Contracted Law Enforcement Oversight and Monitoring

The SSLE Department has been working to develop and implement an effective method of tracking and monitoring the activities of safety and security resources deployed on the Metro System using the GPS function on smartphones used by Metro safety and security personnel.

The Mobile Phone Validators (MPV) provided to contracted law enforcement officers are now GPS enabled and are able to provide information on the location and movement of the MPV and law enforcement resources. Metro has not yet begun using the GPS function and information generated to track or monitor the activities of contracted law enforcement resources.

We recommend the SSLE Department should work to develop a more macro approach to oversight and monitoring of contracted law enforcement resources using the GPS function of the MPV assigned to contracted law enforcement personnel and the data generated from them.

Oversight of Other Law Enforcement Contract Requirements

In our review of compliance with the contract terms, we found some instances of non-compliance by all three law enforcement agencies with qualifications and training of personnel assigned, reports and information being provided to Metro, equipment provided under the contract, and appropriate support for invoices submitted. Increased monitoring and oversight of these requirements seems warranted given the size of the contracts and the importance of the services being provided.

We recommend the SSLE Department should consider expanding monitoring and oversight of other contract requirements including qualifications and training of personnel, required reporting, equipment provided, and invoice support and compliance with the contract. We also recommend

Metro seek reimbursement for overbillings and overpayments resulting from noncompliance with contract terms during FY 2018.

C.   Key Performance Indicators (KPI)

It is essential that Metro clearly define performance expectations for each of the contract law enforcement agencies and use meaningful performance indicators to evaluate how well these expectations are being met.

Reporting of Crime and Incident Response Time Indicators

Two of the KPI included in each of the law enforcement contracts were intended to provide information on the outcomes of the law enforcement service provided including changes in the number of crimes reported and increases in crime incident response times.

In crime reporting the emphasis should be on violent crime, which is obviously the most impactful to the Metro System and has the greatest impact on Metro's riders. Reporting all crime in the aggregate is less meaningful because violent crimes such as homicide, robbery and rape are given the same weight as lesser crimes such as larceny, petty theft, and vandalism.

A primary workload for law enforcement is responding to and handling incidents that occur on the Metro System or calls for service. Metro's SSLE Department currently only collects and reports response time information for emergency calls for service. While emergency calls for service are obviously the most important calls, tracking and reporting response time on less urgent incidents and calls for service is also important.

Often these lower priority calls for service involve quality of life issues and concerns as well as victims of property crimes. A slow response to these incidents can have a negative impact on the perception of the riding public transit that the system is safe and well protected. In addition, not requiring contract law enforcement agencies to track and report these response times communicates to them and their officers that these calls are not important.

We recommend that Metro's SSLE Department begin to collect and report on response times for all calls for service that require a law enforcement response.

Visibility of Law Enforcement Security Personnel Indicators

Providing a visible security presence within the Metro System is an important strategy for providing both a sense and reality of safety. Three of the KPI included in each of the law enforcement contracts were intended to provide information on the visibility of law enforcement security personnel on the Metro System. These are 1) the ratio of proactive versus dispatched activity, 2) the number of foot and vehicle patrols of bus stops, transit centers, train platforms, plazas, and stations, and 3) the number of bus and train boardings.

Contract law enforcement agencies were only able to report on the ratio of proactive versus dispatched activity. Contract law enforcement agencies were not able to report on the other two KPI. While these are important indicators and would provide useful information on the level of activity and visibility of contracted law enforcement personnel, it was not practical for the law enforcement

agencies to reliably collect meaningful information for these indicators. As discussed in Section B of this report, using the GPS function and the data generated could provide more reliable and meaningful information on the amount of time contracted law enforcement officers spend on each of these activities related to KPI 2 and 3 above.

Law Enforcement Personnel Presence Indicator

One of the KPI included in each of the law enforcement contracts was intended to provide information on the presence of the contracted law enforcement personnel. This is the ratio of staffing levels and vacant assignments. This indicator is important in both communicating to the contract law enforcement agencies the need to actually staff contracted assignments and to report how effectively these positions are actually being staffed. Reported staffing levels collectively were at 98.5% or above during FY 2018.

Baseline Expectations and Other Potential Performance Indicators

It is important to establish baseline expectations or targets for each performance indicator. This not only clearly communicates performance expectations, but it also can help drive improvements in performance through the development and implementation of new strategies. Baseline performance levels for each KPI have not been developed.

We recommend Metro's SSLE Department work with contract law enforcement agencies to establish baseline or target performance levels for each of the KPI currently in use. They should also work together to determine if additional KPI would be appropriate and meaningful.

D. Community Policing

Community policing within a transit system should place an emphasis on quality of life issues. The customers of the Metro System must feel safe and secure. The presence of security, in whatever form, must have a "felt presence;" that is, they must be visible and engaged without becoming oppressive and threatening.

Metro Community Policing Plan

The Metro SSLE Department is in the process of developing a community policing plan for the Metro System. The Metro Community Policing Plan will be a unified plan instead of having each of the three law enforcement agencies develop individual community policing plans. The Metro Community Policing Plan is part of Metro's new Equity Platform, which aims to assure equity across all programs impacting transit service, planning, and policing. The SSLE Department expects to have a draft Metro Community Policing Plan completed by the Fall of 2019.

We recommend the Metro SSLE Department continue to develop the Metro Community Policing Plan and ensure it includes specific training in Problem Oriented Policing for law enforcement personnel, attendance by law enforcement personnel at community meetings, and protocols to obtain feedback from bus and rail managers.

Law Enforcement Service Request (LESR) System

Metro employees, including bus and train operators, maintenance personnel, customer service

representatives, and others are the front-line representatives of Metro and have ongoing and direct interaction with the riding public. The LESR system implemented in FY 2018 should provide good information on Metro employee safety and security issues and concerns on the system going forward.

During FY 2018, a total of 935 law enforcement service requests were generated by Metro employees. Our review of the requests and responses indicate that law enforcement agencies are using the LESR to identify and resolve issues and concerns.

E.   Compliance with Specific Contract Requirements

The contracts with the three law enforcement agencies each contain specific requirements related to personnel and training, billing, required reports, and other contractual requirements.

Overview of Law Enforcement Contract Requirements

Each of the contracts with the three law enforcement agencies includes specific contract requirements. This includes requirements for the experience and training of law enforcement personnel assigned to Metro, billing information and supporting documentation, required information and reports on activities, and other information on equipment provided.

Los Angeles Police Department (LAPD) Contract Compliance

The following are the results of our review of LAPD's contract compliance:

- LAPD was not in compliance with two of the contract requirements related to personnel and training.

- The total amount billed and paid to LAPD for FY 2018 did not exceed the estimated cost specified in the contract for Year 1.

- Invoices submitted to Metro were based on actual services provided and supported by daily summary of assignments and hours worked using the cost data from the payroll system. However, actual payroll records were not submitted with the invoices as required.

- For overtime charges, we were unable to determine whether the billing rates exceeded the approved maximum fully burdened hourly rates because the list of maximum fully burdened hourly rates that LAPD submitted to Metro was not in compliance with the contract.

- Eight labor classifications totaling $281,400.77 were not found in the required list of maximum fully burdened hourly rates.

- For straight time charges, we identified a total amount of $3,874.99 as overbilled by LAPD and overpaid by Metro.

- LAPD invoiced an overhead rate of 12.76% for overtime hours that was unsupported by

adequate documentation.

- LAPD met 8 out of 9 contract requirements for submitting required reports to Metro. The reports were submitted with adequate information and in a format that allows Metro to determine the calculation of the reported figures. However, no information was provided as to when these reports were submitted to Metro so we were unable to determine if the reports were submitted on time in accordance with the contract.

- Exhibit E of the contract provides a list of equipment that the LAPD was supposed to provide under the contract. We found that LAPD did not provide the equipment in the quantities listed in Exhibit E.

Los Angeles County Sheriff's Department (LASD) Contract Compliance

- LASD was not in compliance with two of the contract requirements related to personnel and training.

- The total amount billed and paid for FY 2018 to LASD did not exceed the estimated cost specified in the contract for Year 1.

- Except for a credit amount understatement of $1,699.68, the billing rates were consistent with Metro's approved rates. Invoices were based on actual services provided and supported by Payment Certification, the Service Level and Billing Status Report, and the Patrol Compliance Report.

- LASD met 7 out of 8 contract requirements for required reports. The reports were submitted in a timely manner, with adequate information and in a format that allows Metro to determine the calculation of the reported figures.

Long Beach Police Department (LBPD) Contract Compliance

- LBPD was not in compliance with the contract requirement for Transit Policing training.

- The total amount billed and paid for FY2018 exceeded the estimated cost specified in the contract for Year 1 by $885,578.

- Daily summary of assignments for all hours worked and payroll records were not submitted with the invoices.

- The billing rates exceeded Metro's approved maximum fully burdened hourly rates for three labor categories. Only one of the three labor categories was listed in the approved maximum fully burdened hourly rates. We identified a total amount of $14,643.89 as overbilled by LBPD

and overpaid by Metro.

- The billing methodology for equipment cost was not consistent with the contract agreement.

- LBPD met 8 out of 9 contract requirements for required reports. The reports were submitted with adequate information and in a format that allows Metro to determine the calculation of the reported figures. No information was provided as to when these reports were submitted to Metro so we were unable to determine if the reports were submitted to Metro on time.

F.   Fare and Code of Conduct Compliance Enforcement

Enforcing fare compliance on the Metro System as well as the Metro Customer Code of Conduct is a key element of Metro's safety and security mission.

Code of Conduct and Parking Enforcement and Citations

The vast majority (98%) of the citations for Metro Code of Conduct violations are issued by Metro Security. This demonstrates the substantial change in the transfer in responsibility for fare and code of conduct enforcement from contracted law enforcement to Metro Security. The number of Code of Conduct citations issued increased substantially (162%) between FY 2017 and FY 2018. Total citations are 35% below the level for FY 2013.

Performance Indicators for Metro Security

The role and responsibilities of Metro Security have expanded substantially over the past few years and now includes primary responsibility for enforcing Metro's Code of Conduct on the system, including fare enforcement. Given this, it is important that Metro Security have an effective accountability system, including meaningful performance indicators.

The SSLE Department reports they will be developing KPIs for Metro Security during 2019.   These KPIs will cover two key areas: Fare Enforcement and Critical Infrastructure Protection.   The fare enforcement KPI will focus on effective strategies to increase fare compliance. The critical infrastructure KPI will focus on assessing and mitigating security threats to the transit system and its critical structures.

FINANCIAL IMPACT

Adoption of the recommendations in this report does not increase the financial impact on the agency.

IMPLEMENTATION OF STRATEGIC PLAN GOALS

The recommendations in this report support Strategic Plan Goal 2.1 (Improving security), Goal 5.6 (fostering and maintaining a strong safety culture), and Goal 2 (delivering outstanding trip experiences).

NEXT STEPS

Metro management should:

- Complete the Schedule for Tracking Metro's Proposed Actions in response to the recommendations provided in Appendix B of the report as determinations are made on implementing the recommendations; and
- Periodically report to the Metro Board on the status of actions taken to implement the recommendations.

ATTACHMENTS

Attachment A - Metro Security Performance Review Fiscal Year 2018

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Karen Gorman
Inspector General

Metro

Board Report

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

File #: 2019-0496, **File Type:** Informational Report

Agenda Number: 27.

OPERATIONS, SAFETY AND CUSTOMER EXPERIENCE COMMITTEE
EXECUTIVE MANAGEMENT COMMITTEE
JULY 18, 2019

SUBJECT: MONTHLY UPDATE ON TRANSIT SAFETY AND SECURITY PERFORMANCE

ACTION: RECEIVE AND FILE

RECOMMENDATION

RECEIVE AND FILE Transit Safety and Security Report.

ISSUE

This report reflects May 2019 performance data as reported under the transit policing deployment strategy which is a combination of in-house fare compliance officers, private security for fixed assets and a multi-agency law enforcement deployment strategy by the Los Angeles Police Department (LAPD), Los Angeles County Sheriff's Department (LASD), and Long Beach Police Department (LBPD). The information in this report summarizes Crimes Against Persons, Crimes Against Property, and Crimes Against Society data under Uniform Crime Reporting (UCR) Program, average emergency response times, assaults on bus operators, and Metro's fare compliance and homeless outreach efforts. The Six Key Performance Indicators (KPI) are Uniform Crime Reporting guidelines, Average Emergency Response Times, Percentage of Time Spent on the System, Ratio of Staffing Levels vs Vacant Assignments, Ratio of Proactive vs Dispatched Activity, and Number of Grade Crossing Operations.

BACKGROUND

UCR is a National Incident-Based Reporting System from the US Department of Justice. It captures crime offenses in one of three categories: Crimes Against Persons,
Crimes Against Property, and Crimes Against Society.

DISCUSSION

Crime stats are as follows:

Crimes Against Persons
For the month of May 2019, crimes against persons increased by 9 crimes system-wide compared to the same period last year.

Crimes Against Property
For the month of May 2019, crimes against property decreased by 16 crimes system-wide compared to the same period last year.

Crimes Against Society
For the month of May 2019, crimes against society decreased by 10 crimes system-wide compared to the same period last year.

Bus Operator Assaults
There were 9 bus operator assaults reported in May, which is four more compared to the same period last year.

Average Emergency Response Times:
Emergency response times averaged 4.61 minutes for the month of May.

Physical Security Improvements:
The Systems Security and Law Enforcement division continues to provide a secure and safe environment for our patrons and employees. Our Metro Facility physical security assessment was completed, and the report was presented to key Metro leaders in Bus and Rail Operations, Information Technology and Facilities.   The physical security assessment of Union Station started in August and concluded in February 2019.

We are working closely with the Los Angeles Police Department to develop a concept of the operations for the deployment of the Thruvision detection at range technology. We have had several meetings with the LAPD, and we continue to develop the procedures that will protect the public and Metro.

We met with the California Public Utilities Commission representatives to plan our Triennial Audit which will occur in September 2019.

We continue to improve our new Transit Watch application, and we hope to have the prototype ready this winter.

The Red Line ancillary area surge continues, and we are making progress with securing our underground rail stations.

The New Blue Line North project planning commenced, and the site walks were conducted to identify law enforcement and security locations to support the construction.

Metro's Homeless Efforts:
In spring 2016, Metro created the Metro Homeless Task Force to address the displaced persons that have turned to Metro system and property for alternative shelter. Out of the Task Force, Metro created the Metro Transit Homeless Action Plan which was presented to the Metro Board of Directors in February 2017. The Action Plan's goals are to enhance the customer experience, maintain a safe and secure system, and provide coordinated outreach. Components of the plan include Metro's coordination with County and City Measure H and Measure HHH. The plan also called for the hiring

of two C3 teams (County, City, Community) through the County Department of Health Services as indicated by Metro's Board of Directors. The C3 teams are to provide coordinated and responsive outreach to the homeless and to ultimately get them in housing resources.

Metro's C3 Homeless Outreach Teams:
Metro's C3 Homeless Outreach teams' twelve-month pilot program began on May 22, 2017 with initial homeless outreach on the Red Line. Since the launch of Metro's C3 Homeless Outreach teams they have provided substantial homeless outreach-with 5,194 total unduplicated homeless contacts,1,315 of whom have been linked to permanent housing solutions with a total of 114 homeless persons permanently housed. In FY19 Metro expanded the C3 teams from two to eight teams to cover rail, bus and Union Station.

C3 Homeless Outreach May1, 2019 through May 31, 2019:

Performance Measure	May Number Served	Project Year to date Number Served
Contacts with unduplicated individuals	220	5,194
Unduplicated individuals engaged	82	2,785
Unduplicated individuals provided services (obtaining vital documents, follow-up activities, transportation, CES packet, clinical assessment, etc.) or successful referral (supportive services, benefits linkage etc.)	134	2,122
Unduplicated individuals engaged who are successfully linked to an interim housing resource	83	862
Unduplicated individuals engaged who are linked to a permanent housing resource	22	339
Unduplicated individuals engaged who are permanently housed	16	114

Staff received eight referrals from LAPD. Of these, two could not be located and two declined services. Of those remaining:
- Four people were placed in interim housing.
- One of these four is now living with her significant other.
- The other three are continuing to work with the team toward permanent housing.

Impact Story resulting in Stable Housing
Recently Metro Security referred a 30 year old female and her three male children ages 10, 8, 6 to PATH Metro. The client reported that she was stranded in Los Angeles after fleeing a domestic violence relationship and was trying to return to her mother's home in Hemet, California. The client displayed obvious signs of being distraught and worried that her abuser would find her at the station. The determination was made by PATH Outreach Team members to transport the client and her children to her mother's home in Hemet rather than trying to place her on the next available train. The client's mother was contacted and gladly agreed to receive her daughter and grandchildren. PATH Metro Outreach Team then transported all four individuals to Hemet, California in PATH's company vehicle. Client and children were reunified with her mother and are residing in her home. The Client promised to follow-up with the police to report the abuse. Client also stated that her

abuser did not know the location of her mother's home and as a result of that she "felt safe" at her mother's home.

C3 Coordination with Law Enforcement

With Metro System Security and Law Enforcement personnel as the lead, Metro's C3 teams coordinate with LAPD's Homeless Outreach and Protective Engagement (HOPE) Teams, LASD's Mental Evaluation Teams (MET), Long Beach PD, and Metro's Transit Security Officers, in an effort to engage the homeless and provide placement into services. These law enforcement entities provide gap service on the lines for homeless outreach when the C3 Teams are off duty or working another portion of the system.

Sheriff Mental Evaluation Team (MET) Contacts May 5, 2019 through June 1, 2019

These monthly statistics only include contacts of the Transit MET Units. They do not include contacts made by other Transit Services Bureau personnel. In addition to the data reported below, Transit MET Units:

- Transported 21 clients to other homeless outreach connection services.
- 2 teams attended LASD/MET MILO training at Industry Station - 05/22/2019.
- 7 teams attended LACMET training meeting hosted by LASD County-Met - 05/22/2019.
- 6 teams attended Basic Crisis Negotiation training course from 05/28/2019 - 05/31/2019.
- 7 teams attended Advance Crisis Negotiation training course from 06/03/2019 - 06/05/2019.

Long Beach Quality of Life Officers Update May 2019

The Quality of Life Officers began working with LBPD at the beginning of February 2019. The Blue Line Closure was in effect for the entire month of May. The number of contacts should increase once the "New Blue" opens in June.

The Quality of Life Officers have concluded their work with Metro personnel and Long Beach Health Department's Multi-Service Center Homeless Outreach personnel at two right-of-way homeless encampments in Long Beach. The encampment locations are:

- An abandoned golf course property adjacent to the blue Line and north of the Wardlow Station.

- On the eastern perimeter right-of-way at Division 11.

These locations are in maintenance mode with Quality of Life Officers checking on the locations daily to ensure encampments do not become re-entrenched.

May 2019 Law Enforcement Homeless Outreach

ACTION	LAPD HOPE	LASD MET	LBPD
Contacts	1,183	441	14
Referrals	30	267	4
5150 Holds	15	15	0
Mental Illness	24	140	0
Substance Abuse	44	138	4
Veterans	7	5	0
Shelter	5	7	0
Motel Housing Plan	1	0	0
VA Housing	0	0	0
Return to Family	1	0	0
Transitional Long Term Housing	5	0	0
Detox	0	0	0
Rehab	3	0	0

Metro ROW Encampment:
- May 1, 2019 - MRL Vermont Beverly Station Plaza, abandoned site. Trash cleanup completed on May 3, 2019.

Metro Encampments Outside, Adjacent to Metro ROW:
- May 24, 2019 - Burbank Branch Chandler Bikeway East of Vineland Avenue - Active Encampment Cleanup was cleared by LAPD and cleaned by LADOT on May 30, 2019.

Measure H Generalist:
Metro's Homeless Action Plan integrates itself into the work provided under Measures H and HHH. Part of the E6 Strategies of Measure H includes 40 additional outreach workers otherwise known as "generalists" to conduct outreach on government properties including Metro, and countywide parks, libraries, beaches and harbors. These generalists do not go past the fare gates and their data, per the county will not be extrapolated for Metro. However, these generalists currently work with the C3 teams to provide outreach services.

Connect Days
Connect Days provide comprehensive homeless resources at location sites throughout LA County. These resource opportunity events are led by Council Districts (CD) and are utilized by Metro's C3 and Measure H teams when the Connect Days are adjacent to Metro properties. CD1 hosts a standing Connect Day at MacArthur Park that was utilized in May by Metro's C3 teams to provide comprehensive resources to the homeless.

Mental Health Outreach Workers:

The LA County Department of Mental Health has provided a mental health clinician to one of Metro's contracted HOPE team. Mental Health professionals are paired with all MET Teams.

Faith Based Partnership
Since January 2019, Metro has hosted four regional faith leader roundtable discussions to identity ways that Metro and the Faith based community in LA County may partner to serve the homeless. There is a major opportunity for faith-based groups to provide additional resources to homeless contacts on Metro in several ways: hosting Connect Days; partnering with entities that provide necessities (food, shelter, clothing) and providing referral information. Metro invites faith based groups and local nonprofits interested in providing resources to transit located homeless to contact Metro's System Security and Law Enforcement Department.

..Attachments
<u>ATTACHMENTS</u>
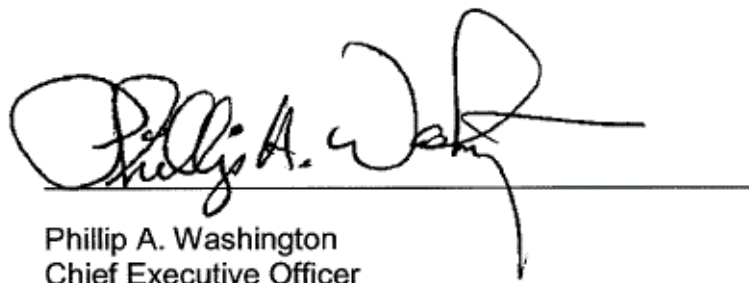
Attachment A - System-Wide Law Enforcement Overview May 2019
Attachment B - MTA Supporting Data May 2019
Attachment C - Key Performance Indicators May 2019
Attachment D - Transit Police Summary May 2019

Prepared by: Aston T. Greene, Interim Chief, System Security and Law Enforcement,
            (213) 922-2599

Reviewed by: Phillip A. Washington, Chief Executive Officer, (213) 922-7555

Phillip A. Washington
Chief Executive Officer

SYSTEM-WIDE LAW ENFORCEMENT OVERVIEW
MAY 2019

Attachment A

Crimes Against Persons, Property, and Society
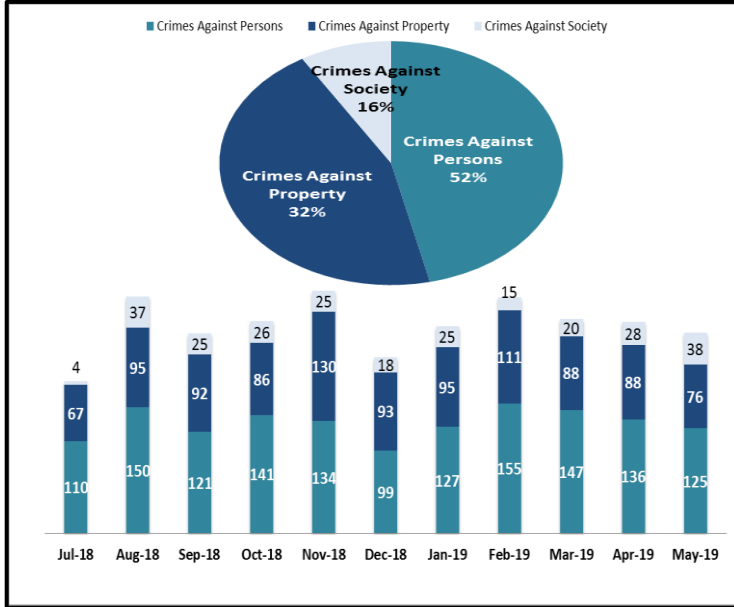
When compared to the same period last year, Crimes Against Persons increased by 9 crimes, Crimes Against Property decreased by 16 crimes, and Crimes Against Society decreased by 10 crimes.

Average Emergency Response Times

	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18	Jan-19	Feb-19	Mar-19	Apr-19	May-19
Emergency	4.80	4.58	3.96	4.46	5.74	4.88	4.50	5.90	5.50	4.71	4.61
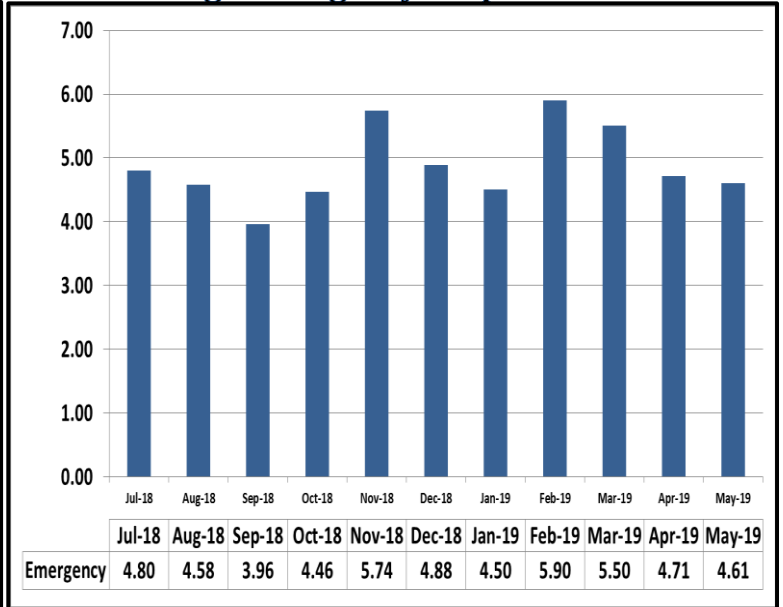
Average emergency response time was 4.61 mins.

Bus Operator Assaults

Compared to May of last year, there were four more bus operator assaults this month
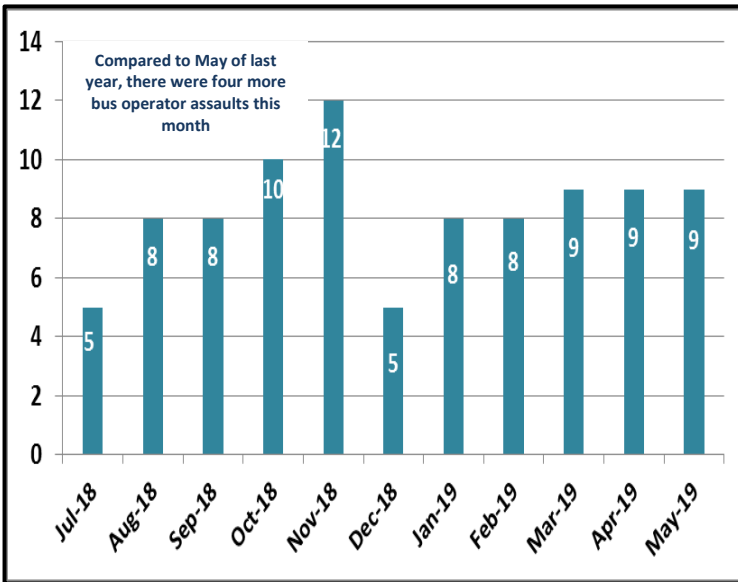
Fare Compliance
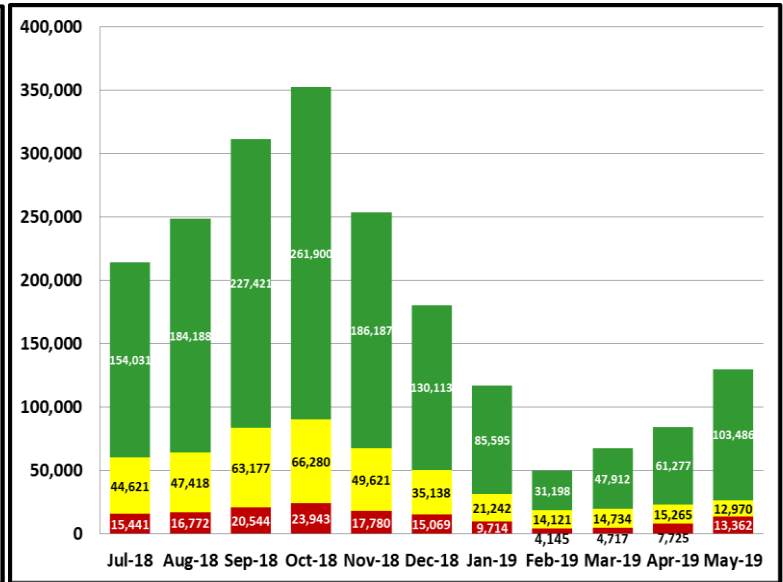
Green Checks- Occurs when a patron has valid fare

Yellow Checks- Occurs when a patron has valid fare, but did not tap at transfer station

Red Checks- Occurs when a patron has invalid fare

BLUE LINE

ATTACHMENT B

MONTHLY UPDATE ON TRANSIT POLICING PERFORMANCE - MAY 2019

REPORTED CRIME			
CRIMES AGAINST PERSONS	**LAPD**	**LASD**	**LBPD**	**FYTD**
Homicide	0	0	0	0
Rape	0	0	0	0
Robbery	1	0	0	46
Aggravated Assault	1	2	1	42
Aggravated Assault on Operator	0	0	0	0
Battery	3	5	0	65
Battery Rail Operator	0	0	0	3
Sex Offenses	1	0	0	8
SUB-TOTAL	**6**	**7**	**1**	**164**
CRIMES AGAINST PROPERTY	**LAPD**	**LASD**	**LBPD**	**FYTD**
Burglary	0	0	0	3
Larceny	5	2	0	84
Bike Theft	0	0	0	4
Motor Vehicle Theft	0	0	0	9
Arson	0	0	0	0
Vandalism	0	0	0	17
Other	0	0	0	7
SUB-TOTAL	**5**	**2**	**0**	**124**
CRIMES AGAINST SOCIETY	**LAPD**	**LASD**	**LBPD**	**FYTD**
Weapons	0	1	1	17
Narcotics	0	5	0	76
Trespassing	1	1	0	13
SUB-TOTAL	**1**	**7**	**1**	**106**
TOTAL	**12**	**16**	**2**	**394**

ARRESTS			
AGENCY	**LAPD**	**LASD**	**LBPD**	**FYTD**
Felony	6	6	4	198
Misdemeanor	4	44	44	1,107
TOTAL	**10**	**50**	**48**	**1,305**

CITATIONS			
AGENCY	**LAPD**	**LASD**	**LBPD**	**FYTD**
Other Citations	13	47	5	1,101
Vehicle Code Citations	10	13	232	1,710
TOTAL	**23**	**60**	**237**	**2,811**

CALLS FOR SERVICE			
AGENCY	**LAPD**	**LASD**	**LBPD**	**FYTD**
Routine	4	31	5	572
Priority	31	43	20	1,333
Emergency	1	3	6	443
TOTAL	**36**	**77**	**31**	**2,348**

DISPATCHED VS. PROACTIVE			
AGENCY	**LAPD**	**LASD**	**LBPD**
Dispatched	22%	2%	1%
Proactive	78%	98%	99%
TOTAL	**100%**	**100%**	**100%**

PERCENTAGE OF TIME ON THE RAIL SYSTEM	
Blue Line-LAPD	85%
Blue Line-LASD	69%
Blue Line-LBPD	0%

CRIMES PER STATION				
STATION	**CRIMES AGAINST PERSONS**	**CRIMES AGAINST PROPERTY**	**CRIMES AGAINST SOCIETY**	**FYTD**
7th St/Metro Ctr	2	1	0	13
Pico	0	1	0	7
Grand/LATTC	1	0	0	5
San Pedro St	0	0	0	6
Washington	2	1	1	11
Vernon	0	0	0	4
Slauson	0	1	3	14
Florence	1	0	0	18
Firestone	0	1	0	18
103rd St/Watts Towers	2	1	0	17
Willowbrook/Rosa Parks	4	0	3	37
Compton	0	0	1	23
Artesia	1	0	0	11
Del Amo	1	0	0	9
Wardlow	0	0	0	14
Willow St	0	0	0	9
PCH	0	0	0	1
Anaheim St	0	0	0	4
5th St	0	0	0	2
1st St	0	0	0	1
Downtown Long Beach	1	0	1	6
Pacific Av	0	0	0	4
Blue Line Rail Yard	0	0	0	3
Total	**15**	**6**	**9**	**237**

GRADE CROSSING OPERATIONS			
LOCATION	**LAPD**	**LASD**	**LBPD**	**FYTD**
Washington St	80	0	0	779
Flower St	30	0	0	273
103rd St	2	0	0	48
Wardlow Rd	0	0	4	41
Pacific Ave.	0	0	0	1
Willowbrook	0	26	0	353
Slauson	0	3	0	35
Firestone	0	3	0	52
Florence	0	8	0	102
Compton	0	34	0	252
Artesia	0	24	0	175
Del Amo	0	11	0	138
Long Beach Blvd	0	0	0	0
TOTAL	**112**	**109**	**4**	**2,249**

LEGEND
Los Angeles Police Department
Los Angeles County Sheriff's Department
Long Beach Police Department

GREEN LINE

ATTACHMENT B

MONTHLY UPDATE ON TRANSIT POLICING PERFORMANCE - MAY 2019

REPORTED CRIME			
CRIMES AGAINST PERSONS	LAPD	LASD	FYTD
Homicide	0	0	0
Rape	0	0	1
Robbery	1	1	29
Aggravated Assault	0	1	11
Aggravated Assault on Operator	0	0	0
Battery	0	3	34
Battery Rail Operator	0	0	0
Sex Offenses	0	0	10
SUB-TOTAL	1	5	85
CRIMES AGAINST PROPERTY	LAPD	LASD	FYTD
Burglary	0	0	0
Larceny	3	1	44
Bike Theft	0	0	0
Motor Vehicle Theft	1	0	9
Arson	0	0	0
Vandalism	0	0	12
SUB-TOTAL	4	1	65
CRIMES AGAINST SOCIETY	LAPD	LASD	FYTD
Weapons	0	2	11
Narcotics	0	7	42
Trespassing	0	4	7
SUB-TOTAL	0	13	60
TOTAL	5	19	210

ARRESTS			
AGENCY	LAPD	LASD	FYTD
Felony	0	9	77
Misdemeanor	0	63	407
TOTAL	0	72	484

CITATIONS			
AGENCY	LAPD	LASD	FYTD
Other Citations	0	75	574
Vehicle Code Citations	0	4	127
TOTAL	0	79	701

CALLS FOR SERVICE			
AGENCY	LAPD	LASD	FYTD
Routine	0	135	1,510
Priority	9	79	805
Emergency	2	7	112
TOTAL	11	221	2,427

DISPATCHED VS. PROACTIVE		
AGENCY	LAPD	LASD
Dispatched	19%	6%
Proactive	81%	94%
TOTAL	100%	100%

CRIMES PER STATION				
STATION	CRIMES AGAINST PERSONS	CRIMES AGAINST PROPERTY	CRIMES AGAINST SOCIETY	FYTD
Redondo Beach	0	1	0	7
Douglas	0	0	0	1
El Segundo	0	0	0	0
Mariposa	0	0	0	5
Aviation/LAX	1	2	0	5
Hawthorne/Lennox	0	0	2	7
Crenshaw	0	0	1	10
Vermont/Athens	0	0	0	11
Harbor Fwy	0	1	0	10
Avalon	0	1	0	14
Willowbrook/Rosa Parks	4	0	5	37
Long Beach Bl	1	0	3	24
Lakewood Bl	0	0	0	9
Norwalk	0	0	2	12
Total	6	5	13	152

PERCENTAGE OF TIME SPENT ON THE RAIL SYSTEM	
Green Line-LAPD	88%
Green Line-LASD	73%

LEGEND
Los Angeles Police Department
Los Angeles County Sheriff's Department

EXPO LINE

MONTHLY UPDATE ON TRANSIT POLICING PERFORMANCE - MAY 2019

REPORTED CRIME			
CRIMES AGAINST PERSONS	**LAPD**	**LASD**	**FYTD**
Homicide	0	0	0
Rape	0	0	5
Robbery	2	1	41
Aggravated Assault	1	0	22
Aggravated Assault on Operator	0	0	0
Battery	6	2	82
Battery Rail Operator	0	0	0
Sex Offenses	0	1	15
SUB-TOTAL	**9**	**4**	**165**
CRIMES AGAINST PROPERTY	**LAPD**	**LASD**	**FYTD**
Burglary	0	0	2
Larceny	5	1	133
Bike Theft	0	0	25
Motor Vehicle Theft	0	0	0
Arson	0	0	0
Vandalism	0	0	13
SUB-TOTAL	**5**	**1**	**173**
CRIMES AGAINST SOCIETY	**LAPD**	**LASD**	**FYTD**
Weapons	0	0	3
Narcotics	0	0	1
Trespassing	1	0	2
SUB-TOTAL	**1**	**0**	**6**
TOTAL	**15**	**5**	**344**

ARRESTS			
AGENCY	**LAPD**	**LASD**	**FYTD**
Felony	1	1	27
Misdemeanor	25	2	88
TOTAL	**26**	**3**	**115**

CITATIONS			
AGENCY	**LAPD**	**LASD**	**FYTD**
Other Citations	38	1	323
Vehicle Code Citations	21	0	81
TOTAL	**59**	**1**	**404**

CALLS FOR SERVICE			
AGENCY	**LAPD**	**LASD**	**FYTD**
Routine	3	43	525
Priority	44	26	471
Emergency	8	1	45
TOTAL	**55**	**70**	**1,041**

DISPATCHED VS. PROACTIVE		
AGENCY	**LAPD**	**LASD**
Dispatched	21%	12%
Proactive	79%	88%
TOTAL	**100%**	**100%**

CRIMES PER STATION				
STATION	**CRIMES AGAINST PERSONS**	**CRIMES AGAINST PROPERTY**	**CRIMES AGAINST SOCIETY**	**FYTD**
7th St/Metro Ctr	1	0	0	9
Pico	0	0	0	6
LATTC/Ortho Institute	1	0	0	10
Jefferson/USC	1	2	0	19
Expo Park/USC	0	0	0	18
Expo/Vermont	0	0	0	21
Expo/Western	1	1	0	33
Expo/Crenshaw	1	0	0	22
Farmdale	0	0	0	16
Expo/La Brea	0	0	0	16
La Cienega/Jefferson	0	0	0	18
Culver City	0	0	0	7
Palms	1	1	0	8
Westwood/Rancho Park	1	1	0	13
Expo/Sepulveda	2	0	0	12
Expo/Bundy	0	0	1	10
26th St/Bergamot	1	1	0	6
17th St/SMC	0	0	0	6
Downtown Santa Monica	3	0	0	19
Expo Line Rail Yard	0	0	0	0
Total	**13**	**6**	**1**	**269**

PERCENTAGE OF TIME SPENT ON THE RAIL SYSTEM	
Expo Line-LAPD	85%
Expo Line-LASD	96%

GRADE CROSSING OPERATIONS			
LOCATION	**LAPD**	**LASD**	**FYTD**
Exposition Blvd	113	0	2,241
Santa Monica	0	42	312
Culver City	0	1	33
TOTAL	**113**	**43**	**2,586**

LEGEND
Los Angeles Police Department
Los Angeles County Sheriff's Department

RED LINE

MONTHLY UPDATE ON TRANSIT POLICING PERFORMANCE - MAY 2019

REPORTED CRIME		
CRIMES AGAINST PERSONS	**LAPD**	**FYTD**
Homicide	0	0
Rape	0	3
Robbery	4	59
Aggravated Assault	5	69
Aggravated Assault on Operator	0	1
Battery	16	181
Battery Rail Operator	1	3
Sex Offenses	1	21
SUB-TOTAL	**27**	**337**
CRIMES AGAINST PROPERTY	**LAPD**	**FYTD**
Burglary	0	0
Larceny	15	188
Bike Theft	0	10
Motor Vehicle Theft	0	0
Arson	0	0
Vandalism	4	14
SUB-TOTAL	**19**	**212**
CRIMES AGAINST SOCIETY	**LAPD**	**FYTD**
Weapons	0	0
Narcotics	0	0
Trespassing	8	28
SUB-TOTAL	**8**	**28**
TOTAL	**54**	**577**

ARRESTS		
AGENCY	**LAPD**	**FYTD**
Felony	35	50
Misdemeanor	94	188
TOTAL	**129**	**238**

CITATIONS		
AGENCY	**LAPD**	**FYTD**
Other Citations	743	1,385
Vehicle Code Citations	91	136
TOTAL	**834**	**1521**

CALLS FOR SERVICE	
AGENCY	**LAPD**
Routine	3
Priority	116
Emergency	6
TOTAL	**125**

DISPATCHED VS. PROACTIVE	
AGENCY	**LAPD**
Dispatched	26%
Proactive	74%
TOTAL	**100%**

PERCENTAGE OF TIME SPENT ON THE RAIL SYSTEM	
Red Line- LAPD	77%

LEGEND
Los Angeles Police Department

CRIMES PER STATION				
STATION	**CRIMES AGAINST PERSONS**	**CRIMES AGAINST PROPERTY**	**CRIMES AGAINST SOCIETY**	**FYTD**
Union Station	4	0	3	54
Civic Center/Grand Park	0	0	1	13
Pershing Square	1	3	0	36
7th St/Metro Ctr	3	1	0	42
Westlake/MacArthur Park	6	1	0	52
Wilshire/Vermont	2	1	1	30
Wilshire/Normandie	0	0	0	4
Vermont/Beverly	1	1	1	16
Wilshire/Western	0	0	0	3
Vermont/Santa Monica	2	1	0	23
Vermont/Sunset	0	0	0	15
Hollywood/Western	0	0	0	16
Hollywood/Vine	4	1	0	51
Hollywood/Highland	1	2	0	29
Universal City/Studio City	0	0	0	9
North Hollywood	4	7	2	44
Red Line Rail Yard	0	0	0	0
Total	**28**	**18**	**8**	**437**

GOLD LINE

ATTACHMENT B

MONTHLY UPDATE ON TRANSIT POLICING PERFORMANCE - MAY 2019

REPORTED CRIME			
CRIMES AGAINST PERSONS	**LAPD**	**LASD**	**FYTD**
Homicide	0	0	1
Rape	0	0	1
Robbery	0	1	11
Aggravated Assault	0	0	15
Aggravated Assault on Operator	0	0	0
Battery	3	0	31
Battery Rail Operator	0	0	0
Sex Offenses	0	0	4
SUB-TOTAL	**3**	**1**	**63**
CRIMES AGAINST PROPERTY	**LAPD**	**LASD**	**FYTD**
Burglary	0	0	1
Larceny	0	2	36
Bike Theft	0	2	12
Motor Vehicle Theft	0	1	10
Arson	0	0	1
Vandalism	0	1	12
SUB-TOTAL	**0**	**6**	**72**
CRIMES AGAINST SOCIETY	**LAPD**	**LASD**	**FYTD**
Weapons	0	0	1
Narcotics	0	2	6
Trespassing	0	0	1
SUB-TOTAL	**0**	**2**	**8**
TOTAL	**3**	**9**	**143**

ARRESTS			
AGENCY	**LAPD**	**LASD**	**FYTD**
Felony	1	1	22
Misdemeanor	1	25	100
TOTAL	**2**	**26**	**122**

CITATIONS			
AGENCY	**LAPD**	**LASD**	**FYTD**
Other Citations	5	37	240
Vehicle Code Citations	0	8	105
TOTAL	**5**	**45**	**345**

CALLS FOR SERVICE			
AGENCY	**LAPD**	**LASD**	**FYTD**
Routine	1	59	690
Priority	39	118	1,161
Emergency	5	7	108
TOTAL	**45**	**184**	**1,959**

DISPATCHED VS. PROACTIVE		
AGENCY	**LAPD**	**LASD**
Dispatched	19%	3%
Proactive	81%	97%
TOTAL	**100%**	**100%**

CRIMES PER STATION				
STATION	**CRIMES AGAINST PERSONS**	**CRIMES AGAINST PROPERTY**	**CRIMES AGAINST SOCIETY**	**FYTD**
APU/Citrus College	0	2	1	16
Azusa Downtown	0	0	0	1
Irwindale	0	0	0	3
Duarte/City of Hope	1	0	0	7
Monrovia	0	1	0	6
Arcadia	0	0	0	4
Sierra Madre Villa	0	1	0	8
Allen	0	0	0	0
Lake	0	0	1	4
Memorial Park	0	0	1	4
Del Mar	0	0	0	1
Fillmore	0	0	0	3
South Pasadena	0	0	0	0
Highland Park	1	0	0	4
Southwest Museum	0	0	0	5
Heritage Square	0	0	0	2
Lincoln/Cypress	0	0	0	5
Chinatown	0	0	0	1
Union Station	0	0	0	6
Little Tokyo/Arts Dist	2	0	0	4
Pico/Aliso	0	0	0	4
Mariachi Plaza	0	0	0	8
Soto	0	0	0	3
Indiana (both LAPD & LASD)	0	0	0	6
Maravilla	0	0	0	0
East LA Civic Ctr	0	0	0	1
Atlantic	0	1	0	11
Total	**4**	**5**	**3**	**117**

PERCENTAGE OF TIME SPENT ON THE RAIL SYSTEM	
Gold Line-LAPD	87%
Gold Line-LASD	61%

GRADE CROSSING OPERATIONS			
LOCATION	**LAPD**	**LASD**	**FYTD**
Marmion Way	123	0	1,698
Arcadia Station	0	5	50
Irwindale	0	5	28
Monrovia	0	9	71
City of Pasadena	0	17	297
Magnolia Ave	0	0	0
Duarte Station	0	6	25
City Of Azusa	0	5	88
South Pasadena	0	15	110
City Of East LA	0	11	136
Figueroa St	113	0	591
TOTAL GOAL= 10	**236**	**73**	**3,094**

LEGEND
Los Angeles Police Department
Los Angeles County Sheriff's Department

ORANGE LINE

MONTHLY UPDATE ON TRANSIT POLICING PERFORMANCE - MAY 2019

REPORTED CRIME		
CRIMES AGAINST PERSONS	**LAPD**	**FYTD**
Homicide	0	0
Rape	0	0
Robbery	0	8
Aggravated Assault	2	13
Aggravated Assault on Operator	0	1
Battery	2	12
Battery Bus Operator	0	2
Sex Offenses	2	2
SUB-TOTAL	**6**	**38**
CRIMES AGAINST PROPERTY	**LAPD**	**FYTD**
Burglary	0	0
Larceny	1	17
Bike Theft	0	3
Motor Vehicle Theft	0	0
Arson	0	0
Vandalism	0	11
SUB-TOTAL	**1**	**31**
CRIMES AGAINST SOCIETY	**LAPD**	**FYTD**
Weapons	0	0
Narcotics	0	0
Trespassing	0	0
SUB-TOTAL	**0**	**0**
TOTAL	**7**	**69**

ARRESTS		
AGENCY	**LAPD**	**FYTD**
Felony	1	5
Misdemeanor	2	18
TOTAL	**3**	**23**

CITATIONS		
AGENCY	**LAPD**	**FYTD**
Other Citations	428	3,813
Vehicle Code Citations	249	2,976
TOTAL	**677**	**6,789**

CALLS FOR SERVICE		
AGENCY	**LAPD**	**FYTD**
Routine	0	0
Priority	7	7
Emergency	1	1
TOTAL	**8**	**8**

DISPATCHED VS. PROACTIVE	
AGENCY	**LAPD**
Dispatched	14%
Proactive	86%
TOTAL	**100%**

CRIMES PER STATION				
STATION	**CRIMES AGAINST PERSONS**	**CRIMES AGAINST PROPERTY**	**CRIMES AGAINST SOCIETY**	**FYTD**
North Hollywood	1	1	0	7
Laurel Canyon	0	0	0	0
Valley College	0	0	0	0
Woodman	0	0	0	3
Van Nuys	3	0	0	12
Sepulveda	0	0	0	2
Woodley	0	0	0	1
Balboa	1	0	0	10
Reseda	0	0	0	5
Tampa	0	0	0	0
Pierce College	0	0	0	0
De Soto	0	0	0	1
Canoga	1	0	0	9
Warner Center	0	0	0	0
Sherman Way	0	0	0	1
Roscoe	0	0	0	0
Nordhoff	0	0	0	1
Chatsworth	0	0	0	1
Total	**6**	**1**	**0**	**53**

PERCENTAGE OF TIME SPENT ON THE BUS SYSTEM	
Orange Line- LAPD	87%

LEGEND
Los Angeles Police Department

SILVER LINE

MONTHLY UPDATE ON TRANSIT POLICING PERFORMANCE - MAY 2019

REPORTED CRIME			
CRIMES AGAINST PERSONS	**LAPD**	**LASD**	**FYTD**
Homicide	0	0	0
Rape	0	0	0
Robbery	1	0	4
Aggravated Assault	0	0	3
Aggravated Assault on Operator	0	0	0
Battery	0	0	6
Battery Bus Operator	0	0	0
Sex Offenses	0	0	0
SUB-TOTAL	**1**	**0**	**13**
CRIMES AGAINST PROPERTY	**LAPD**	**LASD**	**FYTD**
Burglary	0	0	0
Larceny	1	0	4
Bike Theft	0	0	2
Motor Vehicle Theft	0	0	0
Arson	0	0	0
Vandalism	0	0	3
SUB-TOTAL	**1**	**0**	**9**
CRIMES AGAINST SOCIETY	**LAPD**	**LASD**	**FYTD**
Weapons	0	0	0
Narcotics	0	0	0
Trespassing	0	0	0
SUB-TOTAL	**0**	**0**	**0**
TOTAL	**2**	**0**	**22**

ARRESTS			
AGENCY	**LAPD**	**LASD**	**FYTD**
Felony	0	0	7
Misdemeanor	0	1	28
TOTAL	**0**	**1**	**35**

CITATIONS			
AGENCY	**LAPD**	**LASD**	**FYTD**
Other Citations	439	0	3,818
Vehicle Code Citations	340	0	3,660
TOTAL	**779**	**0**	**7,478**

CALLS FOR SERVICE			
AGENCY	**LAPD**	**LASD**	**FYTD**
Routine	2	0	6
Priority	5	0	28
Emergency	3	0	9
TOTAL	**10**	**0**	**43**

DISPATCHED VS. PROACTIVE		
AGENCY	**LAPD**	**LASD**
Dispatched	12%	0%
Proactive	88%	100%
TOTAL	**100%**	**100%**

CRIMES PER STATION				
STATION	**CRIMES AGAINST PERSONS**	**CRIMES AGAINST PROPERTY**	**CRIMES AGAINST SOCIETY**	**FYTD**
El Monte	0	0	0	0
Cal State LA	0	0	0	0
LAC/USC Medical Ctr	0	0	0	0
Alameda	0	0	0	0
Downtown	0	0	0	1
37th St/USC	0	0	0	1
Slauson	0	0	0	1
Manchester	0	1	0	2
Harbor Fwy	0	0	0	3
Rosecrans	0	0	0	1
Harbor Gateway Transit Ctr	1	0	0	3
Carson	0	0	0	0
PCH	0	0	0	2
San Pedro/Beacon	0	0	0	1
Total	**1**	**1**	**0**	**15**

PERCENTAGE OF TIME SPENT ON THE BUS SYSTEM	
Silver Line- LAPD	91%
Silver Line- LASD	83%

LEGEND
Los Angeles Police Department
Los Angeles County Sheriff's Department

BUS PATROL

ATTACHMENT B

MONTHLY UPDATE ON TRANSIT POLICING PERFORMANCE - MAY 2019

REPORTED CRIME			
CRIMES AGAINST PERSONS	LAPD	LASD	FYTD
Homicide	0	0	0
Rape	0	0	0
Robbery	11	1	100
Aggravated Assault	4	1	82
Aggravated Assault on Operator	0	1	14
Battery	14	4	226
Battery Bus Operator	4	3	69
Sex Offenses	3	1	39
SUB-TOTAL	36	11	530
CRIMES AGAINST PROPERTY	LAPD	LASD	FYTD
Burglary	0	0	2
Larceny	20	4	211
Bike Theft	0	1	25
Motor Vehicle Theft	0	0	2
Arson	0	0	0
Vandalism	1	3	39
SUB-TOTAL	21	8	279
CRIMES AGAINST SOCIETY	LAPD	LASD	FYTD
Weapons	0	0	10
Narcotics	0	5	48
Trespassing	0	0	7
SUB-TOTAL	0	5	65
TOTAL	57	24	874

LASD's Crimes per Sector		
Sector		FYTD
Westside	1	20
San Fernando	1	4
San Gabriel Valley	5	20
Gateway Cities	5	36
South Bay	12	48
Total	24	128

LAPD's Crimes per Sector		
Sector		FYTD
Valley Bureau		
Van Nuys	1	11
West Valley	0	4
North Hollywood	1	10
Foothill	0	4
Devonshire	3	6
Mission	2	7
Topanga	1	10
Central Bureau		
Central	6	52
Rampart	0	26
Hollenbeck	2	8
Northeast	0	7
Newton	8	31
West Bureau		
Hollywood	3	12
Wilshire	3	32
West LA	0	16
Pacific	0	N/A
Olympic	4	43
Southwest Bureau		
Southwest	6	93
Harbor	1	4
77th Street	11	88
Southeast	5	16
Total	57	480

ARRESTS			
AGENCY	LAPD	LASD	FYTD
Felony	1	8	78
Misdemeanor	6	60	425
TOTAL	7	68	503

CITATIONS			
AGENCY	LAPD	LASD	FYTD
Other Citations	28	66	501
Vehicle Code Citations	0	41	293
TOTAL	28	107	794

CALLS FOR SERVICE			
AGENCY	LAPD	LASD	FYTD
Routine	3	98	1,173
Priority	16	128	2,117
Emergency	3	19	238
TOTAL	22	245	3,528

DISPATCHED VS. PROACTIVE		
AGENCY	LAPD	LASD
Dispatched	38%	2%
Proactive	62%	98%
TOTAL	100%	100%

PERCENTAGE OF TIME SPENT ON THE BUS SYSTEM	
LAPD BUS	86%
LASD BUS	77%

LEGEND
Los Angeles Police Department
Los Angeles County Sheriff's Department

UNION STATION

MONTHLY UPDATE ON TRANSIT POLICING PERFORMANCE - MAY 2019

REPORTED CRIME		
CRIMES AGAINST PERSONS	**LAPD**	**FYTD**
Homicide	0	0
Rape	0	0
Robbery	1	7
Aggravated Assault	0	19
Aggravated Assault on Operator	0	0
Battery	5	46
Battery Rail Operator	0	0
Sex Offenses	1	9
SUB-TOTAL	**7**	**81**
CRIMES AGAINST PROPERTY	**LAPD**	**FYTD**
Burglary	0	2
Larceny	1	67
Bike Theft	0	6
Motor Vehicle Theft	0	0
Arson	0	0
Vandalism	1	11
SUB-TOTAL	**2**	**86**
CRIMES AGAINST SOCIETY	**LAPD**	**FYTD**
Weapons	0	0
Narcotics	0	0
Trespassing	0	12
SUB-TOTAL	**0**	**12**
TOTAL	**9**	**179**

ARRESTS		
AGENCY	**LAPD**	**FYTD**
Felony	2	33
Misdemeanor	4	89
TOTAL	**6**	**122**

CITATIONS		
AGENCY	**LAPD**	**FYTD**
Other Citations	21	113
Vehicle Code Citations	5	31
TOTAL	**26**	**144**

CALLS FOR SERVICE		
AGENCY	**LAPD**	**FYTD**
Routine	4	**4**
Priority	43	**43**
Emergency	7	**7**
TOTAL	**54**	**54**

DISPATCHED VS. PROACTIVE	
AGENCY	**LAPD**
Dispatched	23%
Proactive	77%
TOTAL	**100%**

PERCENTAGE OF TIME SPENT AT UNION STATION	
LOCATION	**LAPD**
Union Station	83%

LEGEND
Los Angeles Police Department

Crimes Against Persons, Property, and Society

■ Crimes Against Persons ■ Crimes Against Property ■ Crimes Against Society

Crimes Against Society 16%
Crimes Against Persons 52%
Crimes Against Property 32%

Month	Persons	Property	Society
Jul-18	110	67	4
Aug-18	150	95	37
Sep-18	121	92	25
Oct-18	141	86	26
Nov-18	134	130	25
Dec-18	99	93	18
Jan-19	127	95	25
Feb-19	155	111	15
Mar-19	147	88	20
Apr-19	136	88	28
May-19	125	76	38

Average Emergency Response Times

	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18	Jan-19	Feb-19	Mar-19	Apr-19	May-19
Emergency	4.80	4.58	3.96	4.46	5.74	4.88	4.50	5.90	5.50	4.71	4.61
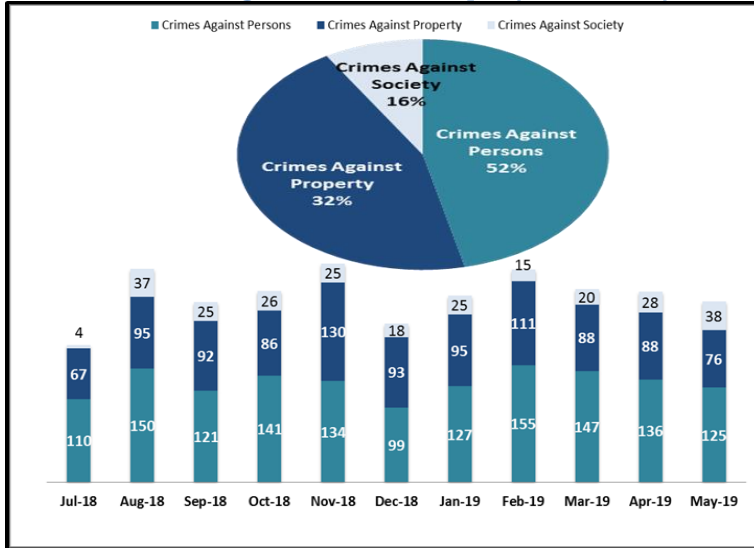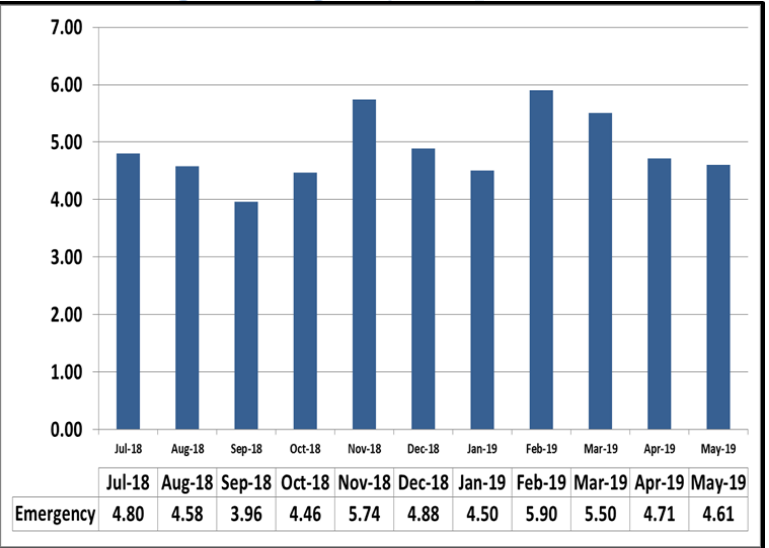
Percentage of Time Spent on the System

■ Percentage of Time Spent on System
■ Time Spent Doing Other Law Enforcement Duties

	Percentage of Time Spent on System	Time Spent Doing Other Law Enforcement Duties
Rail	75%	25%
Bus	82%	19%
Orange Line	87%	13%
Silver Line	87%	13%

Percentage of Time Spent on the System as a Whole

- Bus 10%
- Rail 44%
- Orange Line 10%
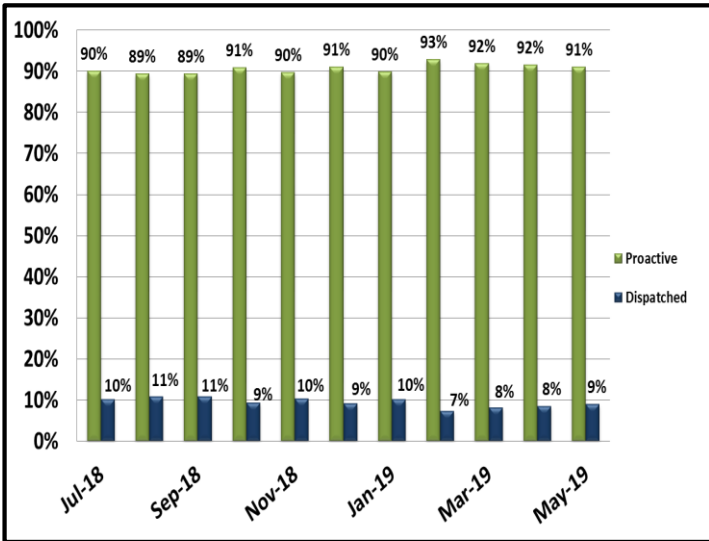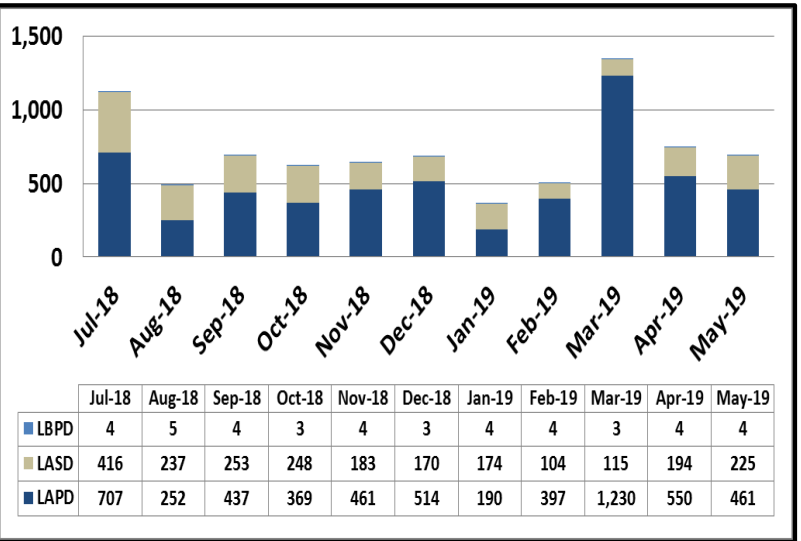- Silver Line 10%
- Other 26%
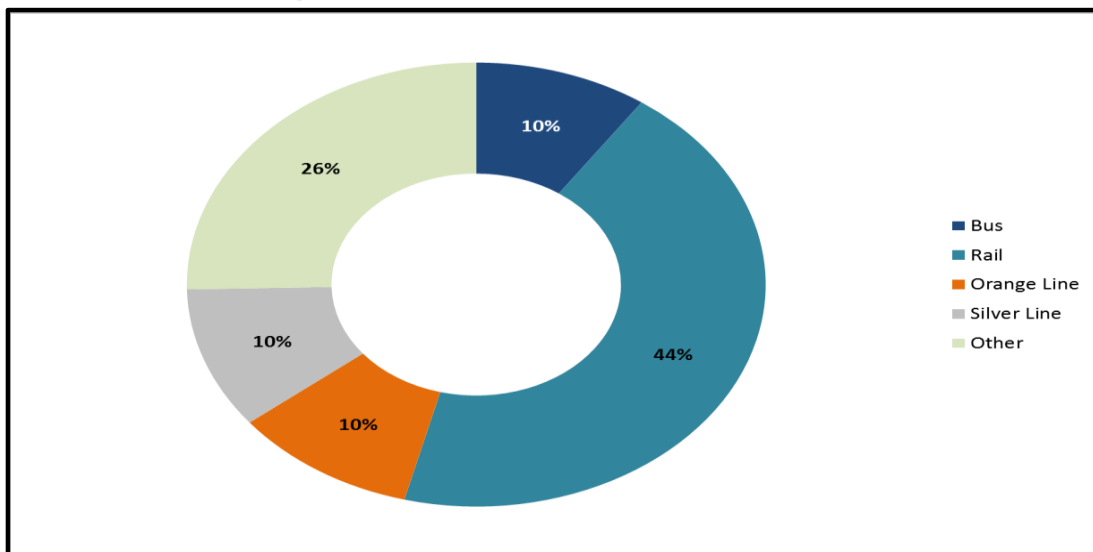
KEY PERFORMANCE INDICATORS
MAY 2019

Ratio of Staffing Levels vs Vacant Assignments
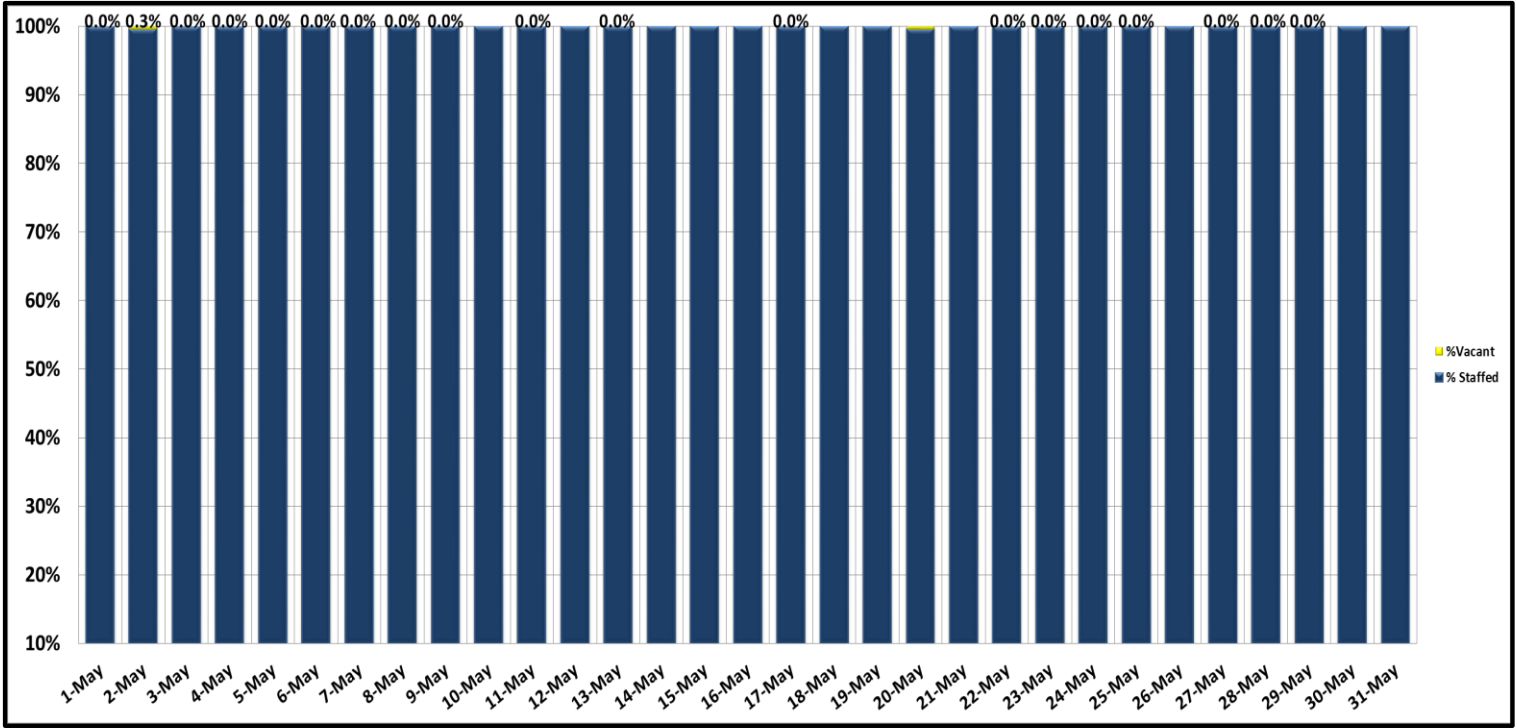
Ratio of Proactive vs Dispatched Activity

Grade Crossing Operations

	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18	Jan-19	Feb-19	Mar-19	Apr-19	May-19
LBPD	4	5	4	3	4	3	4	4	3	4	4
LASD	416	237	253	248	183	170	174	104	115	194	225
LAPD	707	252	437	369	461	514	190	397	1,230	550	461

Grade Crossing Operation Locations May:

1. Blue Line Stations (225)
2. Expo Line Stations (156)
3. Gold Line Stations (309)

Transit Police
Monthly Crime Report

	2018	2019
	May	**May**
CRIMES AGAINST PERSONS		
Homicide	0	0
Rape	3	0
Robbery	19	25
Aggravated Assault	13	18
Aggravated Assault on Operator	0	1
Battery	63	63
Battery Rail Operator	5	8
Sex Offenses	13	10
SUB-TOTAL	**116**	**125**
CRIMES AGAINST PROPERTY		
Burglary	0	0
Larceny	69	61
Bike Theft	7	3
Motor Vehicle Theft	1	2
Arson	0	0
Other	0	0
Vandalism	15	10
SUB-TOTAL	**92**	**76**
CRIMES AGAINST SOCIETY		
Weapons	9	4
Narcotics	26	19
Trespassing	13	15
SUB-TOTAL	**48**	**38**
TOTAL	**256**	**239**
ENFORCEMENT EFFORTS		
Arrests	271	451
Citations	1,694	2,960
Fare Checks	280,585	129,818
Calls for Service	1,501	1,194

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To provide excellence in service and support

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Board Report

File #: 2019-0529, **File Type:** Oral Report / Presentation

Agenda Number: 39.

EXECUTIVE MANAGEMENT COMMITTEE
JULY 18, 2019

SUBJECT: **P3 PROGRAM UPDATE**

ACTION: **ORAL REPORT**

RECOMMENDATION

RECEIVE oral update on P3 Program.

P3 Program Update
Innovative Project Delivery:
P3 Unsolicited Proposals & Project Implementation

OFFICE OF EXTRAORDINARY
INNOVATION

Executive Management Committee
LA Metro Board of Directors
July 2019

Overview

1. **Unsolicited Proposal Update**
   - Progress update on existing reviews
   - New proposals

2. **P3 Projects Status Update**
   - P3 Project Development Overview
   - P3 Project Updates

3. **Programmatic Activities**

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P3 Unsolicited Proposal Update

P3 Delivery or Private Financing Solutions Currently Under Consideration

> LA Streetcar Acceleration
>> o Deferral of UP consideration to refine federal grant application

> Performance-Based Facility Roof Rehab & Maintenance P3
>> o Benchmarking underway to assess asset conditions

> Managed Bus and Toll Lane Network
>> o Phase II request for information pending

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P3 Unsolicited Proposal Update

P3 Delivery or Private Financing Solutions Currently Under Consideration

> Technology-Enhanced Vermont BRT Corridor
>> o Phase II request for information pending

> Zero-Emission Bus Electrification Infrastructure
>> o Two proposals received & advanced for Phase II analysis

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P3 Project Development Overview

Internal process established to guide evaluation of P3 delivery for planned transit projects

> Based on P3 best-practice from around the world

> Identify, evaluate, develop, & execute P3 projects in a predictable & manageable way

> Aligns with Project Development timeline & NEPA/ CEQA milestones

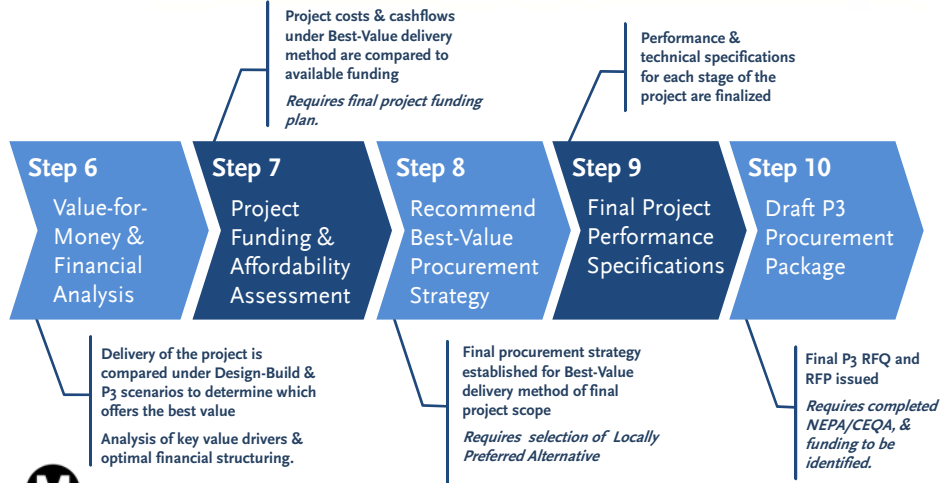> Ensure potential P3 procurements don't "get ahead of" project development

(M) Metro

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P3 Development Process

Projects identified through evaluation of Unsolicited Proposals or internal staff screening

Interviews of P3 industry participants to evaluate potential market interest & gather information about project risks & opportunities

Project's risks across all lifecycle phases identified & evaluated

Step 1 — Project Screening & Identification

Step 2 — Qualitative Project Assessment

Step 3 — Market Sounding

Step 4 — Project Cost Report

Step 5 — Project Risk Assessment

Project characteristics evaluated for key risks & opportunities

Requires a project concept alternative & major project characteristics to be defined

Initial project Lifecycle Cost Report covering construction, O&M, & rehabilitation/SGR

Requires project level of design minimum of 5-10 percent. Greater design desirable for more complex or risky projects

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P3 Development Process

Project costs & cashflows under Best-Value delivery method are compared to available funding

Requires final project funding plan.

Performance & technical specifications for each stage of the project are finalized

Step 6 — Value-for-Money & Financial Analysis

Step 7 — Project Funding & Affordability Assessment

Step 8 — Recommend Best-Value Procurement Strategy

Step 9 — Final Project Performance Specifications

Step 10 — Draft P3 Procurement Package

Delivery of the project is compared under Design-Build & P3 scenarios to determine which offers the best value

Analysis of key value drivers & optimal financial structuring.

Final procurement strategy established for Best-Value delivery method of final project scope

Requires selection of Locally Preferred Alternative

Final P3 RFQ and RFP issued

Requires completed NEPA/CEQA, & funding to be identified.

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Summary of Current P3 Projects

West Santa Ana Branch LRT

> **Status:** Value-for-Money (VfM) & Financial Analysis
> o Next Steps: Develop financial inputs for VfM modelling

Sepulveda Transit Corridor PDA

> **Status:** PDA Solicitation Package Drafting
> o Next Steps: Release PDA solicitation (est. Sept./Oct.)
>   **P3 activities to occur after initial project development phase*

East San Fernando Valley LRT

> Status: Step 3 – Market Sounding
> o Next Steps: Finalize project cost report & risk assessment

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Programmatic P3 Activities

Metro continues to build it's P3 program as a Center of Excellence to be "RFP-ready"

> Model P3 RFQ/RFP & Project Agreement development

> Peer-learning with P3 procurement agencies in Ontario and Vancouver, CA

> Collaboration with Association for the Improvement of American Infrastructure P3 industry group

> American Road & Transportation Builders Association P3 Owners' Forum

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Board Report

File #: 2019-0511, **File Type:** Federal Legislation / State Legislation (Position)   **Agenda Number:** 41.

**EXECUTIVE MANAGEMENT COMMITTEE
JULY 18, 2019**

SUBJECT: FEDERAL LEGISLATION

ACTION: ADOPT STAFF RECOMMENDED POSITION

RECOMMENDATION

ADOPT staff recommended position:

A.   House Resolution 2723 (Lowenthal) - Economy in Motion: The National Multimodal and
      Sustainable Freight Infrastructure Act **SUPPORT**

ATTACHMENT
Attachment A - HR 2723 (Lowenthal) Legislative Analysis

Prepared by: Michael Davies, Senior Manager, Federal Affairs, (213) 841-4990
           Raffi Hamparian, Senior Director, Federal Affairs & Government Relations (213) 922-3769

Reviewed by: Yvette Rapose, Interim Chief Communications Officer, (213) 418-3154

Phillip A. Washington
Chief Executive Officer

BILL: HOUSE RESOLUTION 2723

AUTHOR: CONGRESSMAN ALAN LOWENTHAL (D-LONG BEACH)

SUBJECT: ECONOMY IN MOTION: THE NATIONAL MULTIMODAL AND SUSTAINABLE FREIGHT INFRASTRUCTURE ACT

STATUS: HOUSE COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE; HOUSE COMMITTEE ON WAYS AND MEANS

ACTION: SUPPORT

RECOMMENDATION

Staff recommends that the Board of Directors adopt a SUPPORT position on House Resolution 2723 (Lowenthal), the National Multimodal and Sustainable Freight Infrastructure Act.

ISSUE

H.R. 2723 (Lowenthal) would establish a Freight Transportation Infrastructure Trust Fund and create a freight specific formula and competitive grant program for multimodal projects. Specifically, H.R. 2723 offers a dedicated revenue source by implementing a proposed national 1% waybill fee. The entity paying for the cargo to be shipped via ground transportation within the United States would be required to pay a fee of 1% of the total cost of transportation.

DISCUSSION

In 2015, Congress passed the bipartisan Fixing America's Surface Transportation (FAST) Act, which for the first time outlined a national freight policy and set up both formula and competitive programs to invest in these systems. The FAST Act funded both of these programs through 2021, but because the Highway Trust Fund is not able to provide the amount of funding necessary to keep up with the nation's infrastructure needs, it is important to identify and support sustainable funding sources that will be dedicated for goods movement projects.

Goods movement is a significant economic engine in Los Angeles County, with the Ports of Los Angeles and Long Beach handling well over 40% of all cargo shipped into the United States. Communities that surround Los Angeles County's ports experience a high level of congestion and negative environmental impacts as a result of the large amount of cargo exiting the County's two ports as it is transported to rail yards and warehouses across Los Angeles County and surrounding counties. Through the creation of a program aimed at improving the movement of goods, residents, commuters and businesses will benefit from less congestion and improved air quality.

Consistent with Metro's 2019 Board-approved Federal Legislative Program in support of creating a fully funded federal freight program; H.R. 2723 (Lowenthal) establishes a Freight Transportation Infrastructure Trust Fund, a formula and competitive multimodal grant program, and incorporates these programs into existing FAST Act freight program

criteria. The program would generate funding through the collection of fees for transporting cargo nationally.

The estimated $10 billion in annual funds collected from this proposed fee would be deposited into a Freight Transportation Infrastructure Trust Fund and then be distributed equally between the existing National Multimodal Freight Funding Formula Program and the National Freight Infrastructure Multimodal Competitive Grant Program (currently known as the Infrastructure for Rebuilding America program, or INFRA) created in the FAST Act. Qualifying projects could include capital freight projects on roads, rail, intermodal connectors, including first and last mile connectors, rail grade separations, on-dock rail and landside infrastructure on ports and airports included in a State Freight Plan.

Metro is currently developing the Los Angeles County Goods Movement Strategic Plan in coordination with many of the regional partners in the County involved in the goods movement sector. Funding created through H.R. 2723 will support the implementation of projects, pilots, and programs identified in this plan as priorities for the county.

Staff believes that H.R. 2723 could be adopted in any infrastructure package offered or incorporated into the next surface transportation reauthorization bill (the current bill expires in September of 2020).

For these reasons, staff recommends the Board adopt a SUPPORT position on the measure H.R. 2723.

DETERMINATION OF SAFETY IMPACT
There is no determined safety impact due to the enactment of the proposed legislation.

IMPLEMENTATION OF STRATEGIC PLAN GOALS
Staff recommendation supports strategic plan goal # 4.2: Metro will help drive mobility agendas, discussions and policies at the state, regional and national levels.

FINANCIAL IMPACT
This bill could have a positive financial impact on our agency as it provides additional federal funding that Metro and its regional partners could utilize for goods movement projects across Los Angeles County.

ALTERNATIVES CONSIDERED
Staff has considered adopting an oppose position on the bill. Adopting an oppose position on the bill would be counter to the advocacy efforts as outlined in the Board-approved 2019 Federal Legislative Program.

NEXT STEPS
Should the Board adopt a SUPPORT position on this measure; staff will communicate the Board's position to the author and work with Congress to ensure its adoption into law. Staff will continue to keep the Board informed as this issue is addressed throughout the 116th Congress.

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Metropolitan Transportation
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Los Angeles, CA

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Board Report

File #: 2019-0489, **File Type:** Plan   **Agenda Number:** 42.

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EXECUTIVE MANAGEMENT COMMITTEE
JULY 18, 2019

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SUBJECT: **METRO CLIMATE ACTION AND ADAPTATION PLAN**

ACTION: **ADOPT PLAN**

RECOMMENDATION

ADOPT the Metro Climate Action and Adaptation Plan.

ISSUE

In 2012, the Los Angeles County Metropolitan Transportation Authority (Metro) released the Climate Action and Adaptation Plan (CAAP), establishing a framework for reducing greenhouse gas emissions and building the agency's resilience to the effects of climate change. The 2012 CAAP needs to be updated to reflect the current state of science and policy regulations and to conform to LA Metro's commitments under Measure R, Measure M and acceleration of the completion of 28 projects by 2028.

BACKGROUND

Metro's 2012 CAAP established a framework for reducing our greenhouse gas emissions and building resilience to minimize the impacts of climate change. Metro has worked to embed climate action into systems, assets and operations to create a resilient and forward-thinking Agency prepared for a changing future since 2012.

Metro is at the forefront of implementing visionary climate impact reducing strategies. Our projects and activities have been cited in recommended practice and best practice reports produced by the American Public Transportation Association, the Transportation Research Board, and most recently by the State of California in the report *Paying It Forward: The Path Toward Climate-Safe Infrastructure In California*
<http://resources.ca.gov/climate/climate-safe-infrastructure-working-group/>). Metro staff has been actively involved in all of these activities. ***But these are not enough.***
Metro has accomplished much in climate impact reducing programs and infrastructure since the 2012 CAAP was released. Staff believes that more ambitious goals for the near and long term developed through this 2012 CAAP update process will ensure that the assets we currently have and that we are building through the Measure R and Measure M capital programs are able to withstand more frequent and extreme weather events. More importantly, the strategies in this update will ensure that our agency can continually provide essential services to all our customers despite the changing

baseline environmental conditions related to climate change. The 2019 CAAP will build upon the plans, initiatives, and programs created since the 2012 CAAP, while creating a visionary path for minimizing our greenhouse gas emission impacts to the environment and building resilience in our infrastructure and communities.

The 2019 CAAP:

- Provides an update on what Metro has accomplished and how approaches to climate action have changed since the 2012 CAAP;
- Summarizes current and projected greenhouse gas emissions from Metro operations;
- Describes how climate change could affect Metro's system and operations; and
- Identifies steps to reduce emissions and increase resilience to climate change.

The 2019 CAAP was developed by our Environmental Compliance and Sustainability Division (ECSD) staff in partnership with Enterprise Transit Asset Management, Emergency Management, Safety, Communications, Operations, Engineering, and Countywide Planning and Development.

DISCUSSION

The 2019 CAAP identifies the actions Metro will be undertaking to reduce our climate change impacts through two broad strategies:

- Reducing Metro's greenhouse gas emissions, which contribute to climate change, and
- Increasing the resiliency of the Metro system and service to the effects of extreme weather events and long-term climate changes.

The 2019 CAAP provides a summary of the greenhouse gas mitigation and climate resilience goals, strategies and actions as well as a discussion of our stakeholder engagement and the results of that engagement. Emerging issues associated with implementation, including ***prioritization of opportunities for feasible acceleration,*** are also discussed.

As outlined in the CAAP, these strategies and actions will be implemented in a variety of ways. Many strategies and actions are tied to procurement decisions. A related Board action for staff to implement a Metro Sustainable Acquisition Plan (SAP) was presented for approval in the June 2019 Board Meeting. Our ability to reduce greenhouse gas emissions and promote sustainability and environmental stewardship directly through our agency's procurement actions are addressed in the SAP.

A summary of the greenhouse gas mitigation and climate resilience goals is provided below:

- **GHG Mitigation Goals**

  o Reduce GHG emissions by 79% below 2017 levels by 2030

  o Achieve zero emissions by 2050

- **Climate Resilience Goal**

  o Create a climate resilient organization and transit system: prepared, ready and able to

provide consistent services to the people of LA County

Greenhouse Gas Mitigation

Metro has implemented a significant number of greenhouse gas emissions reduction strategies since 2012 and is on track to reduce agency operational emissions in support of the State's targets for greenhouse gas emissions reductions. Since the 2012 CAAP 2012, Metro has transitioned its bus fleet fuel from fossil natural gas to renewable natural gas, implemented numerous energy-efficient lighting, and expanded on-site renewable energy installations in the form of solar and flywheel technologies. These changes, plus the impact of state and federal policies to reduce emissions from a variety of sectors, drove Metro's greenhouse gas emissions ***down by nearly 12%*** from 2010 to 2017- *despite approximately 4% increase in service*.

Through Metro's ongoing business as usual efforts to adopt new transportation technologies and the continued impact of California's aggressive climate policies, staff projects that Metro's greenhouse gas emissions will continue to decline to 57% below 2017 levels by 2030 and 81% by 2050. While this trajectory is substantial, it is not enough. More ambitious targets for greenhouse gas reduction are necessary to minimize the impacts of climate change. Through the strategies identified in the 2019 CAAP, Metro commits to reduce direct agency greenhouse gas emissions to 79% relative to 2017 levels by 2030 and 100% (i.e., zero emissions) by 2050.

Thirteen measures have been identified to reduce emissions from every aspect of Metro's operations by 2050:

1. Switch directly operated buses to battery-powered technologies
2. Deploy battery-powered buses in the contracted fleet
3. Switch vanpool vehicles to battery-powered vehicles
4. Replace non-revenue vehicles with battery-powered vehicles
5. Install systems to store energy captured from trains
6. Buy 100% renewable energy
7. Install photovoltaic systems
8. Install water-saving fixtures
9. Install non-potable recycled water systems
10. Install LED lights at facilities
11. Install electric heating systems
12. Replace facility appliances with more efficient electric appliances
13. Install electric vehicle charging at Metro facilities and implement an employee electric vehicle outreach plan

If fully implemented, these measures are projected to avoid more than 416,000 metric tons of annual carbon dioxide emissions-the equivalent of the annual emissions of more than 88,000 passenger vehicles, while also providing net cost savings and environmental co-benefits like air quality and drought resilience.

Building Resilience

Reducing greenhouse gas emissions can help slow the pace of climate change, but it cannot stop it. California's climate is already changing, and scientists expect the changes to intensify in the years

and decades ahead. These changes pose risks to Metro's infrastructure, services, riders and employees. More extreme climate and weather conditions could interrupt service and cause delays. They could also bring safety risks; increased operation, maintenance and repair costs; and reduce Metro's ability to provide emergency services to other partners in the region.

Building climate resilience is a risk-reduction strategy. Taking actions today can avoid future major costs, disruptions to service and safety risks. Metro's goal is to create a climate-resilient organization and transit system prepared, ready and able to continue to provide services to the people of LA County no matter what the future brings.

Resilience thinking is already part of Metro's daily business culture. Most planning and building decisions already include climate-resilience strategies, but there is more to be done. Metro will ensure climate-resilience is considered more thoroughly when making decisions related to planning, designing, construction, procurement, internal protocols and more, while also developing solutions that can be implemented gradually and modified as new information becomes available, minimizing costs and disruptions to service.

A climate-resilient Metro will plan proactively to reduce impacts due to climate change while ensuring climate resilience is pursued equitably across user groups and communities by:

1. Making climate resilience an organizational priority and integrating it throughout planning and daily operations.
2. Establishing a flexible approach to adaptation that can be monitored and adjusted over time as scientists improve their understanding of climate change and its impacts.

Stakeholder Engagement

Input from staff, riders, and other key external stakeholders was a critical and valuable component of developing and evaluating the goals of the 2019 CAAP. The 2019 CAAP incorporated input through the following engagement opportunities:

- Staff interviews
  - Since March 2018, ECSD staff interviewed Metro staff throughout the agency. These interviews were primarily conducted during scheduled Environmental Management System (EMS) Core Team meetings at the operating divisions. Four Bus Divisions (Divisions 9, 10, 13, and 15), five Rail Divisions (Divisions 11, 20, 21, 22, and 24), and the Central Maintenance Facility (Division 30) were interviewed. The EMS Administration group, which includes executives from Corporate Safety, Quality Assurance, Operations and Maintenance, was also interviewed. Metro staff were also engaged as part of Metro's quarterly "Growing a Greener Workforce" (GGW) meetings, which includes Metro employees who are interested in incorporating sustainability into their respective departments and have an environmental certification or credential. Employees who participated in the CAAP from the GGW included Contract Management, ITS, Public Relations, Community Relations, Systemwide Design, Government Relations, and Emergency Management. Other Metro groups interviewed included Construction Management, Facilities Engineering, Emergency Management, Enterprise Transit Asset Management, Systems Engineering, Countywide Planning and

Development, and Wayside Systems.

- Metro Sustainability Council
    - The Metro Sustainability Council has provided an objective forum for external collaboration for the 2019 CAAP. Staff presented to the Sustainability Council monthly from October 2018 to April 2019, including two workshops with councilmembers. The engagement strategy for the CAAP was developed with guidance and concurrence from the Sustainability Council's executive committee and consistent with the Sustainability Council Meetings Arc. As a result of meaningful feedback from the Sustainability Council, Metro augmented its engagement strategy to include additional touchpoints and add review time to the draft CAAP. Following the two workshops, staff presented to the Sustainability Council on how stakeholder input has been incorporated into the CAAP. A comprehensive comment review matrix was developed to facilitate stakeholder tracking of input received (Attachment B). The Metro Sustainability Council unanimously endorsed the CAAP during its July 12, 2019 meeting.

- Rider survey
    - In 2019, Metro conducted the first rider survey on climate change, asking for impressions and concerns related to climate risks, including information on how extreme weather events affect riders' comfort and convenience. The survey was deployed from January 8, 2019 through February 11th, 2019 and received nearly 400 responses. The survey was advertised online through emails and posts on Metro's the Source and Twitter. Additionally, staff attended 10 of the NextGen public workshops between January 8th and February 6th, 2019. At the workshops, staff provided flyers in English and Spanish that explained the survey and directed community members to the survey's link. For community members who could not access the survey via a computer or cell phone, a laptop was available to take the survey in-person with staff assistance.

Implementing the 2019 CAAP

Meeting these goals will require bold action. To manage change effectively, Metro will need to consider several emerging issues and address potential barriers to action. Five overarching principles will guide the 2019 CAAP implementation process:

Principle 1: Embrace Climate Leadership
Implementing the 2019 CAAP requires leadership, collaboration and bold action from Metro senior leadership; participation from Metro's entire workforce to contribute to an organizational culture of climate leadership; and active engagement from Metro's vast network of stakeholders to provide critical input and advice. All of these teams will work to reduce emissions and increase resilience while also aligning with other Metro priorities, such as equity goals outlined in the Equity Platform Framework, infrastructure and operational goals set out in the Long Range Transportation Plan and Agency level goals identified in Vision 2028 Strategic Plan.

Principle 2: Secure Funding and Prioritize Resources
While many resources already designated for planning, designing, building and operating the Metro system can be leveraged in pursuit of climate action, additional resources will be required to

implement the CAAP. Climate action must be reflected across all funding strategies and identified within both department and project budgets.

Wherever feasible, partnerships should be leveraged to jointly support climate related initiatives. This can be accomplished by identifying external partners that share Metro's vision for climate action and whose decisions collectively impact the sustainability of the region, such as City and County of LA, Caltrans and other state and local agencies. There is also value in private sector partnerships to maximize financial capital to fund, operate and maintain assets that contribute to impactful climate action. By working together and pooling financial resources, mitigation potential and preparations for climate risks can be optimized.

Principle 3: Integrate Climate Knowledge into Existing Decision Making Processes
Climate forward thinking must be seamlessly and rigorously integrated into existing decision making processes and systems. Key planning, design, construction, procurement and risk mitigation decisions require knowledge about GHG emissions and climate resilience. Integrating climate change thinking into Metro operations and processes has already begun in many Metro departments, through new sustainable acquisition practices and the use of lifecycle costing tools. Climate information and data will be incorporated as inputs when evaluating choices, alternatives and project priorities.

Principle 4: Monitor and Evaluate Progress
To maintain transparency and accountability to the goals set in this CAAP and to communicate any new goals and measures, the Energy & Resources Report and future Sustainability Reports will provide an annual update to stakeholders on Agency progress and the status of implementation timeframes.

Annual CAAP reporting will track the status of pilots, technology assessments, financial analyses, decision making outcomes and other major planning efforts underway. Reports will not only highlight key successes, but also identify where challenges or barriers persist. Additionally, these reports provide an opportunity to reevaluate technology choices, specific mitigation measures and actions, and implementation timelines. ***Opportunities for feasible acceleration will be prioritized, subject to emerging issues and constraints and considering responsible stewardship of taxpayer dollars.***

Principle 5: Engage with Community Stakeholders
Input and expertise from staff, riders and other key stakeholders will be a key component of implementing and evaluating the goals in this CAAP. Increased collaboration through existing partnerships will support implementation of CAAP goals while also helping to identify co benefits or redundancies among partners.

Metro will leverage existing engagement mechanisms with new ones for strategic exchange of information. Existing mechanisms include: ridership surveys, Service Councils, the Sustainability Council, general councils (e.g., Transportation Business Advisory Council), website content, email, social media, local committees, customized trainings and conference presentations. Internal communication channels include MyMetro Headlines section of the Metro intranet portal, department

newsletters, employee visual messaging boards at division facilities and employee trainings. New engagement opportunities and innovative ideas that further the agency's climate action and resilience goals can also be captured through the Unsolicited Proposal Process and Public Private Partnerships programs.

CEQA Considerations

The 2019 CAAP is not a project for the purposes of the California Environmental Quality Act (CEQA), and any projects, mitigation or other measures described in the CAAP will be developed and adopted through a public review process which includes CEQA compliance, if required. Evaluation of future project-level impacts is too speculative to include in an environmental document at this time as the CAAP is a policy document and does not include the approval of any specific project (see CEQA Guidelines Section 15145).

DETERMINATION OF SAFETY IMPACT

The CAAP affirms and reinforces a strong safety and preparedness culture throughout our operations and practices. A key element of the CAAP will be to promote a transportation system that improves safety for travelers by preparing the system for a variety of hazards.

FINANCIAL IMPACT

We will leverage funding and staff resources to accelerate the achievement of goals and initiatives prioritized in this CAAP. This includes aligning the agency's business processes, resources, plans, and tools with the CAAP's vision, goals, and initiatives and ensuring that financial decisions, annual budgets, programs, services support the Metro 2019 CAAP. It also means aligning human capital and financial resource decisions to reflect the CAAP's vision and priorities. This realignment will occur in a phased approach over the next several years to allow for the completion of initiatives that are already in progress. Assessments of planning, capital, or operating costs associated with specific initiatives in the CAAP may also be brought before the Board for action individually, or as part of a program or associated actions, as appropriate.

Impact to Budget

There is no change to the FY20 approved budget. Individual projects or initiatives outlined in the CAAP will be developed with individual project budgets and resource allocations.

IMPLEMENTATION OF STRATEGIC PLAN GOALS

As outlined in the report, the 2019 CAAP was developed to harmonize GHG and resilience goals with broader Agency goals and priorities set forth by other Metro documents, including the Vision 2028 Strategic Plan. Specifically, the risk assessment methodology included indicators that directly aligned with one or more of the Strategic Plan goals (see Table B-10 on page 80 of Attachment A).

ALTERNATIVES CONSIDERED

The Board could decide to delay or forgo the adoption of the 2019 CAAP. This alternative is not

recommended. The strategies in this 2019 CAAP are essential to maintain the momentum to reach our ambitious near and long-term climate reducing goals. This climate action and adaptation plan is critical to ensure Metro can continue to provide vital mobility services to LA County as the climate changes. Over the coming decades, the Los Angeles County region will undertake one of the largest transportation infrastructure investments in the western hemisphere. As LA Metro works with public, community, and private sector partners to build out this infrastructure for the future, we are also seizing opportunities to create a visionary path for minimizing contributions to climate change while building resilience to a changing climate for the over 1.2 million people who rely directly on our bus and train service today and more than 10 million people whose quality of life is affected by our ability to implement transportation solutions that successfully meet their mobility needs in the next ten years. The Board's adoption of the CAAP will provide support and direction for a comprehensive climate action plan from our agency and spur the collective actions necessary to advance our vision for a world-class transportation system that will efficiently, effectively, and equitably serve the mobility needs of people who live, work, and play within LA County.

NEXT STEPS

Upon Board approval, ECSD will act as the lead department facilitating the implementation of 2019 CAAP goals and will oversee implementation of the strategies while working with and supporting key internal stakeholders. ECSD will provide these key departments with technical analysis, project development, lifecycle costing, funding identification, education and training support.

The CAAP is a policy level document that requires additional steps to determine project-level impacts, including any acceleration and costs. Staff will determine these impacts concurrent with the environmental impact analysis, when necessary, prior to executing on projects and initiatives consistent with identified CAAP strategies.

Implementation best practices already exist within Metro. For example, the Environmental Management System to monitor, track, and evaluate progress and outcomes of climate related initiatives across the Agency. The SAP is another mechanism to ensure CAAP goals are incorporated into our procurement of goods and services.
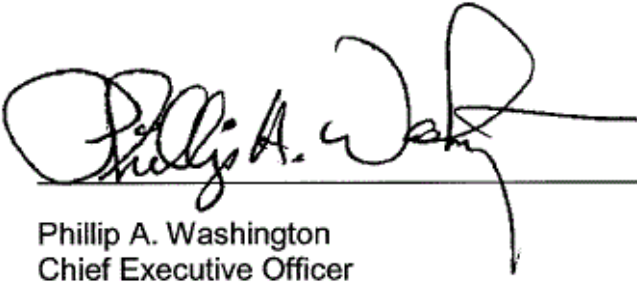
Consistent with the implementation principles laid out above, staff will report back on CAAP implementation on an annual basis through existing sustainability reporting mechanisms.

ATTACHMENTS

Attachment A - 2019 Metro Climate Action and Adaptation Plan
Attachment B - Sustainability Council Comments and Response Log

Prepared by: Cris Liban, Executive Officer, Environmental Compliance and Sustainability, (213) 922-2471, LibanE@metro.net

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Phillip A. Washington
Chief Executive Officer

http://libraryarchives.metro.net/DB_Attachments/2019-0489_Attachment_A_Draft_Final_2019_CAAP.pdf

Date	April 8, 2019
To	Metro Sustainability Council
From	Cris Liban, Executive Officer, Projects Engineering
Subject	Metro Climate Action and Adaptation Plan Comment Resolution

Metro staff sincerely appreciates the time, effort, and collaboration of the Metro Sustainability Council (Council) on the update the Metro Climate Action and Adaptation Plan (CAAP). At the October 2018 meeting, Metro introduced the Council the the CAAP Update. Since then, Council members and Metro staff have engaged monthly on the CAAP Update, and the Council has provided valuable feedback.

On March 8, 2019, Metro staff presented an overview of the Draft CAAP Update report to the Council, and a copy of the report was disseminated later that day. To facilitate an engaging partnership on the Draft CAAP Update, an engagement opportunity meeting was held at Metro headquarters on March 14th, during which time Metro and consultant staff were available to review the draft report, answer any questions, and capture verbal comments. Additionally, to provide the Council more time for a meaningful and thorough review, the deadline for comments was extended from March 22nd to end of business April 2nd.

Metro staff has since reviewed the excellent and insightful comments submitted by Council members. Metro truly appreciates the commitment to engagement and has addressed the comments in the most technically appropriate manner. Response to all comments received orally at the March 14th meeting as well as those received electronically by the deadline were included in the attached comment matrix. For a detailed overview of responses to all comments, please review the accompanying comment matrix.

Many of the comments submitted by Council members identified critical issues, which Metro staff has categorized as emerging issues. Accordingly, the CAAP Update is being revised to include a section for these emerging issues within the Implementation Chapter. This section will identify aspirations for the agency, including strategy acceleration, entry points where these aspirations fit within the work Metro is undertaking, potential barriers to accelerated implementation, and how the annual review of progress on CAAP initiatives will be used to adjust targets and goals with new information (technology, lessons learned, policies, etc.). Additionally, these emerging issues will be addressed fully in the Metro Sustainability Strategic Plan, currently in development, as well as other Metro planning documents brought forth to the Metro Sustainability Council.

#	Reviewer	Chapter #	Page #	Line #	Sustainability Council Comment	Response
1	March 14th Meeting*	3			Would like to see more communication and involvement with public in list of actions. It's important to communicate these risks to the public.	External communication is a major component of how Metro is planning around risk, and the CAAP includes a critical external communication component as outlined in principle# 5 in Chapter 4. The CAAP also emphasizes the need to coordinate with other efforts inside and outside of Metro, such as Metro's All-Hazards Mitigation Plan.
2	March 14th Meeting*	3			This feels like framework of how Metro should approach adaptation in general and less like an action plan. Is the first bullet point (about identifying triggers, thresholds, metrics, etc.) going to be addressed in the CAAP or the Resiliency Framework or other documents?	The introduction to section 3.3 and Principle 4 in Chapter 4 will be revised to clarify.
3	March 14th Meeting*	3			Liked the elevator pathway, would like to see more of those.	At this point, we are not planning on adding more examples pathways into the CAAP, but will be developing them during implementation, and can provide additional examples in our annual Sustainability Reporting.
4	March 14th Meeting*	3	41		Table 3.2. Saw this as a "menu" of adaptation actions that are out there, but no recommendations on which ones are good for Metro and which ones Metro is specifically tackling. Is that correct?	All of these actions have been partially implemented or studied. Language throughout Chapter 3 will be revised to make it clear that adaptation actions are already being implemented at Metro, and that Metro is open to exploring all available adaptation actions beyond those in this table as part of the adaptation pathways approach.
5	March 14th Meeting*	3	41		To Table 3.2, add another column that says "type" or "department" explaining where specific actions take place within Metro.	We will add another column to the "Example Adaptation Actions" Table in Chapter 3 that indicates the type of process the measure might fall under: Planning, Design & Engineering; Procurement; Asset Management & Maintenance; Operations; Emergency Management & Disaster Response.
6	March 14th Meeting*	3			Include outreach to adjoining agencies and other stakeholders throughout County/state. When thresholds are exceeded and action needs to occur, Metro will need money, so they should discuss with these outside entities so that money is ready and available when needed.	We will expand upon in Principle 2 within Chapter 4.
7	March 14th Meeting*	3			Absent from risks is drought and how that affects green infrastructure in transportation space. Heat impacts on air quality is also missing.	The limitations of both of those are addressed in Appendix B--Drought is embedded in the extreme heat section. We will add a sentence to the main body under the discussion of extreme heat risks to further emphasize: "Extreme heat often leads to reduced air quality, which further impacts health."
8	March 14th Meeting*	3			In assets listed, there's no green infrastructure - there's more "hard" assets that are listed.	We will edit the asset list in Chapter 3 to clarify that this list is imperfect and not comprehensive, and there is room for improvement on data management. Metro's asset management database contains almost 26,000 records of distinct assets, including landscaping. Green infrastructure is embedded in many of these assets as well, including for example almost 80 miles of bioswales and California native or drought tolerant landscaping. Risk analysis is limited to the availability of geospatial data which, does not distinguish the green infrastructure components from hard assets.
9	March 14th Meeting*	Overall			When meeting with other stakeholders, should make the purpose/overview of the report more clear.	The CAAP will be revised to clarify the purpose of the plan, and the executive summary and introduction sections will be edited to provide a better overview of the plan.
10	March 14th Meeting*	1	4		Will we get to see the rest of the bus survey results?	The Survey Results will be provided in a new appendix, Appendix E.
11	March 14th Meeting*	Overall			Interfacing this with SCAG or CTC plans?	Metro ECSD is coordinating closely with Metro Countywide Planning, specifically with Long Range Planning and the Federal/State Policy and Programming business units to ensure that we can leverage opportunities both in the preparation of the SCAG RTP/SCS and any revisions to CTC funding allocations. With SB 526 (Allen) under consideration this legislative session, there is now uncertainty in this process. Metro will adapt our approach to achieve our climate goals.
12	March 14th Meeting*	ES			Are the 8 mitigation measures in here?	The Executive Summary will be revised to clarify.
13	March 14th Meeting*	Overall			Does this plan break out any new initiatives or summarize what's already happening? What's different from existing policy? What is Metro self-initiating with this plan? Where are the new measures?	A column will be added to Table 2-7 that describes Metro's current progress in each area addressed by a mitigation measure. Existing or ongoing commitments, plans, studies, and pilot initiatives will be included here where relevant.

#	Meeting				Comment	Response
14	March 14th Meeting*	Overall			The battery electric buses have been approved by the Board, so how do we know which of these are new due to the CAAP?	A column will be added to Table 2-7 that describes Metro's current progress in each area addressed by a mitigation measure. Existing or ongoing commitments, plans, studies, and pilot initiatives will be included here where relevant.
15	March 14th Meeting*	2	19		Would these measures be in the future Energy Resources report and be tracked every year to make sure Metro is on track to meet these?	Formal reporting on CAAP initiatives will be included in annual sustainability reports beginning with 2020 Energy and Resource Report (approx. June 2020). Additional information will be added under Principle 4 (monitoring and evaluating) in Chapter 4.
16	March 14th Meeting*	ES			There should be a risk management matrix that says for each risk how it's graded, the mitigation actions, the triggers for engaging that action and what to do when those triggers are reached, etc. Table 3-1 gives the score, but each item should also list a way to mitigate that risk and/or respond to that risk if it becomes a reality. Recommend having the CAAP start out with this table, and then throughout plan go into those in more detail. Could put this in Executive Summary. Connecting actions to risks more can create thresholds that can be followed up on and lay foundations for next actions. Prioritize high risks in the actions.	The Executive Summary will be revised. Related to risk management, we are moving towards a culture of embedding risk in decision-making: information that's needed, metrics we should be tracking to know how to act, etc.
17	March 14th Meeting*	1	3	25-28	Add a Number 3 to the list; sentence most appropriate is on pg. 38: "The CAAP supports this goal by identifying ways the agency can increase its resiliency to climate risks while also aligning with agency goals and priorities set in the Equity Platform Framework, Vision 2028 Strategic Plan and the 2009 Long Range Transportation Plan." Make this a 3rd point or replace it with the 2nd point.	Statement of climate resilience will be refined in Section 3.3 to include this language.
18	March 14th Meeting*	1			CAAP talks about being aligned with local initiatives, but where is the Roadmap Initiative with LA Cleantech Incubator (LACI)?	Metro's committed goal of nearly 80% reduction in agency GHG emissions by 2030 outlined in the current version of the CAAP is consistent and greatly exceeds Metro's contribution to the TEP goal of 25% reduction in LA County transportation-sector GHG emissions and air pollution by 2028. The CAAP maintains Metro's commitment of a 100% ZEB fleet by 2030, consistent with the "Local transit" sector target in the TEP. CAAP goals for installation of employee commuting charging infrastructure and electrification of non-revenue and vanpool vehicles all contribute to the TEP's People Movement targets.
19	March 14th Meeting*	1			In response to above comment: LACI's Roadmap is not part of statutory mandate of state; LACI might make good recommendations but Metro should not be held accountable to that. Other state mandates do have funding behind them that Metro can be held accountable to.	Metro's committed goal of nearly 80% reduction in agency GHG emissions by 2030 outlined in the current version of the CAAP is consistent and greatly exceeds Metro's contribution to the TEP goal of 25% reduction in LA County transportation-sector GHG emissions and air pollution by 2028. The CAAP maintains Metro's commitment of a 100% ZEB fleet by 2030, consistent with the "Local transit" sector target in the TEP. CAAP goals for installation of employee commuting charging infrastructure and electrification of non-revenue and vanpool vehicles all contribute to the TEP's People Movement targets.
20	March 14th Meeting*	2	19		In mitigation measures list, add a column saying where we're at right now. This information can help stakeholders. Could have a color-coding approach saying if things are a recommitment, policy, etc.	A column will be added to Table 2-7 that describes Metro's current progress in each area addressed by a mitigation measure. Existing or ongoing commitments, plans, studies, and pilot initiatives will be included here where relevant.
21	March 14th Meeting*	ES			Is this document visionary? Are the measures enough?	This report aligns with the aspirations outlined in Motion 57 and provides a roadmap to address Metro's continuing efforts to reduce its own greenhouse gas emissions. Metro aligns these strategies with those of others that it can influence.
22	March 14th Meeting*	Overall			Would rather see a limited action plan that's implemented and can be held accountable, rather than a bold vision plan with many actions; need to find this balance. It is important to include that this report is visionary, but need to consider the cost.	Executive Summary will be revised to address this. Edits throughout the report will be made to keep consistent message.

23	March 14th Meeting*	ES			Need to incorporate information on the cost of these measures and when cost is important.	We will include a table in the Executive Summary that shows each of the measures, the NPV over the analysis period (2019-2050), and the annual emissions reduced from 2017 levels. We will also include annual emissions reduced from 2017 levels in table 2-11 (Mitigation Scenario Implementation Costs and Emission Reductions), and rename the columns for clarity.
24	March 14th Meeting*		2	16	Emissions inventory shows the biggest potential is from Metro's ability to decrease VMT. Crosswalk ridership projections with Metro's strategic plan?	We will add a paragraph in Chapter 2 in the Greenhouse Gas Mitigation at Metro "Approach" section to clarify.
25	March 14th Meeting*		2	16	Don't just look at Metro's positive impacts on VMT, but also see if Metro is increasing VMT.	Language in Chapter 2 will be included to identify areas of potential GHG impacts and benefits that are not currently addressed in this CAAP such as upstream emissions from purchased goods, waste disposal, and construction projects.
26	March 14th Meeting*		3	32	Transit-Dependent Vulnerability Map - is there an effort to connect this with equity framework?	Metro's Equity Platform is still being developed. The Equity Focused Communities mapping project is still underway and was not available to include in this CAAP. We will add tithe following note to Chapter 3 in the explanation of the map: "Metro is in the process of developing an Equity Platform, an additional tool to define a common basis for Metro and the community to build an agenda around improving equity."
27	March 14th Meeting*	ES			Major changes should be made to Exec Summary. Make it about the bold vision of Metro and what we're doing, where we're headed. Bring out the headlines--so they can say, look, here is what Metro is doing. What are the costs to Metro? Make recommendations for specific action to be more ambitious and specific. Make ES more advocacy. Detail measures, next steps, explain that adaptation approach is first time it's being embedded into a public agency in California--i.e. sell the approach.	Executive Summary will be revised accordingly.
28	March 14th Meeting*	ES			In ES, the resilience goals and the next steps are confusing--some are really similar, some are different. Look at them side-by-side, and how mitigation would fit in. Resilience Goal #6 seems similar to 4th implementation principal. Need clearer goal or principle around metrics/thresholds. Need clearer/upfront that establishing metrics is an essential step. Also, consider using language that talks about tying actions to something measurable. Metrics still need to be brought out more--best discussion of need for triggers is buried in case study, but it needs to be prominent.	Executive Summary will revised so that the discussion of thresholds is made more prominent.
29	March 14th Meeting*	ES			Not clear how we're thinking about engaging with other agencies. What is their role? SCAG, LA, Caltrans, etc.--list them specifically.	Will be listed under Principle 5 in Chapter 4.
30	Roy Thun		3	29	1	General comment the document does a good job of identifying risks based on vulnerability and criticality. However, there is no recognition of the wider societal impacts that are likely to occur within Metro's service area for the same, or related, climatic conditions that would effect Metro. This is very important to consider with respect to criticality of Metro's services in the face of civil unrest, emergency transportation needs and general state of panic. Suggest commenting on this topic in Chapter 3 and 4 with cross reference to Metro's operational integrity plan.	The Plan discusses Metro's critical role in creating a resilient LA, and mentions the All Hazard Mitigation Plan, which will take this broader lensed approach.
31	Yareli Sanchez		1	3	27	Metro needs to approach climate resiliency from a perspective that is less centered on Metro's assets. As a large agency in the Los Angeles region, Metro's action can contribute to regional resiliency as a whole.	Agree that a resilient Metro system is one piece of a larger resilient community. The call-out box (Resilience at Metro and Beyond) in Chapter 1 highlights this point.
32	Yareli Sanchez		1	2	6	In keeping with previous comment, an important next step, once we recognize that Metro can contribute to regional resiliency, is to coordinate with other government entities to amplify efforts, identify cost saving measures, and identify how Metro's assets can be used to respond to climate emergencies (evacuations). This can perhaps be done through a cross-cutting agency committee or workgroup and will require Metro to think regionally instead of a Metro Asset approach. Next step, better coordination with other regional and agency entities.	We will expand upon in Principle 2 described in Chapter 4.
33	Yareli Sanchez		3	39	4	Should recognize that riders are also critical partners in monitoring on the ground conditions and the efficacy of Metro's response/interventions	External communication is a major component of how Metro is planning around risk, and the CAAP includes a critical external communication component as outlined in principle #5 of Chapter 4, which highlights the value of rider input.

34	Yareli Sanchez	3	40	23	Protecting infrastructure does not necessarily have to be done through a hardening approach. Metro needs to recognize the value of both soft (natural), hard, and hybrid approaches and recognize when each is appropriate. Greening a bus station, for example, is a soft and low-cost approach to urban cooling. Add soft/natural infrastructure strategy into pathway approach and recognize in evaluation of a strategy that these are low cost and multi-benefit approaches	The Hardening/Protecting Infrastructure category of adaptation actions in Chapter 3 will be revised to include natural approaches, and we will add examples of natural infrastructure in several other places in the document.
35	Yareli Sanchez	3	40		Recognize that capacity building is also an adaptation action. Providing training, for employees, and resources, for both communities and employees, can ensure communities can respond to climate emergencies. Great you all identified communication with staff and ridership as being key!	Language will be revised so that the "operational" category of adaptation actions in Chapter 3 also includes "behavior modifications." We will discuss training and other modifications as an example.
36	Yareli Sanchez	3	40	23	Need to recognize the value of smart multi-benefit design here as well, not just engineering. Good design and better materials can increase dependability but also feeling of safety, aesthetic value, etc.	Principles #3 and #5 in Chapter 4 will be revised to note benefits of collaboration and co-benefits.
37	April 2nd Letter**				I.1.a. Metro should pledge to go ZERO CARBON for transportation, property assets, etcetera, by [X] date, and announce an upcoming Request for Information for same;	This CAAP includes an aggressive commitment to reducing GHG emissions by 87% from 2017 levels by 2050. While the CAAP does outline an opportunity to reduce emissions to zero through the purchase of carbon offsets, the CAAP does not include carbon offset purchases as a mitigation measure. However, the CAAP will be revised to adopt all 13 mitigation measures analyzed which will increase the GHG emissions reduction targets. Chapter 4 will include an Emerging Issues section that will identify acceleration strategies, where feasible. This section will describe entry points where these aspirations fit within the work Metro is undertaking, potential barriers to accelerated implementation, and how the annual review of progress on CAAP initiatives will be used to adjust targets and goals with new information (technology, lessons learned, policies, etc.).
38	April 2nd Letter**				I.1.b. Metro should plan a pathway to become NET-ZERO for buildings and site-facilities which will include additional on-site distributed generation (DG) such as photo-voltaic system/solar thermal system/ inverter plus battery energy storage and micro-grids, By [X] date Metro should have a clear plan for onsite DG and resiliency measures; by [x] date Metro should have begun plans to install onsite DG and a microgrid at [X] these locations and by [X] date at these locations;	Chapter 4 will include an Emerging Issues section that will identify acceleration strategies, where feasible. This section will describe entry points where these aspirations fit within the work Metro is undertaking, potential barriers to accelerated implementation, and how the annual review of progress on CAAP initiatives will be used to adjust targets and goals with new information (technology, lessons learned, policies, etc.). As part of advancing implementation for GHG strategies outlined in this CAAP, Metro will be developing updates to existing energy management plans that will specifically address opportunities for incorporation of net-zero building technology, distributed generation and microgrids, and renewable energy supply. Metro is also finalizing a Green Procurement Framework to address material and product selection.
39	April 2nd Letter**				I.2. Metro should plan to exceed Cal-Green via modifications/upgrades/retrofits: double glazed windows, low-E; building automation systems; roof and our wall insulations by [X} date;	Chapter 4 will include an Emerging Issues section that will identify acceleration strategies, where feasible. This section will describe entry points where these aspirations fit within the work Metro is undertaking, potential barriers to accelerated implementation, and how the annual review of progress on CAAP initiatives will be used to adjust targets and goals with new information (technology, lessons learned, policies, etc.). As part of advancing implementation for GHG strategies outlined in this CAAP, Metro will be developing updates to existing energy management plans that will specifically address opportunities for incorporation of net-zero building technology, distributed generation and microgrids, and renewable energy supply. Metro is also finalizing a Green Procurement Framework to address material and product selection. Through the Metro Sustainability Plan Program (as related to construction of all Metro infrastructure), the most recent and most stringent requirements for CALGreen compliance and exceedance are included for Purple Line Extension 3. Metro will monitor how the mandatory and voluntary requirements are being applied and incorporate the lessons learned in the implementation of other projects.

40	April 2nd Letter**				I.3. Metro should convert to zero-emission for the non-contracted bus fleet by 2025, (Date and timeline for accountability);	Chapter 4 will include an Emerging Issues section that will identify acceleration strategies, where feasible. This section will describe entry points where these aspirations fit within the work Metro is undertaking, potential barriers to accelerated implementation, and how the annual review of progress on CAAP initiatives will be used to adjust targets and goals with new information (technology, lessons learned, policies, etc.).
41	April 2nd Letter**				I.4. Creating Electrification of Metrolink rails for which LA Metro is the planning agency, which has been broadly discussed… Electrification of rail transportation, for which LA Metro is a transportation planning agency; and electrification of certain lines: It has been previously discussed in terms of the value of introducing electrified rolling stock (such as electric locomotives, electric multiple units, hybrid-electric units, or dual-mode electric units), among lines with higher frequencies of service. The capital investments could provide a platform upon which to implement electrification.	We are coordinating with our partner agencies such as Metrolink to plan for such an initiative.
42	April 2nd Letter**				I.5. Metro should determine and include which best practices to undertake to influence commuter behavior: In other words what should LA Metro / Metrolink's light rail consider in light of the top railways/bus systems in the world? Examples: free fares, cleaner trains and buses, free wifi, seamless fare systems (applications for Android and i-Phone users), timeliness (not having to wait more than 4 minutes in between trains)	Though not explicitly addressed in this CAAP, Metro constantly strives to provide a world-class transportation system that enhances quality of life for all who live, work and play within LA County. As such, the agency has initiatives around many of the items mentioned here. LA Metro is currently piloting Wi-Fi on Metro trains and buses. In addition, Metro is conducting a NextGen Bus Study, the goal of which is to create an attractive and competitive world-class bus system. To achieve this goal, all aspects of Metro bus service are on the table for study, including speed, distance, frequency, time of day, reliability as well as quality of service and safety. Additionally, at the Metro December 2018 Board Meeting, new mobility fees and congestion pricing were studied as part of Item 38. Receive and File of the Twenty-Eight by '28 White Paper. The Agenda item noted that a congestion pricing initiative could position the agency to offer free transit services in time for the 2028 Olympic Games. Metro is also in the early stages of developing a Customer Experience plan and indicators. Metro values timeliness, which is why it was a key component of the Metro Vision 2028 Strategic Plan. Metro is striving to improve wait times on lines like the Purple Line to achieve trains every 4 minutes. Lastly, Office of Extraordinary Innovation has an unsolicited proposal process, for which any new innovative partnership projects can be submitted for review.
43	April 2nd Letter**				II.a. Metro cannot wait 30 years to electrify the contracted bus fleet (BEB Deployment Contracted, as referred to on page 23) given that it has contracting authority for doing same. Metro can and needs to develop a time frame for turn over within 10 years, based on current contract obligations and not extending further contractual relationships with buses other than zero-emission buses.	Chapter 4 will include an Emerging Issues section that will identify acceleration strategies, where feasible. This section will describe entry points where these aspirations fit within the work Metro is undertaking, potential barriers to accelerated implementation, and how the annual review of progress on CAAP initiatives will be used to adjust targets and goals with new information (technology, lessons learned, policies, etc.).
44	April 2nd Letter**				II.b. Similarly, Metro cannot wait 30 years to turn over the vanpool assets (Battery Electric Vehicle (BEV) Vanpool Deployment, as referenced on page 23). The useful life of the current vehicles is likely not 30 years, as such there should be a refusal to purchase any new vehicles that are not zero-emission).	Chapter 4 will include an Emerging Issues section that will identify acceleration strategies, where feasible. This section will describe entry points where these aspirations fit within the work Metro is undertaking, potential barriers to accelerated implementation, and how the annual review of progress on CAAP initiatives will be used to adjust targets and goals with new information (technology, lessons learned, policies, etc.).
45	April 2nd Letter**				II.c. Any further investment in any fuels that will ultimately be replaced is wasteful of Metro and taxpayer resources. Existing gas infrastructure should be utilized as a redundant or emergency back-up system in the event of a natural disaster prior to Metro adopting needed resiliency technologies such as distributed generation, battery energy storage and microgrids.	Chapter 4 will include an Emerging Issues section that will identify acceleration strategies, where feasible. This section will describe entry points where these aspirations fit within the work Metro is undertaking, potential barriers to accelerated implementation, and how the annual review of progress on CAAP initiatives will be used to adjust targets and goals with new information (technology, lessons learned, policies, etc.).
46	April 2nd Letter**				III.a. Three decades to replace existing heating, venting and air conditioning systems (Facility Heating, Venting and Air Conditioning Electrification) and replace appliances (Facility Appliance Electrification) is excessive.	Chapter 4 now includes an Emerging Issues section that identify acceleration strategies, where feasible. This section describes entry points where these aspirations fit within the work Metro is undertaking, potential barriers to accelerated implementation, and how the annual review of progress on CAAP initiatives will be used to adjust targets and goals with new information (technology, lessons learned, policies, etc.). As part of advancing implementation for GHG strategies outlined in this CAAP, Metro will be developing updates to existing energy management plans that will specifically address opportunities for incorporation of net-zero building technology, distributed generation and microgrids, and renewable energy supply. Metro is also finalizing a Green Procurement Framework to address material and product selection.

47	April 2nd Letter**				III.b. Similarly, Facility LED lighting installation is "low-hanging fruit" and Metro can set a more actionable time frame of completion within 5 years, not a 2030 deadline.	Chapter 4 will include an Emerging Issues section that will identify acceleration strategies, where feasible. This section will describe entry points where these aspirations fit within the work Metro is undertaking, potential barriers to accelerated implementation, and how the annual review of progress on CAAP initiatives will be used to adjust targets and goals with new information (technology, lessons learned, policies, etc.). As part of advancing implementation for GHG strategies outlined in this CAAP, Metro will be developing updates to existing energy management plans that will specifically address opportunities for incorporation of net-zero building technology, distributed generation and microgrids, and renewable energy supply.
48	April 2nd Letter**				IV.a. Metro will experience increased demand for electricity through the next 3 decades and the planned amount of distributed generation is insufficient for same. The annual planned amount of installed photovoltaic is insufficient given the needs and a division, by division, or line by line approach should be considered, and possibly a Request for Information issued regarding same.	Chapter 4 will include an Emerging Issues section that will identify acceleration strategies, where feasible. This section will describe entry points where these aspirations fit within the work Metro is undertaking, potential barriers to accelerated implementation, and how the annual review of progress on CAAP initiatives will be used to adjust targets and goals with new information (technology, lessons learned, policies, etc.). As part of advancing implementation for GHG strategies outlined in this CAAP, Metro will be developing updates to existing energy management plans that will specifically address opportunities for incorporation of net-zero building technology, distributed generation and microgrids, and renewable energy supply.
49	April 2nd Letter**				IV.b. Metro should be focusing on becoming Net Zero which involves including battery energy storage as part of the planning for zero emission bus line and rail line (infra) electrification.	Chapter 4 will include an Emerging Issues section that will identify acceleration strategies, where feasible. This section will describe entry points where these aspirations fit within the work Metro is undertaking, potential barriers to accelerated implementation, and how the annual review of progress on CAAP initiatives will be used to adjust targets and goals with new information (technology, lessons learned, policies, etc.). As part of advancing implementation for GHG strategies outlined in this CAAP, Metro will be developing updates to existing energy management plans that will specifically address opportunities for incorporation of net-zero building technology, distributed generation and microgrids, and renewable energy supply.
50	April 2nd Letter**				V.a. Misleading analysis as well in the context of GRID GHG impacts versus Transportation and Building Stock/ Property GHG impacts: This point concerns page 21, Measure ES-2 and the assertion "…greenhouse gas emissions benefits do not fully emerge until California's electricity grid is less carbon intensive than the renewable natural gas Metro is currently supplying to our CNG fleet, approximately 2031." There are Grid impacts and there are local air quality impacts in the urban cities that they service, (quieter, cleaner, safer) including no tail pipe emissions. In other words: if the grid is dirty, it's okay if our buses are dirty, too; we don't need to clean up our buses(?).	Metro recognizes the air quality benefits of vehicle electrification and as such has committed to a 100% ZEB fleet by 2030 (the full quote reads as follows: "While this transition provides **immediate air quality benefits**, the greenhouse gas emissions benefits do not fully emerge until California's electricity grid is less carbon intensive that the renewable natural gas Metro is currently supplying to our CNG fleet, approximately 2031."). However, it is important to note that currently projections for greenhouse gas emissions indicate an increase in greenhouse gas emissions if Metro were to continue to rely on grid-supplied electricity while transitioning to ZEB fleets. Despite this, the CAAP recommends transitioning Metro's fleets to ZEB and pursuing lower-carbon sources of electricity to mitigate a potential increase in GHG emissions from electrification. Figure 2-9 (Metro greenhouse gas emissions, by end-use category, all mitigation measures, 2019–2050) in the current CAAP outlines how pursuing lower-carbon sources of electricity can facilitate even greater reductions in GHG emissions. Additional language will be added in this section of Chapter 2 to ensure clarity and avoid any misrepresentations of the analysis.

51	April 2nd Letter**				V.b.A) The supply of what is actual renewable natural gas, is very small; so the idea of running Mero's buses on RNG is troubling;	Metro has contracting authority to provide up to 100% of its bus fuel requirements with RNG and there is no indication that supply is limited. Further, Metro's supply contracts for RNG in no way impact the availability of fuel for its bus fleet, so there is no impact or added risk to bus operations. Metro's RNG supply program is consistent with the agency's commitment to a ZEB fleet by 2030, with RNG acting as a transitional low-carbon fuel while ZEB implementation ramps up.
52	April 2nd Letter**				V.b.B) As well, tail Pipe Emissions matter: page 21, E-2; This text box negates harmful emissions from near zero or "low NOX" buses. It also fails to discuss the local air quality benefits from zero-emissions that are needed in communities that live in and around our transit corridors that these buses and trains service.	While the scope of the inventory and mitigation analyses is focused on GHG emissions, we will include text that acknowledges air pollution emissions from CNG buses within the Regional Context. Metro is in the process of procuring ZEBs in the fastest way possible. We are in the transition phase, with the goal of ensuring we maintain the level of service using the cleanest fleet and fuel possible and available to us.
53	April 2nd Letter**				V.b.C) Finally, a strategy that involves purchasing credits is not one that benefits Angelenos who live around or ride LA Metro transportation modalities.	In section 2.4 ("Getting to Zero" text box) we examine the potential for carbon offsets, but conclude that currently, though this strategy has been utilized as a viable option by other entities, Metro has chosen to instead focus on reducing emissions by investing in transportation infrastructure. We will provide additional text to further reinforce this point.
54	April 2nd Letter**				VI.a.i. The process for decision-making should include a discussion of the External Benefits Estimator (which includes the societal benefits to the region- including social costs of carbon, as well as job creation aspects, as well as projects that change the transit-rider's experience); as has been used by other transportation planning agencies. As opposed to just cost (implementation and otherwise) and feasibility as primary decision makers. Readers will want to understand the societal/environmental benefits inherent in some projects, while still others may want to better understand the costs and financial feasibility; all of which are important.	The current cost analyses are aimed at helping Metro understand the impact on Metro's bottom line and to provide a point of comparison between measures. Both readers and decision-makers should be informed about the marginal cost-abatement potentials for each measure. In a financial resource-constrained environment, the most cost-effective GHG mitigation measures may be prioritized over those that are not as cost-effective. Regardless, the CAAP will be revised to adopt all 13 mitigation measures analyzed which will increase the GHG emissions reduction targets. Additionally, Metro is exploring tools that integrate external benefits into decision making, such as the Triple-Bottom-Line tool being piloted for the Emergency Security Operations Center (ESOC) project. The goal is to conduct these assessments at the project-level.
55	April 2nd Letter**				VI.a.ii. Metro-Directed Control should not be as heavy of an analysis point. There are few areas for which Metro cannot exert influence with respect to sustainability. This is, if it determines to implement sustainability not via a business-as-usual approach. For example, because Metro enters into contracts for some of the buses it utilizes, it can exert control vis-à-vis the contracting process; similarly, the Battery Electric Vanpool deployment is also something within Metro direct control. Metro can make a determination as to which types of vehicles for which it will provide rebates and incentives. Additionally, Metro likely has domain over where it provides parking for its employees and can implement measures to incentivize employees to ride share or alternatively provide more vehicle chargers. The concept of direct control versus another kind of control is a means to delay sustainability planning.	Analyzing how and where Metro's influence can change outcomes is a critical part of determining feasibility and ultimately implementing the GHG measures outline in this CAAP. Taking the various Metro fleets as an example, there are different ownership models that need to be taken into account when determining how to implement the electrification strategy. Additional language will be included in the revised CAAP to clarify "direct control" and how this analysis was used to inform implementation timelines. Additionally, as of April 2019, Metro is in the process of developing a Green Procurement Framework, the goal of which is to exert influence in the contracting process as evidenced by the best practices cited in the Framework. The next phase of that initiative will explore additional ways beyond those best practices that Metro can influence the contracting community.
56	April 2nd Letter**				VII. Since Metro owns and controls a significant amount of property throughout the Los Angeles region, including buildings, parking lots, maintenance yards, and transit stops, the opportunity is ripe to enhance regional resilience by recognizing the multiple benefits of green infrastructure projects and prioritizing the implementation of these projects within the Climate Action and Adaptation Plan...Metro should recognize the opportunities associated with the Safe Clean Water program and all the momentum being built around green infrastructure as a tool to combat climate change and highlight and implement these strategies as part of its CAAP.	Metro values the multi-benefits of green infrastructure, and has been proactively incorporating such principles and strategies in all Metro infrastructure projects beginning with the Metro Orange Line. We realize that green infrastructure was inadequately emphasized in the CAAP. We will add several references to green infrastructure and its benefits in the CAAP.

57	April 2nd Letter**				VIII. MAINTAINING CONSISTENCY WITH LOCAL INITIATIVES IN WHICH METRO IS A PARTNER: LA Metro is a partner in Los Angeles Clean Tech Incubator's Transportation Electrification Pathway (TEP) and has been involved in developing the TEP from the inception. LA Metro's CAAP is inconsistent with these goals, which is concerning given that LA Metro helped develop these goals and yet, is now planning far less than what is an appropriate amount given the anticipated needs, as well as the GHG gains that can be achieved by encouraging LA Metro employees to switch to a zero-emission car or a hybrid.	Metro's committed goal of nearly 80% reduction in agency GHG emissions by 2030 outlined in the current version of the CAAP is consistent and greatly exceeds Metro's contribution to the TEP goal of 25% reduction in LA County transportation-sector GHG emissions and air pollution by 2028. The CAAP maintains Metro's commitment of a 100% ZEB fleet by 2030, consistent with the "Local transit" sector target in the TEP. CAAP goals for installation of employee commuting charging infrastructure and electrification of non-revenue and vanpool vehicles all contribute to the TEP's People Movement targets.
58	April 2nd Letter**				IX. CAAP STAKEHOLDER ENGAGEMENT: Opportunities for engagement regarding CAAP are lacking in LAMSC meetings. The LAMSC is a volunteer council, comprised of professionals employed by entities other than LA Metro, which means that volunteers need to have the opportunity to deal with the substance of the CAAP at the meetings. The process does not facilitate meaningful input by allowing explanation at the council meetings itself as well as tracking input from prior workshops to determine incorporation or lack thereof for different reasons. Our perception is that the majority of the feedback provided to the Metro team at the initial CAAP workshops has not been incorporated into the current draft, and we are left not understanding why. Our hypothesis is that an expedited project timeframe has made the team unable to adequately respond to feedback provided over the past few months. Considering that the CAAP only gets updated once every five years, this rushed approach does not give due importance to one of, if not the most pressing issue of our time.	The engagement strategy for the CAAP has been developed with guidance and concurrence from the LAMSC executive committee and consistent with the LAMSC Meetings ARC. However, as a result of meaningful feedback from the LAMSC, Metro augmented its engagement strategy to include additional touchpoints and add review time to the CAAP draft, which lengthened the overall project timeframe. Finally, the project timeframe is one that was committed to as part of the commitment to the Metro Board, specifically to the current Board Chair. Staff have provided regular reporting to the LAMSC on CAAP progress including two workshops that were designed specifically for LAMSC input. Following both workshops, staff presented to the LAMSC on how stakeholder input has been incorporated into the CAAP. A comprehensive comment review matrix has been developed to facilitate for stakeholder tracking of input received. This CAAP is designed to be updated as needed according to new information, to new technologies, or to new relevant statutes/regulations. A formal revisit of the whole CAAP is going to be done every five years.
59	April 2nd Letter**				X. GOVERNANCE ISSUES: In order to rise to the challenges of climate change, Metro needs leadership at the executive level to ensure that planning, construction and operations are all in alignment with CAAP objectives. We have been advocating for the creation of a Chief Sustainability Officer position at Metro, and we continue to do so with this letter as well. Per Motion 57, Metro has committed to utilizing a project-specific sustainability coordinator to guide and monitor all future highway and transit projects and report to a Sustainability Officer; however, such actions still lack the direction of quantifiable targets and metrics, are piecemeal in nature and do not signal a meaningful endeavor by the agency. Given the climate and sustainability goals inherent in Motion 57, this undertaking needs a Chief Sustainability Officer and coordinating staff to not only lead these initiatives, but follow through to execute the implementation. Currently, it appears environmental and sustainable efforts occur as sporadic pilot projects and vary widely among the different departments within Metro. ECSD has done much of this work, but there is a long ways to go yet in terms of institutionalizing these goals, which calls for additional leadership, a CSO, and team to effectuate these efforts.	Metro staff are delivering on the current CAAP strategies using existing resources and are expected to do so moving forward. This comment is going to be carried forward to address the implementation of Metro's overall sustainability and environmental program, including the CAAP.
60	April 2nd Letter**				XI. BARRIERS: Further discussion of the CAAP can and should mention any significant constraints to implementation, such as State of Good Repair issues, maintenance issues, operations issues and budgetary issues. Rather than just sticking with the low-hanging fruits, this CAAP should be an opportunity to identify higher-ambition areas of opportunity. Such information would provide necessary talking points to understand how to provide support to Metro adopting and implementing bold climate and sustainability goals.	Chapter 4 will include an Emerging Issues section that identify acceleration strategies, where feasible. This section will describe entry points where these aspirations fit within the work Metro is undertaking, potential barriers to accelerated implementation, and how the annual review of progress on CAAP initiatives will be used to adjust targets and goals with new information (technology, lessons learned, policies, etc.).

*March 14th meeting attended by: Jennifer J. Kropke, Esq., Bryn Lindblad, Michael Kadish, Wendy Nystrom, Patty Menjivar, Lorena Palacios, and Mark Kempton.

**April 2nd Letter submitted by: Jennifer J. Kropke, Esq., Bryn Lindblad, John Harriel, Jr., Will Wright, Hon., Big John Cares, Bruce Reznik, Caryn Mandelbaum, Michael Kadish, Joel Levin, and Yareli Sanchez.

61	Bryn Lindblad	1	4	Text box	The text box mentions one of the results of the Metro survey re. climate adaptation. Please make the rest of the results available, too.	The Survey Results will be provided in a new appendix, Appendix E.
62	Bryn Lindblad	2	13	table 2-4	Please explain why contracted bus GHG/VRM has increased 22% from 2010 to 2017. This is a move in the wrong direction.	As reported in Table 2-3, emissions from Metro's contracted bus fleet have increased slightly from 2010 to 2017 (7%). We don't have the full dataset from 2010 and cannot pinpoint the driving factor behind this minor trend, but believe this increase could be a result of better reporting practices and not indicative of a change in operations. At the same time, Metro's contracted bus service measured in vehicle revenue miles (VRM) has decreased by roughly 12% from 2010 to 2017 (although actual levels of service measured in vehicle revenue hours have decreased by only 2%). The slight increase in emissions and decrease in the corresponding normalization factor (VRM) exaggerate the overall change in emissions from this source. Although normalization factors are a useful way of measuring and comparing performance, this section has been removed from the final version of the CAAP.
63	Bryn Lindblad	2	12	table 2-3	Please explain why facility electricity has increased 70% from 2010 to 2017. We were told the former includes CNG whereas the latter doesn't, so if comparing apples to apples the increase would be even larger than 70%, which is troubling (a move in the wrong direction).	Based on the available data, overall electricity consumption from facilities has increased by 119% since 2010. While we are developing a normalization factor that takes into account building square footage in order to better assess this indicator. Metro has constructed or significantly expanded over a dozen maintenance facilities, 30 rail stations, and many more ancillary facilities that support 6 new or extended rail and BRT lines during that timeframe. Despite this increase in electricity consumption, GHG emissions from this sector only increased 70% due in large part to lower emissions factors from grid electricity and marginally from Metro's own on-site renewable generation.
64	Bryn Lindblad	2	16	figure 2-5	The biggest thing Metro can do for reducing GHGs is to reduce more VMT. Please consider at least mentioning that here as something that Metro could look to include more robustly in the next CAAP update.	Chapter 2 will be revised to address the importance of VMT reduction and add a connection to other Metro efforts.
65	Bryn Lindblad	2	16	4&5	Please include a commitment in this CAAP that the ridership gains projected herein will be consistent with the forthcoming LRTP.	Ridership gains projected in the CAAP were developed given planning data that was available to staff during the analysis and modeling period. The methodology and sources for this information are elaborated in Appendix A of the CAAP. Ridership projections from planned rail and BRT projects could change pending environmental review, Board approval, funding availability, and the modification or addition of new projects. GHG and ridership projections may be revised to remain consistent with the best available data and methodologies and reported out during interim reporting opportunities (e.g. annual sustainability reporting).
66	Bryn Lindblad	2	16	4&5	It would also be helpful to include what the current ridership is, so that the projections have more context.	Chapter 2 will include the 2017 Metro ridership numbers utilized in the methodology.
67	Bryn Lindblad	2	19-20	table 2-7	All of these mitigation measures are directed at Metro's own emissions, and none at displacing emissions (aka. reducing VMT). It would be good to include congestion pricing & LRTP investments as strategies that should aim to reduce GHGs through decreasing VMT.	Chapter 2 will be revised to address the importance of VMT reduction and add a connection to other Metro efforts. The CAAP looks at strategies to minimize the agency's operational emissions, while the agency's Strategic Plan and LRTP address Metro's role in regional VMT reductions, which have an impact on regional greenhouse gas emissions. Additionally, at the Metro December 2018 Board Meeting, new mobility fees and congestion pricing were studied as part of Item 38. Receive and File of the Twenty-Eight by '28 White Paper, and the agency is continuing research and development related to potential congestion pricing models.
68	Bryn Lindblad	3	30		The risk assessment approach is primarily aimed at assessing "assets", and so it has rather clumsily here had more people-centric statements added onto asset-centric assessments. Metro should rather apply a more people-centric approach that focuses on how riders are affected by climate change (e.g. in extreme heat, people need shade and access to drinking water).	We have attempted to highlight the importance of a resilient Metro system for surrounding communities and ridership and the relationship to ridership. For example, the CAAP includes a critical external communication component as outlined in principle #5 of Chapter 4, which highlights the value of rider input. We will continue to keep ridership and surrounding communities at the forefront of the work we do in this CAAP, particularly throughout implementation.

69	Bryn Lindblad	3	32	figure 3-2	How has this map of transit-dependent areas been developed? Instead, I suggest using the Equity Focus Communities map that is currently being developed.	Metro's Equity Platform is still being developed. The Equity Focused Communities mapping project is still underway and was not available to include in this CAAP. We will add tithe following note to Chapter 3 in the explanation of the map: "Metro is in the process of developing an Equity Platform, an additional tool to define a common basis for Metro and the community to build an agenda around improving equity."
70	Bryn Lindblad	3	35	15-23	Please include the impact that wildfires have in deteriorating air quality, and how that may affect people's propensity to use active transportation modes.	We will add clarifying language to the Wildfires discussion in Chapter 3, under the Key Risk Assessment Findings section.
71	Bryn Lindblad	3	37	17-25	Absent from the risks listed are: 1.) the increased likelihood and severity of drought, and how that impacts green infrastructure; 2.) how hotter days causes increased ozone/smog formation, and how that impacts active transportation.	The limitations of both of those are addressed in Appendix B--Drought is embedded in the extreme heat section. We will add a sentence to the main body under the discussion of extreme heat risks to further emphasize: "Extreme heat often leads to reduced air quality, which further impacts health."
72	Bryn Lindblad	3	38	text box	What does "under a broader, all-hazards lens" mean, and what will this 'Resiliency Indicator Framework' be used for?	We will add language clarify the All Hazard callout box in Chapter 3.
73	Bryn Lindblad	3	41-42	table 3-2	These sort of actions for adaptation are what the adaptation plan should consist of, and yet they're only included here as examples, not a plan for action. Metro should do the work to arrive at a list of actions like this and that's what should be in the CAAP. As it is now, the adaptation section reads like a concept framework (describing the concept of flexible pathways), not an action plan with clear next steps.	All of these actions have been partially implemented or studied. Language throughout Chapter 3 will be revised to make it clear that adaptation actions are already being implemented at Metro, and that Metro is open to exploring all available adaptation actions beyond those in this table as part of the adaptation pathways approach.
74	Bryn Lindblad	3	46		This example (of how to deal with an increase in elevator outages) is again a great example of what the adaptation plan should consist of. We need more of these, not just the one example.	At this point, we are not planning on adding more examples pathways into the CAAP, but will be developing them during implementation, and can provide additional examples in our annual sustainability reporting.

| #	Reviewer	Chapter #	Page #	Sustainability Council Comment	Response
1	Roy Thun	2	16	Going forward you may want to talk in terms of 14 mitigation measures rather than 13. The CAAP somewhat discretely notes (p. 16) that it will take additional TBD mitigation measures to achieve the last 4% reduction of emissions by 2050.	The CAAP outlines 13 specific measures the agency could take to reduce GHG emissions to 96% by 2050. However, as highlighted, additional measures will be needed to achieve zero emissions by 2050. As the CAAP is implemented and further measures are explored, those additional measures will be included. As no specific measures were identified to account for that remaining 4%, no additional measures were added to the CAAP's GHG reduction measures list.

Metro Climate Action and Adaptation Plan
Presentation to the Metro EMC
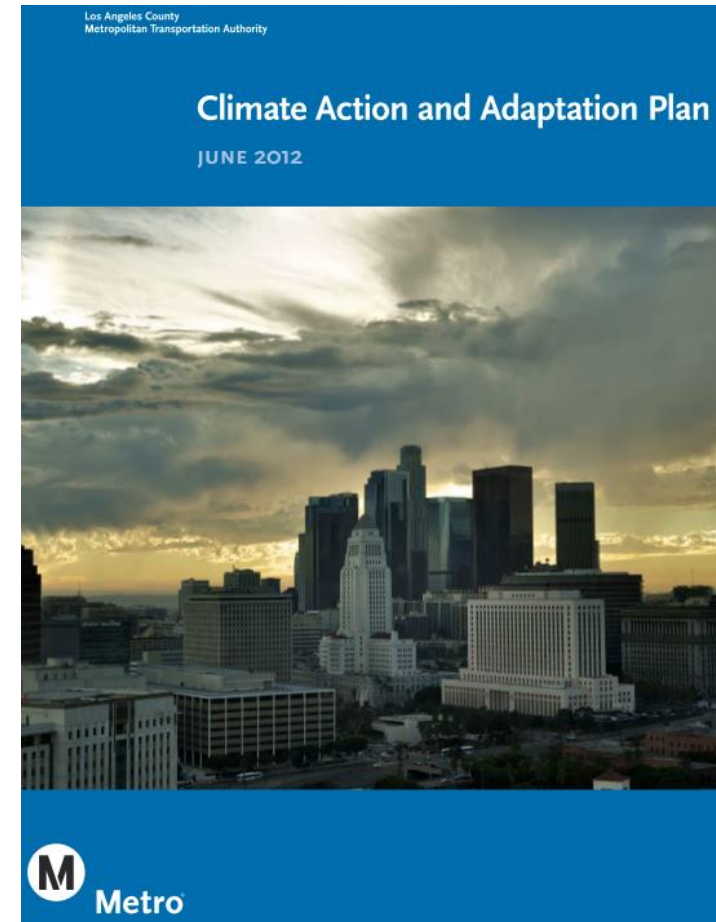## July 2019

2019 Climate Action & Adaptation Plan
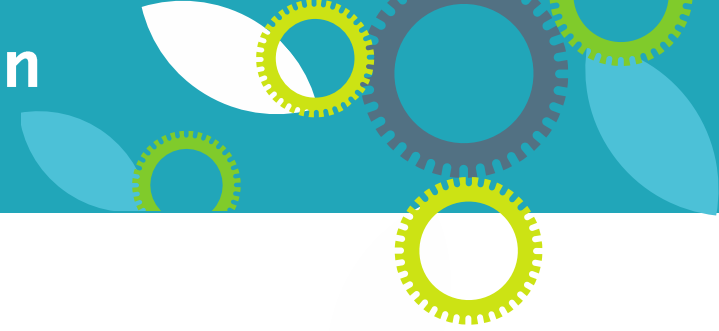
Overview

- **2012 CAAP established a framework for Metro projects, programs, and facilities to:**
    - **Reduce GHG emissions from operations**
    - **Prepare for the impacts of climate change on Metro's systems**
- **2019 CAAP provides:**
    - **Updated GHG emissions forecast thru 2050**
    - **Identifies new GHG goals and reduction strategies**
    - **Identifies Metro's approach to climate resilience**
    - **Outlines strategic implementation principles**

Los Angeles County
Metropolitan Transportation Authority

Climate Action and Adaptation Plan

JUNE 2012

Ⓜ Metro

Ⓜ Metro

Ⓜ Metro

2019 Climate Action & Adaptation Plan

Metro reduced GHGe by **12%** from 2010 to 2017, despite ~4% increase in service
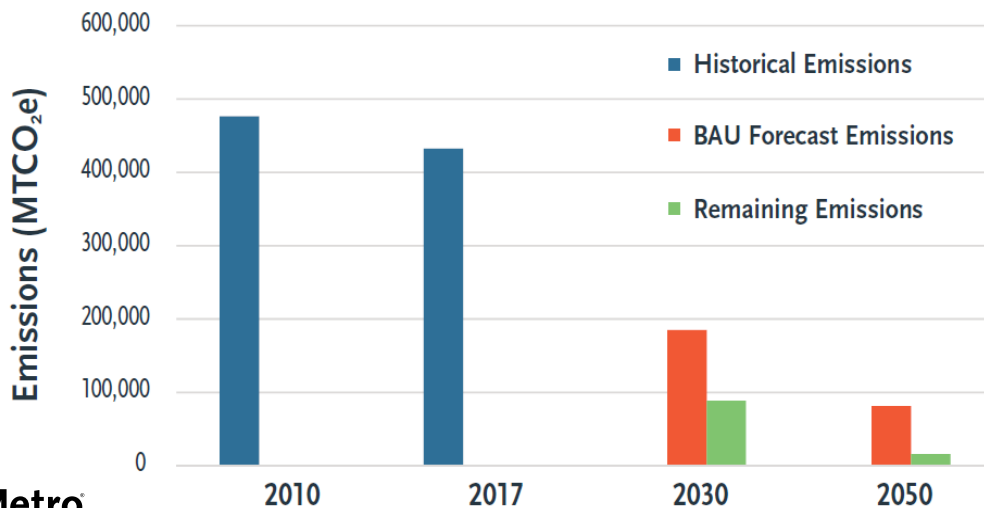
Mitigating GHG Emissions

Goals
- 2030: 79% reduction relative to 2017 levels
- 2050: 100% (zero emissions) relative to 2017

Forecasted emissions with Metro's 13 reduction measures versus Business as Usual (BAU) emissions.

Chart legend:
- Historical Emissions
- BAU Forecast Emissions
- Remaining Emissions

Y-axis: Emissions ($MTCO_2e$), 0 to 600,000
X-axis: 2010, 2017, 2030, 2050

GHG Mitigation Measures
- **Zero emission fleets**
- **Renewable energy supply**
- **Green buildings**
- **EV employee commuting**

Metro

Metro

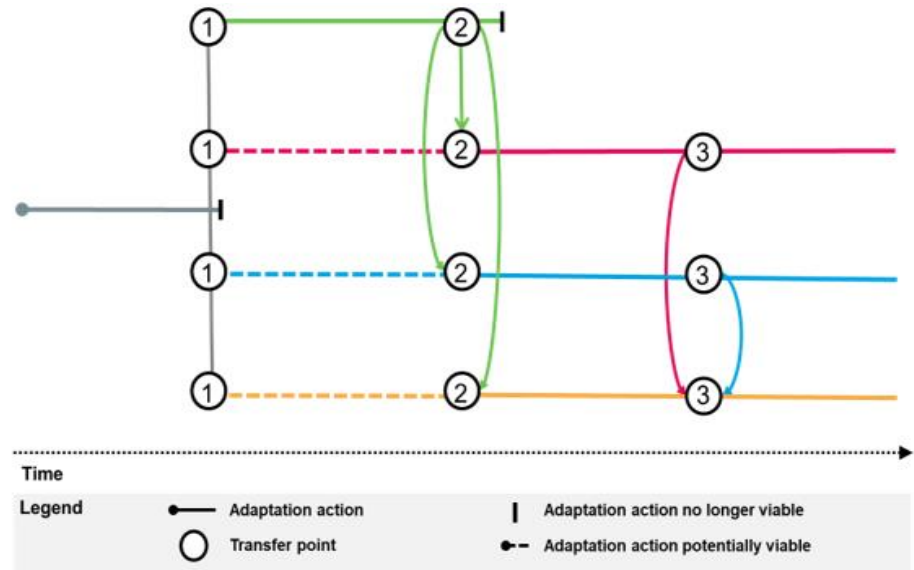# 2019 Climate Action & Adaptation Plan

Building Climate Resilience

Goal
- **Create a climate-resilient organization and transit system: prepared, ready and able to provide consistent services to the people of LA County**

Metro increased the number of climate hazards analyzed from 3 to 7 and considered far more assets than just Metro owned assets.

Resiliency Strategies
1. **Make climate resilience an organizational priority**
2. **Establish a flexible approach to adaptation**

Flexible Adaptation Pathway Model

Time

Legend
- ●— Adaptation action
- ○ Transfer point
- | Adaptation action no longer viable
- ●-- Adaptation action potentially viable

Metro

Stakeholder Engagement

- **Metro Staff interviews**
  - 9 bus and rail divisions
  - Over 18 Gateway headquarters teams
- **Rider Survey**
  - January-February 2019
  - Advertised online via emails, the Source, and Twitter
  - Tabled at NextGen public workshops
  - Received nearly 400 responses
- **Metro Sustainability Council**
  - Presentations and workshops from October 2018 through July 2019
  - *CAAP endorsed by Sustainability Council in its July 12, 2019 meeting*

Metro

Metro
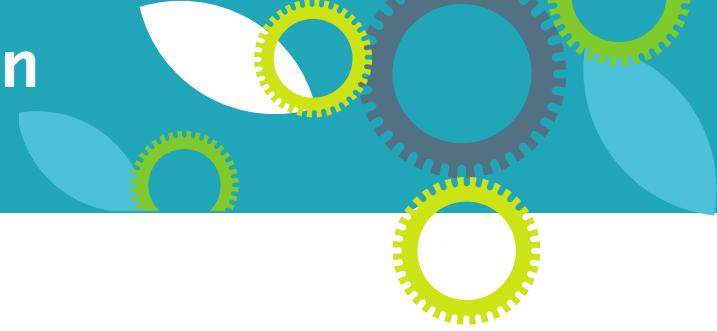
Looking Ahead

- **Five implementation principles**
  - **Principle 1: Embrace Climate Leadership**
  - **Principle 2: Secure Funding and Prioritize Resources**
  - **Principle 3: Integrate Climate Knowledge into Existing Decision-Making Processes**
  - **Principle 4: Monitor and Evaluate Progress**
  - **Principle 5: Engage with Community Stakeholders**
- **Next Steps**
  - **Metro ECSD continues to act as implementation facilitators to monitor, track, and evaluate progress and outcomes**
  - **Report out on an annual basis through sustainability reporting mechanisms**
  - **Develop projects to implement strategies**

Metro