APPENDIX A – 4

2021 TIP Performance Report

Federal Performance Report

Assessment of 2021 TIP Investments in Addressing Federally-Mandated Performance Measures

INTRODUCTION

Performance-Based Planning and Programming

The Moving Ahead for Progress in the 21st Century Act (2012), also known as MAP-21, established several performance management requirements for state departments of transportation (DOTs), metropolitan planning organizations (MPOs), and transit agencies. A performance-based approach to transportation planning and programming intends to ensure the most efficient investment of transportation funds, support improved investment decision-making, and increase accountability and transparency. MAP-21 and subsequent federal legislation require DOTs, MPOs, and transit agencies to establish performance targets for each of the following national goal areas:

- Safety
- Infrastructure Condition
- System Reliability
- Freight Movement and Economic Vitality
- Congestion Reduction
- Environmental Sustainability

MTC's Role

Under the federal performance management rules, MTC is responsible for setting short-range targets and incorporating the targets into its planning processes – most notably, the Transportation Improvement Program (TIP) and the Regional Transportation Plan (RTP).

- **TIP Requirements**

  There are two primary requirements for incorporating performance management into the TIP. For all federally-required targets, MTC must show that the TIP "makes progress towards achieving the performance targets" and that the TIP includes, "to the maximum extent practicable, a description of the anticipated effect of the TIP towards achieving the performance targets" (23 CFR § 450.326). MTC must show that it is moving in the right direction based on the package of investments included in the TIP and must also describe how much of an effect the TIP investments are expected to have on the targets.

  ➔ *Federal Performance Report:* This report reflects all of the federally-required performance targets and seeks to quantify impacts to the greatest extent practicable, while at the same time focusing on consistency and accuracy across projects.

  ➔ *2021 TIP:* The Bay Area's 2021 TIP covers the four-year period of FY 2020-21 through FY 2023-24 and includes approximately 330 transportation projects with $10.3 billion in committed funding during the four-year period. For the 2021 TIP, MTC collected self-reported data from project sponsors to complete the performance analysis.

- **RTP Requirements**
  Starting with Plan Bay Area 2050 (anticipated for adoption in mid-2021), MTC will be required to report on the condition and performance of the transportation system in relation to its adopted performance targets (23 CFR § 450.324). MTC will also have to comply with other new federal requirements related to long-range planning, including any potential scenario planning.

- **Reporting**
  In addition to quantifying progress made towards performance targets in the context of its TIP and RTP, MTC is required to report regional targets to Caltrans. To meet this requirement, MTC has expanded its Vital Signs performance monitoring website (http://www.vitalsigns.mtc.ca.gov/targets) to incorporate federal performance targets, as well as additional performance indicators. Additionally, MTC publishes its regional targets as they are adopted on MTC's website (https://mtc.ca.gov/our-work/plans-projects/major-regional-projects/federal-performance-targets).

2021 TIP Federal Performance Report Structure

This report is organized by goal area and supporting performance measures.

- **Goal and Performance Measure Background:** Each section includes an introduction to the national goal area, a description of each of the federally-required performance measures for that goal, information on the target-setting process, and a status update on the state and regional targeting-setting process. Where possible, recent trend data for the performance measures is also provided.

- **2021 TIP Investments:** Data collected from project sponsors for the 2021 TIP is presented for each goal area and performance measure. This includes the level of investment in projects that have identified the goal area as the project's primary purpose, as well as a summary of the performance benefits from all projects included in the 2021 TIP, regardless of project purpose.

- **Performance Assessment:** For each goal area and performance measure, the report includes an overall assessment of the anticipated effect of the 2021 TIP on achieving performance targets and a discussion of ongoing and future efforts related to the goal area.

SAFETY

Federal performance management regulations identify two distinct areas of transportation safety – road safety from traffic collisions (including collisions involving bicyclists and pedestrians), and transit safety resulting from collisions, other safety events, or major mechanical failures. The overall goal of the transportation safety performance area is to make the nation's transportation systems safer for all users.

Road Safety

Goal: Significantly reduce traffic fatalities and serious injuries on all public roads.

Performance Measures

Five performance measures were established to identify trends and assess progress towards reducing traffic-related fatalities and serious injuries on public roads.

Goal Area	Road Safety
Performance Measures	• Number of fatalities • Rate of fatalities per 100 million vehicle miles traveled • Number of serious injuries • Rate of serious injuries per 100 million vehicle miles traveled • Number of non-motorized fatalities and non-motorized serious injuries *For all measures: 5-year rolling average; all public roads*

Performance Targets

State DOTs are required to set numerical targets each year for each safety measure to comply with the regulation. MPOs have the option of supporting State targets or setting their own region-specific numerical targets on a target-by-target basis.

For the third round of annual target-setting, Caltrans set statewide 2020 targets to align with a trajectory of achieving zero deaths by 2050. For the Bay Area, MTC set 2020 regional targets based on a linear decline to zero fatalities and serious injuries by 2030, in line with a full adoption of Vision Zero. The 2020 targets and corresponding anticipated annual performance changes for each measure are detailed in the table on the following page.

Performance Measures	2020 Targets			
	Caltrans		Bay Area	
	Statewide 2020 Targets 2016-2020 average	**Annual Reduction** 2016-2020	**Regional 2020 Targets** 2016-2020 average	**Annual Reduction** 2016-2020
Fatalities – total	**3,518.0**	-3% fatalities	**404.1**	-7% fatalities
Fatalities – per 100 million VMT	**1.023**	-3% fatalities; +1% traffic volumes	**0.622**	-7% fatalities; +1% traffic volumes
Serious Injuries – total	**13,740.4**	-1.5% injuries	**1,800.9**	-7% injuries
Serious Injuries – per 100 million VMT	**3.994**	-1.5% injuries; +1% traffic volumes	**2.793**	-7% injuries; +1% traffic volumes
Non-motorized fatalities + serious injuries – total	**4,147.4**	-3% fatalities; -1.5% injuries	**702.0**	-7% fatalities; -7% injuries

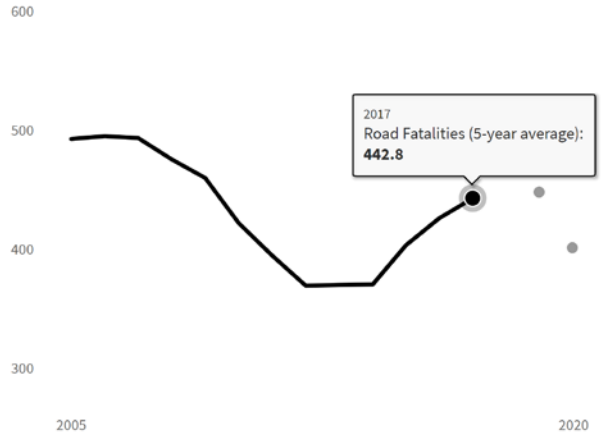
Note: Targets rely on forecast data for 2019-2020 annual fatalities and injuries, based on the annual reduction or increase rates noted. Observed fatality and injury data is available for 2015-2018, observed annual average daily traffic (AADT) data is available for 2017.

In August 2020, Caltrans adopted statewide targets for 2021. MTC has until February 2021 to adopt regional safety targets and may choose to support the new state targets or to adopt its own regional numeric targets.

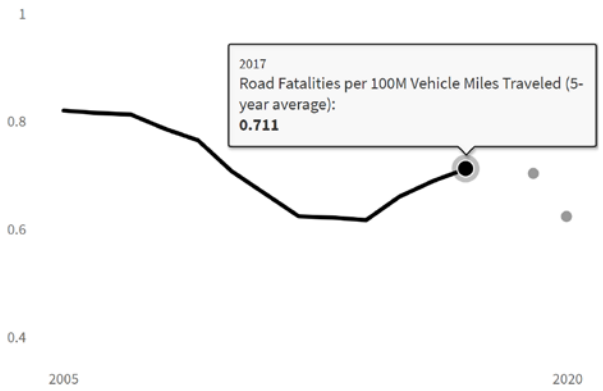
Regional trends for each roadway safety performance measure is provided in charts on the following page. Trend lines are in black, with grey dots representing regional targets (2019 and 2020).

Bay Area Regional Road Safety Trends

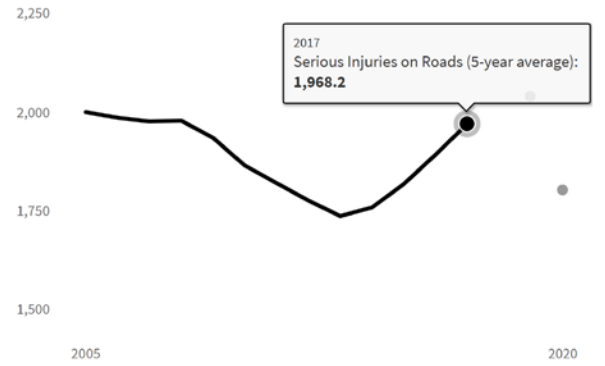
Number of Fatalities



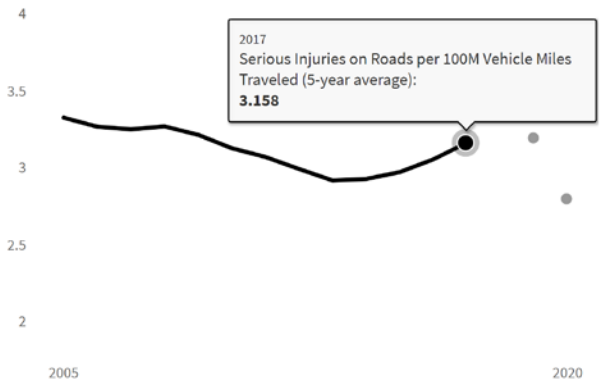
Fatalities per 100 million VMT



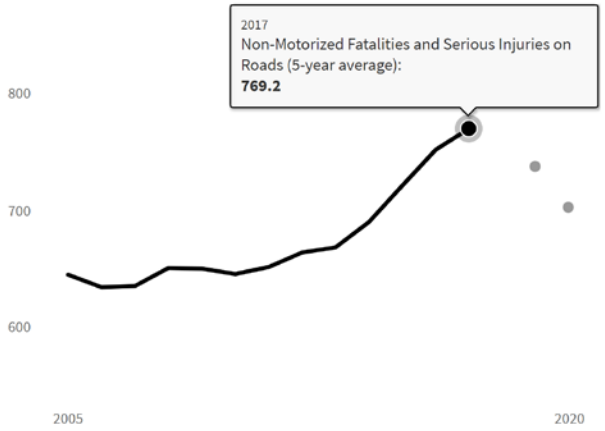
Number of Serious Injuries



Serious Injuries per 100 million VMT



Number of Non-Motorized Fatalities and Serious Injuries



Source: http://www.vitalsigns.mtc.ca.gov/targets

2021 TIP Investments

In the 2021 TIP, nearly $1 billion in federal, state, regional and local funds are directed to projects that have a primary purpose of improving roadway safety for all users (Table 1). Funding for safety-focused projects account for 9% of the dollars in the 2021 TIP, and 22% of all projects in the 2021 TIP have a primary purpose of improving road safety.

$1.0 billion

Table 1
2021 TIP Projects with Primary Purpose to Improve Road Safety *$ in millions*

	Safety Investments	% of TIP Investments	Safety Projects	% of TIP Projects
Alameda	$68	1%	10	18%
Contra Costa	$52	28%	8	21%
Marin	$13	10%	5	29%
Napa	$5	6%	3	19%
San Francisco	$110	14%	4	13%
San Mateo	$35	8%	9	25%
Santa Clara	$122	3%	20	28%
Solano	$24	12%	7	27%
Sonoma	$12	40%	4	27%
Multiple Counties	$514	15%	4	14%
	$954	9%	74	22%

Note: Project purpose data provided by project sponsors through the 2021 TIP. Project totals include one or more "grouped listings," which combine numerous projects into a single listing in the TIP.

This significant investment in road safety projects includes $511 million from three key state-funded safety programs: State Highway Operation and Protection Program (SHOPP) – Collision Reduction Program, Safety Improvements (SHOPP) – Emergency Repair, and State Highway Safety Improvement Program (HSIP). In addition to the state safety investments directed to projects throughout the region, a sampling of other significant road safety investments in the 2021 TIP include:

- $35 million for Caltrain Rengstorff Grade Separation in Mountain View
- $20 million for Willow-Keyes Complete Streets Improvements in Santa Clara County
- $17 million for the Iron Horse Trail Bike and Pedestrian Overcrossing in Contra Costa County
- $15 million for Powell Street Safety Improvements in San Francisco

Transportation projects that are primarily focused on other non-safety objectives, such as congestion reduction or operational improvements, can often contribute to a safer roadway environment. Table 2 details the project investments in the TIP, regardless of the project's primary purpose, that are expected to reduce fatalities or serious injuries for all modes, as well as projects that result in safer travel environments specifically for bicyclists and pedestrians. Many of these projects have a primary objective other than road safety.

Table 2
2021 TIP Projects Anticipated to Result in Road Safety Benefits *$ in millions*

Benefit:	Reduction in the Number and Rate of Fatalities				Reduction in the Number and Rate of Serious Injuries				Reduction in Non-Motorized Fatalities and Serious Injuries			
	Investments		Projects		Investments		Projects		Investments		Projects	
Alameda	$427	56%	30	54%	$430	57%	33	59%	$430	57%	33	59%
Contra Costa	$106	56%	15	39%	$106	56%	15	39%	$61	33%	12	32%
Marin	$13	10%	6	35%	$14	11%	7	41%	$15	12%	8	47%
Napa	$48	64%	6	38%	$59	78%	7	44%	$63	84%	10	63%
San Francisco	$169	22%	6	19%	$169	22%	6	19%	$173	22%	8	26%
San Mateo	$43	10%	12	33%	$43	10%	12	33%	$46	10%	14	39%
Santa Clara	$696	16%	37	52%	$696	16%	37	52%	$614	14%	36	51%
Solano	$117	60%	10	38%	$117	60%	10	38%	$45	23%	10	38%
Sonoma	$14	47%	6	40%	$15	49%	7	47%	$17	58%	8	53%
Multiple	$880	26%	5	17%	$880	26%	5	17%	$880	26%	5	17%
	$2,513	24%	133	40%	$2,529	25%	139	41%	$2,345	23%	144	43%

Note: Anticipated effect of projects on road safety provided by project sponsors through the 2021 TIP. Project totals include one or more "grouped listings," which combine numerous projects into a single listing in the TIP.

Combined into a single measure, more than 150 projects programmed in the 2021 TIP, accounting for nearly $2.6 billion in investments, are anticipated to reduce traffic fatalities and/or serious injuries (Table 3). The data in Table 2 is not additive for Table 3, as individual projects may benefit more than one road safety performance measure.

$2.6 billion

Table 3
2021 TIP Projects Anticipated to Result in Road Safety Benefits *$ in millions*

Reduction in Fatalities or Serious Injuries (including non-motorized)				
	Investments		Projects	
Alameda	$430	57%	34	61%
Contra Costa	$117	62%	17	45%
Marin	$15	12%	8	47%
Napa	$63	84%	10	63%
San Francisco	$173	22%	8	26%
San Mateo	$46	10%	14	39%
Santa Clara	$701	16%	40	56%
Solano	$122	62%	11	42%
Sonoma	$17	58%	8	53%
Multiple	$880	26%	5	17%
	$2,565	25%	155	46%

Note: Anticipated effect of projects on road safety provided by project sponsors through the 2021 TIP. Project totals include one or more "grouped listings," which combine numerous projects into a single listing in the TIP.

Underscoring MTC's commitment to address roadway safety in the region, MTC adopted a Regional Safety/Vision Zero Policy in July 2020. The policy recognizes that MTC is uniquely positioned to facilitate region-wide safety planning and coordination to eliminate traffic fatalities and serious injuries in the Bay Area by 2030. The policy establishes a framework for MTC to:

1) Provide regional leadership to promote safety, engaging and incentivizing leadership across jurisdictions to prioritize safety and work towards aligning funding policy with safety goals.
2) Apply a data-driven approach to inform safety policy and strategic use of available funds and resources. Establish a regional safety data system at MTC that enables local jurisdictions to benefit from consistent and reliable data.
3) Promote equity in regional safety policies by considering and analyzing impacts on historically disadvantaged and under-invested communities and protecting vulnerable roadway users.
4) Support beneficial safety policies and legislation that target evidence-based solutions to safety problems.
5) Engage key regional stakeholders for safety policy development, implementation, and collaboration on safety best practices. Provide education and technical assistance.

TRANSIT SAFETY

Goal: Improve the safety of all public transportation systems, specifically in the areas of fatalities, injuries, safety events (ex.: collisions, derailments), and system reliability.

Performance Measures

The National Public Transportation Safety Plan includes seven performance measures that transit operators and MPOs will be required to track and report. These measures will be used to identify trends and assess progress towards making reductions in transit fatalities, injuries, safety events, and mechanical failures. Each performance measure is tracked and reported by mode of public transportation (i.e. bus, heavy rail).

Goal Area	Transit Safety
Performance Measure(s)	• Number of fatalities, by mode • Rate of fatalities per vehicle revenue miles, by mode • Number of injuries, by mode • Rate of injuries per vehicle revenue miles, by mode • Number of transit safety events, by mode • Rate of transit safety events per vehicle revenue miles, by mode • Mean distance between major mechanical failures, by mode

Performance Targets

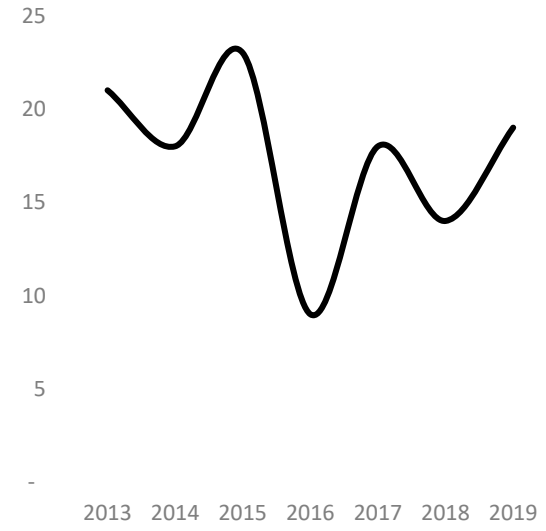
The final rule for these performance measures went into effect in July 2019. Transit operators are required to establish a Public Transportation Agency Plan, including safety performance targets, by July 2021. At this

time, not all Bay Area transit operators have established their safety targets. Once all operators have established their targets, MTC will have 180 days to set regional transit safety targets.

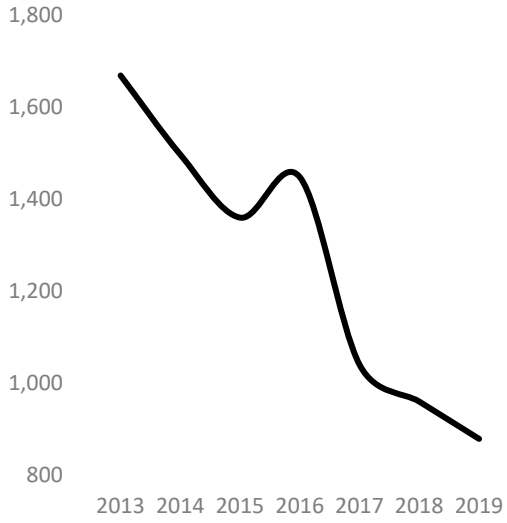
Performance Measures	*MTC Regional Targets*
Fatalities – total, by mode	Pending
Fatalities – rate per vehicle revenue miles, by mode	
Injuries – total, by mode	
Injuries – rate per vehicle revenue miles, by mode	
Transit safety events – total, by mode	
Transit safety events – rate per vehicle revenue miles, by mode	
Major mechanical failures – mean distance between, by mode	

Bay Area Regional Transit Safety Trends

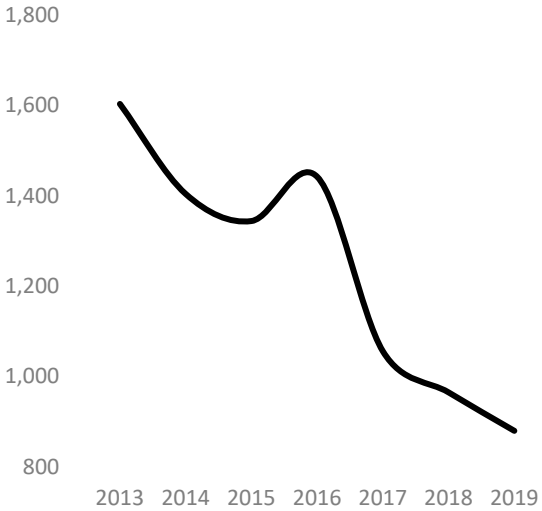
Number of Fatalities - All modes



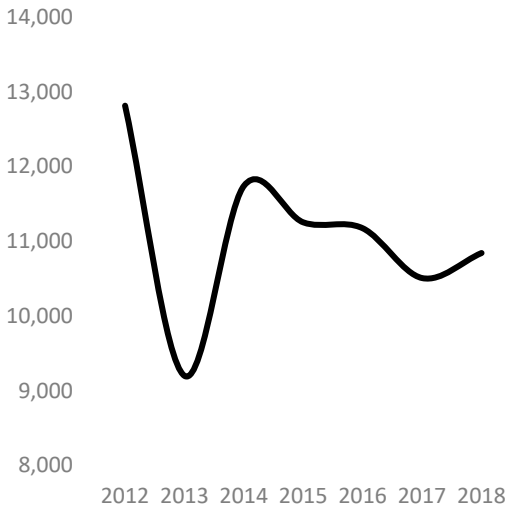
Number of Injuries – All modes



Number of Transit Safety Events - All modes



Number of Major Mechanical Failures - All modes



Source: National Transit Database

2021 TIP Investments

In the 2021 TIP, $53 million is committed to projects that have a primary purpose of improving transit safety (Table 4).

Table 4
2021 TIP Projects with Primary Purpose to Improve Transit Safety *$ in millions*

	Safety Investments	% of 2021 TIP Investments	Safety Projects	% of 2021 TIP Projects
Regional total	$53	1%	5	1%
	$53	1%	5	1%

Note: Project purpose data provided by project sponsors through the 2021 TIP.

However, more than $1.7 billion of 2021 TIP investments are anticipated to improve performance of one or more transit safety performance measures, regardless of overall project purpose (Table 5). This accounts for 17% of the investments included in the 2021 TIP. The bulk of these investments are state of good repair and modernization projects that are also expected to improve the performance of one or more of the transit safety performance measures.

$1.7 billion

Table 5
2021 TIP Projects Anticipated to Result in Transit Safety Benefits *$ in millions*
Investments improving performance outcomes for transit safety

	Investments		Projects	
Regional total	$1,742	17%	71	21%
	$1,742	17%	71	21%

Note: Anticipated effect of projects on transit safety provided by project sponsors through the 2021 TIP. Project totals include one or more "grouped listings," which combine numerous projects into a single listing in the TIP.

A few projects in the 2021 TIP with anticipated transit safety benefits include:

- $41 million for the SFMTA Train Control and Trolley Signal Rehabilitation/Replacement project
- $35 million for Caltrain Rengstorff Grade Separation in Mountain View
- $21 million for the Geneva Harney BRT Infrastructure-East Segment in San Francisco
- $15 million for Powell Street Safety Improvements in San Francisco
- $14 million for CCTA's Automated Driving System

INFRASTRUCTURE CONDITION

The maintenance and preservation of our existing transportation infrastructure are critical for supporting a safe and efficient transportation system. The overall goal of the infrastructure condition performance area is to improve the condition of existing pavements, bridges, and transit assets.

Pavement Condition

Goal: Maintain the condition of highway infrastructure assets in a state of good repair

Performance Measures

Four performance measures were established to identify trends and assess progress towards maintaining a state of good repair on the Interstate and Non-Interstate National Highway System (NHS).

Goal Area	Pavement Condition
Performance Measures	• Percentage of pavements on the Interstate in good condition *(lane miles)* • Percentage of pavements on the Interstate in poor condition *(lane miles)* • Percentage of pavements on the non-Interstate NHS in good condition *(lane miles)* • Percentage of pavements on the non-Interstate NHS in poor condition *(lane miles)*

Performance Targets

State DOTs are required to develop a Transportation Asset Management Plan to develop long-range investment strategies for assets on the National Highway System, including pavement condition. The plan establishes 10-year performance goals and interim two- and four-year performance targets to monitor progress. MPOs are required to set four-year targets and may choose to adopt the statewide target or adopt quantifiable performance targets for the region.

Caltrans adopted its statewide two- and four-year targets for pavement condition in May 2018. In November 2018, MTC chose to support state targets for the four-year performance period.

Performance Measure *Percentage of system total*	**Baseline Condition** 2016	**2 Year Targets**			**4 Year Targets**		
		Caltrans		**MTC**	**Caltrans**		**MTC**
		Statewide Targets 2019	2-year Change	Regional Targets 2019	Statewide Targets 2021	4-year Change	Regional Targets 2021
Interstate in good condition	**44.9%**	**45.1%**	+0.2%	N/A	**44.5%**	-0.5%	Support State Targets
Interstate in poor condition	**3.1%**	**3.5%**	+0.4%		**3.8%**	+0.7%	
Non-Interstate NHS in good condition	**25.5%**	**28.2%**	+2.7%		**29.9%**	+4.4%	
Non-Interstate NHS in poor condition	**7.1%**	**7.3%**	+0.2%		**7.2%**	+0.1%	

2021 TIP Investments

In the 2021 TIP, $785 million is directed to projects with a primary purpose of improving pavement condition on the NHS (Table 6). Of this total amount, $762 million is programmed to various projects in the SHOPP-Roadway Preservation program.

Table 6
2021 TIP Projects with Primary Purpose to Improve Pavement Condition on the NHS
$ in millions

	Investments		Projects	
Regional total	$785	8%	11	3%
	$785	8%	11	3%

Note: Project purpose data provided by project sponsors through the 2021 TIP. Project totals include one or more "grouped listings," which combine numerous projects into a single listing in the TIP.

A total of $1.9 billion is programmed to projects in the 2021 TIP that will improve pavement condition on the Interstate or non-Interstate NHS, regardless of the primary purpose of the projects. These investments are anticipated to bring 845.1 lane-miles of the Interstate and 150.9 lane-miles of the non-Interstate NHS from fair or poor condition into good condition (Table 7). However, the precise impact of these investments on reaching regional performance targets will be affected both by ongoing deterioration of pavement conditions throughout the TIP period as well as additional locally funded pavement preservation and rehabilitation projects that are not reflected in the TIP.

$1.9 billion

Table 7
2021 TIP Anticipated Improvements in Pavement Condition on NHS

Interstate lane-miles Improved *% of regional total*			**Non-Interstate NHS lane-miles Improved** *% of regional total*		
Fair to Good	Poor to Good	**Total Improved to Good**	Fair to Good	Poor to Good	**Total Improved to Good**
817.3 *36.6%*	27.8 *1.2%*	**845.1** ***37.8%***	93.9 *1.6%*	57.0 *1.0%*	**150.9** ***2.6%***

Note: Pavement condition improvements data provided by project sponsors through the 2021 TIP.

Bridge Condition

Goal: Maintain the condition of bridge assets in a state of good repair

Performance Measures

Two performance measures were established to identify trends and assess progress towards maintaining a state of good repair of bridges on the National Highway System (NHS).

Goal Area	Bridge Condition
Performance Measures	• Percentage of NHS bridges classified in good condition *(deck area square meters)* • Percentage of NHS bridges classified in poor condition *(deck area square meters)*

Performance Targets

State DOTs are required to develop a Transportation Asset Management Plan to develop long-range investment strategies for assets on the National Highway System, including bridge condition. The plan establishes 10-year performance targets as well as targets for years 2 and 4 to monitor progress. MPOs are required to set four-year targets and may choose to adopt the statewide target or adopt quantifiable performance targets for the region.

Caltrans finalized the statewide bridge condition targets in May 2018. In November 2018, MTC chose to support state targets for the four-year performance period.

Performance Measure *Percentage of system total*	**Baseline Conditions** 2017	**2 Year Targets**			**4 Year Targets**		
		Caltrans		**MTC**	**Caltrans**		**MTC**
		Statewide Target 2019	2-year change	Regional Target 2019	Statewide Target 2021	2-year change	Regional Target 2021
NHS bridges in good condition	**66.5%**	**69.1%**	+2.6%	N/A	**70.5%**	+4.0%	Support State Targets
NHS bridges in poor condition	**4.8%**	**4.6%**	-0.2%		**4.4%**	-0.4%	

2021 TIP Investments

The 2021 TIP includes project investments totaling $1.5 billion on projects with a primary purpose of improving bridge conditions on the NHS (Table 8). Of this amount, $509 million is programmed to various projects through the SHOPP-Bridge Rehabilitation and Reconstruction program.

Table 8
2021 TIP Projects with Primary Purpose to Improve Bridge Condition on the NHS
$ in millions

	Investments		Projects	
Regional Total	$1,459	14%	22	7%
	$1,459	14%	22	7%

Note: Project purpose data provided by project sponsors through the 2021 TIP. Project totals include one or more "grouped listings," which combine numerous projects into a single listing in the TIP.

More than $1.6 billion is directed to all projects, regardless of project purpose, that will improve bridge deck conditions on the NHS (Table 9). These investments are anticipated to bring 526,161 square meters of bridge deck area, or 0.9% of the regional total, from fair or poor condition into good condition. As compared with bridge conditions from 2017, the projects included in the 2021 TIP can be expected to improve regional

performance on bridge condition by 0.9%. However, the precise impact of these investments on performance will be affected by ongoing deterioration of bridge conditions throughout the TIP period as well as other locally funded bridge projects not captured in the TIP.

$1.6 billion

Table 9
2021 TIP Investments in Bridge Condition on NHS
$ in millions

Bridge Deck Square Meters Improved *% of regional total*		
Fair to Good	Poor to Good	**Total Improved to Good**
377,884 *0.6%*	148,277 *0.2%*	**526,161** ***0.9%***

Note: Bridge deck condition improvement data provided by project sponsors through the 2021 TIP.

Transit Asset Management

Goal: Maintain the condition of public transit assets in a state of good repair

Performance Measures

Four performance measures were established to identify trends and assess progress towards maintaining a state of good repair (SGR) for public transit assets, including rolling stock, equipment, infrastructure, and facilities.

Goal Area	Transit Asset Condition
Performance Measures	• Percentage of revenue vehicles that have met or exceeded their useful life benchmark *(by asset class)* • Percentage of facilities with a condition rating below fair *(by asset class)* • Percentage of rail fixed-guideway with speed restrictions *(directional route-miles)* • Percentage of non-revenue vehicles that have met or exceeded their useful life benchmark

Performance Targets

Transit operators and MPOs are required to set annual targets for each transit asset performance measure. In the case of rolling stock and facilities, the major asset categories are further broken down into distinct asset classes. To develop regional targets, MTC consolidates the targets set by individual operators for each asset class. Targets established by operators reflect realistic forecasts for the coming fiscal year for funding that will be available for the repair or replacement of transit assets.

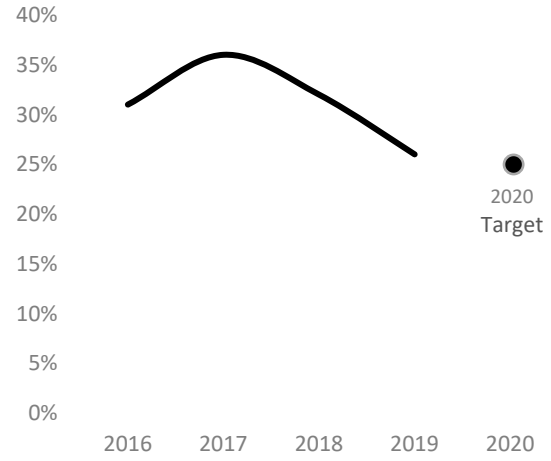
MTC established its latest regional transit asset performance targets in April 2020 based on an aggregation of individual targets set by operators. The regional targets anticipate modest improvements in the percentage of assets in a state of good repair for three of the four asset classes, which represents a

continuation of progress made over the previous year. However, guideway assets are expected to see a slight decline in state of good repair in 2020, though guideway condition improved significantly from 2018 to 2019. The targets for each measure are detailed in the table below, followed by Bay Area regional trend charts for each performance measure.

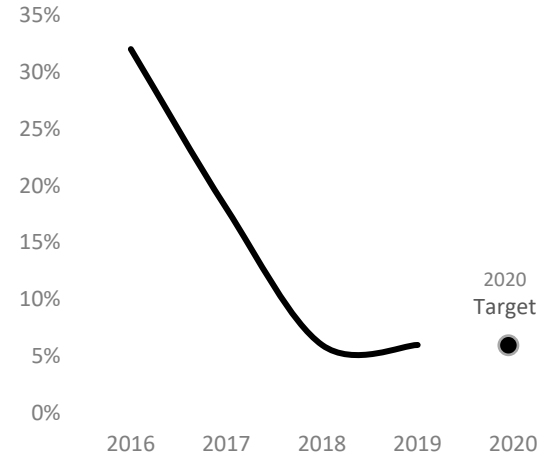
Performance Measures	**Baseline Condition** 2019	**MTC Target** 2020
Revenue Vehicles – percent exceeding useful life benchmark (ULB)	26%	24%
Articulated bus	*12%*	*1%*
Automated guideway vehicle	*0%*	*0%*
Automobile	*18%*	*1%*
Bus	*17%*	*17%*
Cable car	*70%*	*70%*
Commuter rail – locomotive	*56%*	*56%*
Commuter rail – passenger car	*41%*	*41%*
Commuter rail – self-propelled passenger coach	*0%*	*0%*
Cutaway bus	*26%*	*1%*
Double decker bus	*0%*	*0%*
Ferryboat	*21%*	*15%*
Heavy rail	*78%*	*73%*
Light rail	*0%*	*0%*
Minivan	*29%*	*0%*
Over-the-road bus	*35%*	*35%*
Trolley bus	*21%*	*24%*
Van	*10%*	*10%*
Vintage trolley	*100%*	*100%*
Facilities – percent with condition rating below fair	6%	6%
Administrative and maintenance facilities	*5%*	*6%*
Passenger facilities	*7%*	*6%*
Rail fixed-guideway – percent with speed restrictions	1.0%	1.3%
Non-Revenue Vehicles – percent exceeding ULB	56%	53%

Bay Area Transit Asset Management Trends

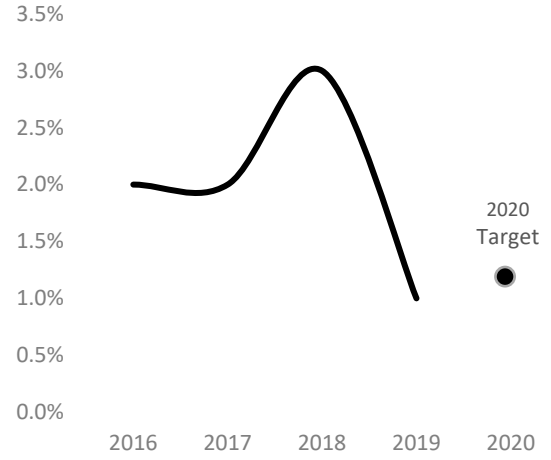
Revenue Vehicles That Have Met or Exceeded Their Useful Life Benchmark (all vehicle classes)



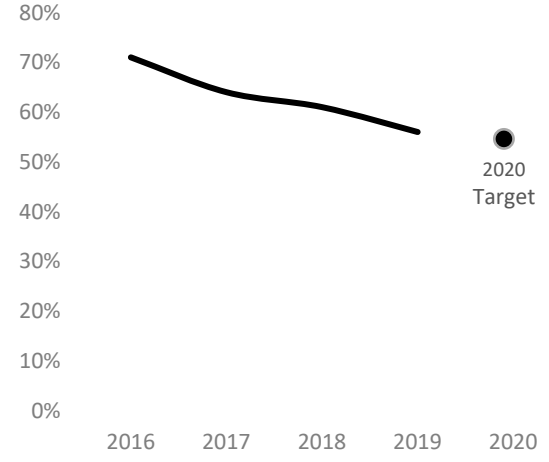
Facilities with a Condition Rating Below Fair



Guideway Route-Miles with Performance Restrictions



Non-Revenue Vehicles That Have Met or Exceeded Their Useful Life Benchmark



2021 TIP Investments

Roughly $563 million is invested in the 2021 TIP on projects with a primary purpose of transit asset management (Table 10).

A total of $3.9 billion is invested in transit maintenance, rehabilitation, or expansion projects regardless of the primary project purpose. Transit rehabilitation or replacement projects directly affect regional transit asset conditions by increasing the share of assets in a state of good repair. Adding new assets as part of a transit service expansion also has an impact on the share of transit assets in a state of good repair by increasing the total number of assets in a particular class.

Table 10
2021 TIP Projects with Primary Purpose of Transit Asset Management *$ in millions*

	Investments	% of 2021 TIP Investments	Projects	% of 2021 TIP Projects
ACE	$7	<1%	1	<1%
BART	$447	4%	4	1%
Fairfield	$0	<1%	1	<1%
GGBHTD	$1	<1%	1	<1%
NVTA	$4	<1%	1	<1%
SFMTA	$49	<1%	3	1%
SolTrans	$3	<1%	1	<1%
STA	$23	<1%	2	1%
Union City Transit	$7	<1%	1	<1%
VTA	$20	<1%	7	2%
Total	$563	5%	22	7%

Note: Project purpose data provided by provided by project sponsors through the 2021 TIP.

Some of the largest investments in transit assets, including expansion projects, in the 2021 TIP include:

$4.2 billion

- $3.2 billion – BART Berryessa to San Jose Extension
- $425 million – BART Transbay Core Capacity Improvements
- $259 million – Caltrain Electrification & expansion projects
- $34 million – SFMTA Light Rail Vehicle Procurement
- $9.5 million – Concord BART Station Modernization
- $4 million – NVTA Vine Transit Bus Maintenance Facility

Rail transit accounts for the majority of the transit asset investment in the 2021 TIP, with the BART extension from Berryessa to San Jose, alone, programmed to receive 76% of the funds programmed to transit asset projects in the 2021 TIP.

The specific impact of these transit investments on annual performance will be heavily influenced by the rate of continued wear and tear on existing transit assets during the TIP period as well as additional investments made by transit operators that are not captured in the 2021 TIP.

In the Bay Area, FTA formula funding for transit capital assets are programmed through the Transit Capital Priorities (TCP) program. The next cycle of the TCP program will begin in early 2021, with a significant influx of FTA-funded transit asset management projects anticipated to be programmed into the TIP at that time.

Table 11. 2021 TIP Anticipated Effect on Transit Asset Management Performance						
Performance Measures/Assets	**Baseline Condition** 2019	**MTC Target** 2020	**Asset Totals** 2020	**New Assets in 2021 TIP**		**Performance with 2021 TIP**
				Expansion	**Replacement**	
Revenue Vehicles *(% past ULB)*						
Articulated bus	12%	1%	489	12		**12%**
Automated guideway vehicle	0%	0%	4			**0%**
Automobile	18%	1%	151			**18%**
Bus	17%	17%	2787	12	41	**15%**
Cable car	70%	70%	42			**70%**
Commuter rail – locomotive	56%	56%	42			**56%**
Commuter rail – passenger coach	41%	41%	177			**38%**
Commuter rail – self-propelled passenger car	0%	0%	18	40	96	**0%**
Cutaway bus	26%	1%	409			**26%**
Double decker bus	0%	0%	13			**0%**
Ferryboat	21%	15%	23			**21%**
Heavy rail	78%	73%	669	412	669	**0%**
Light rail	0%	0%	250	109		**0%**
Minivan	29%	0%	218			**29%**
Over-the-road bus	35%	35%	156		13	**27%**
Trolley bus	21%	24%	309			**21%**
Van	10%	10%	351			**10%**
Vintage trolley	100%	100%	43			**100%**
Facilities *(% with condition rating below fair)*						
Administrative and maintenance facilities	5%	6%	223	1	31	**0%**
Passenger facilities	7%	6%	238	9	43	**0%**
Rail fixed-guideway *(% with speed restrictions)*						
Rail fixed-guideway	1.0%	1.30%	501	6.5	18.1	**0%**
Non-Revenue Vehicles *(% past ULB)*						
Non-Revenue Vehicles	56%	53%	1941			**56%**

Note: Data provided by project sponsors through the 2021 TIP.

Blue = meets 2020 target
Green = does not meet 2020 target

CONGESTION REDUCTION

Goal: Achieve a significant reduction in congestion on the National Highway System

Performance Measures

Two performance measures were established to identify trends and assess progress towards reducing traffic congestion on the National Highway System in urban areas.

Goal Area	Congestion Reduction
Performance Measure	• Annual hours of peak-hour excessive delay per capita by urbanized area • Percent of non-single occupancy vehicle (non-SOV) travel by urbanized area

Performance Targets

State DOTs and MPOs are required to set two- and four-year targets every four years for both congestion measures. Both targets are federally-required to be fully consistent between the state DOT and the MPO for each urbanized area.

For the first performance period, targets must be set by urbanized areas (UAs) with populations over one million that are also in nonattainment or maintenance areas for ozone, carbon monoxide or particulate matter. In the Bay Area, the San Francisco-Oakland and San Jose urbanized areas meet these thresholds. In the second performance period, beginning in 2022, three more urbanized areas in the San Francisco Bay Area will be required to set targets.

For the first round of target-setting, Caltrans and MTC are responsible for setting four-year targets (2022) for the excessive delay measure and two- and four-year targets (2020 and 2022) for the mode share measure.

Caltrans adopted statewide targets in May 2018. The state's targets for the delay measure in the Bay Area's urbanized areas aim to reduce peak-hour excessive delay per capita by 4% over 2017 conditions. The non-SOV share targets set by Caltrans for the Bay Area urbanized areas align with the mode shift targets adopted by MTC through Plan Bay Area 2040. MTC adopted targets for urbanized areas within its region in November 2018; however, given the requirement for full consistency between the MPO and the state DOT targets for each urbanized area, the state targets shown below effectively serve as the regional targets as well.

Performance Measures	Baseline 2017	2-year Targets Caltrans & MTC 2019	4-year Targets Caltrans & MTC 2021
Peak-hour excessive delay – annual, per capita			
San Francisco-Oakland UA	31.3 hours	*Not required to set two-year targets this cycle*	**30.0 hours** (-4.0%)
San Jose UA	27.5 hours		**26.4 hours** (-4.0%)
Concord UA	*Not required to set two- or four-year targets this cycle*		
Santa Rosa UA			
Antioch UA			
Non-SOV travel – percent			
San Francisco-Oakland UA	44.3%	**45.3%** (+1.0%)	**46.3%** (+2.0%)
San Jose UA	24.5%	**25.5%** (+1.0%)	**26.5%** (+2.0%)
Concord UA	N/A	*Not required to set two- or four-year targets this cycle*	
Santa Rosa UA			
Antioch UA			

2021 TIP Investments

Nearly $2.9 billion is invested through the 2021 TIP in projects that are intended to improve congestion throughout the region (Table 12). Approximately 13% of that total amount is directed to projects located within the San Francisco-Oakland or San Jose urban areas. An additional 8% of the total is programmed on projects that aim to improve congestion in more than one urban area (Table 13).

$2.9 billion

Table 12. 2021 TIP Congestion Reduction Projects *$ in millions*

	Investments	% of 2021 TIP Investments	Projects	% of 2021 TIP Projects
Significant improvement	$1,115	11%	47	14%
Moderate improvement	$1,750	17%	86	26%
	$2,865	28%	133	40%

Note: Anticipated effect of projects on congestion provided by project sponsors through the 2021 TIP. Project totals include one or more "grouped listings," which combine numerous projects into a single listing in the TIP.

Table 13. 2021 TIP Congestion Reduction Projects, by Urbanized Areas				*$ in millions*
	Investments	% of 2021 TIP Investments	Projects	% of 2021 TIP Projects
San Francisco-Oakland UA	$647	6%	50	15%
San Jose UA	$694	7%	23	7%
Concord UA	$260	3%	9	3%
Santa Rosa UA	$6	0%	2	1%
Antioch UA	$0	0%	0	0%
Other Areas	$450	4%	25	7%
Multiple areas or regional	$809	8%	24	7%
	$2,865	28%	133	40%

Note: Location of congestion reduction projects provided by project sponsors through the 2021 TIP. Project totals include one or more "grouped listings," which combine numerous projects into a single listing in the TIP.

Projects intended to reduce congestion in the 2021 TIP include:

- $356 million – for various projects in the SHOPP Mobility Improvements program
- $242 million – I-80 Managed Lanes in Solano County
- $218 million – Caltrain Electrification
- $201 million – SR 84 Widening, South of Ruby Hill Drive to I-680 in Alameda County
- $154 million – US 101/Zanker Rd Skyport Drive-North Fourth St Improvements in San Jose
- $94 million – BART Bay Fair Connection project in Alameda County
- $27 million – SR12/29/221 Soscol Junction Interchange Improvements in Napa County

In terms of shifting travel away from single-occupancy vehicle modes, more than $5.4 billion is invested through the 2021 TIP in projects primarily supporting non-auto modes (Table 15).

$5.4 billion

Table 15 2021 TIP Projects with Primary Mode other than Auto				*$ in millions*
	Investments	% of 2021 TIP Investments	Projects	% of 2021 TIP Projects
Alameda	$393	4%	28	8%
Contra Costa	$107	1%	17	5%
Marin	$64	1%	11	3%
Napa	$22	<1%	9	3%
San Francisco	$555	5%	26	8%
San Mateo	$304	3%	14	4%
Santa Clara	$3,426	33%	39	12%
Solano	$48	<1%	17	5%
Sonoma	$24	<1%	12	4%
Multiple Counties	$477	5%	12	4%
	$5,420	53%	185	55%

Note: Primary mode information provided by project sponsors through the 2021 TIP.

When considering all investments in the TIP, regardless of project's primary focus, a total of $5.6 billion is invested in bicycle, pedestrian, or transit travel (Table 16). An example of a project that supports multiple modes is a pavement preservation rehabilitation project that adds sidewalks, bicycle facilities or transit stop improvements. While the pavement rehabilitation is the primary focus of the scope and cost of the project, additional investments are directed to elements that support non-auto modes.

Table 16
2021 TIP Investments in Non-Auto Modes *$ in millions*

	Investments	% of 2021 TIP Investments
Alameda	$390	4%
Contra Costa	$105	1%
Marin	$65	1%
Napa	$26	<1%
San Francisco	$564	5%
San Mateo	$325	3%
Santa Clara	$3,544	34%
Solano	$55	1%
Sonoma	$22	<1%
Multiple Counties	$467	5%
	$5,564	54%

Note: Investments by mode provided by project sponsors through the 2021 TIP.

SYSTEM RELIABILITY

Goal: Improve the efficiency of the surface transportation system

Performance Measures

Two performance measures were established to identify trends and assess progress towards improving reliability of the Interstate system and non-Interstate National Highway System (NHS).

Goal Area	System Reliability
Performance Measures	• Percentage of person-miles traveled on the Interstate highway system that are reliable • Percentage of person-miles traveled on the non-Interstate NHS that are reliable

Performance Targets

State DOTs and MPOs are required to set two- and four-year targets every four years for each reliability measure. MPOs have the option of supporting State targets or setting their own region-specific numerical targets on a target-by-target basis.

Caltrans set their targets in May 2018, which aim for small improvements in reliability for passenger transportation on both the Interstate and non-Interstate NHS. In November 2018, MTC elected to support the state four-year targets for both measures of reliability.

Performance Measure *Percentage of system total*	**Caltrans**			**MTC**		
	Baseline 2017	**2-year Targets** 2019	**4-year Targets** 2021	**Baseline** 2017	**2-year Targets** 2019	**4-year Targets** 2021
Reliable person-miles traveled on Interstate system	64.6%	**65.1%** (+0.5%)	**65.6%** (+1.0%)	63.3%	N/A	Supported State Targets
Reliable person-miles traveled on non-Interstate NHS	73.0%	N/A	**74.0%** (+1.0%)	64.7%	N/A	Supported State Targets

2021 TIP Investments

In the 2021 TIP, nearly $2.9 billion is invested in projects that are expected to improve system reliability on the Interstate system (Table 18). On the non-Interstate NHS, a similar level of investment, $2.7 billion, is directed to system reliability improvements (Table 19).

$2.9 billion

Table 18 2021 TIP Interstate System Reliability Projects *$ in millions*

	Investments	% of 2021 TIP Investments	Projects	% of 2021 TIP Projects
Significant improvement	$1,516	15%	23	7%
Moderate improvement	$1,372	13%	37	11%
	$2,888	28%	60	18%

Note: Anticipated effect of projects on reliability provided by project sponsors through the 2021 TIP. Project totals include one or more "grouped listings," which combine numerous projects into a single listing in the TIP.

$2.7 billion

Table 19
2021 TIP Non-Interstate NHS System Reliability Projects *$ in millions*

	Investments	% of 2021 TIP Investments	Projects	% of 2021 TIP Projects
Significant improvement	$1,969	19%	34	10%
Moderate improvement	$701	7%	52	16%
	$2,670	26%	125	37%

Note: Anticipated effect of projects on reliability provided by project sponsors through the 2021 TIP. Project totals include one or more "grouped listings," which combine numerous projects into a single listing in the TIP.

Reliability projects in the 2021 TIP that support improvements in Interstate and the non-Interstate NHS system include:

- $3.2 billion – BART's Berryessa to San Jose extension
- $356 million for various projects in the SHOPP Mobility Program
- $319 million for various projects in the SHOPP Collision Reduction Program
- $243 million – BATA's Toll Bridge Rehabilitation and Maintenance programs

FREIGHT MOVEMENT AND ECONOMIC VITALITY

Goal: Improve the national freight network, strengthen the ability of rural communities to access national and international trade markets, and support regional economic development

Performance Measures

One performance measure was created to identify trends and assess progress towards improving reliability of the Interstate system specifically for freight trucks.

Goal Area	Freight Movement and Economic Vitality
Performance Measure	• Percentage of Interstate highway system mileage providing reliable truck travel times (Truck Travel Time Reliability Index)

Performance Targets

State DOTs and MPOs are required to set 2- and 4-year numerical targets for the freight movement target. MPOs have the option of supporting State targets or setting their own region-specific numerical targets on a target-by-target basis.

Caltrans set statewide targets in May 2018. These targets reflect a slight degradation of truck travel time reliability, with the percent of reliable Interstate miles decreasing by one tenth of a percentage point in both 2020 and 2022. In November 2018, MTC elected to support the state four-year target.

Performance Measure	Caltrans			MTC		
	Baseline 2017	**2-year Targets** 2019	**4-year Targets** 2021	**Baseline** 2017	**2-year Targets** 2019	**4-year Targets** 2021
Reliable Interstate miles of truck travel – Truck Travel Reliability Index	1.69	**1.68** (-0.6%)	**1.67** (-1.2%)	2.30	N/A	Supported State Target

2021 TIP Investments

Reliability improvement projects for Interstate truck travel account for $2.0 billion of investments in the 2021 TIP (Table 20). Many of the investments that improve reliability on the Interstate for all travelers also improve reliability specifically for truck travel.

$2.0 billion

Table 20
2021 TIP Interstate System Truck Travel Reliability Projects *$ in millions*

	Investments	% of 2021 TIP Investments	Projects	% of 2021 TIP Projects
Significant improvement	$953	9%	18	5%
Moderate improvement	$1,097	11%	24	7%
	$2,050	20%	42	13%

Note: Anticipated effect of projects on reliability provided by project sponsors through the 2021 TIP. Project totals include one or more "grouped listings," which combine numerous projects into a single listing in the TIP.

A few reliability projects in the 2021 TIP that target freight travel specifically include:

- $77 million – I-80/I-680/SR 12 Interchange Phase 2A in Solano County
- $29 million – I-880/Industrial Parkway West Interchange in Alameda County
- $9.2 million – Reconstruct I-80/San Pablo Dam Rd Interchange in Contra Costa County

ENVIRONMENTAL SUSTAINABILITY

Goal: Enhance the performance of the transportation system while protecting and enhancing the natural environment

Performance Measures

One performance measure was created to identify trends and assess progress towards improving emissions reductions under the Congestion Mitigation Air Quality Improvement (CMAQ) Program,

Goal Area	Environmental Sustainability
Performance Measure	• Total emissions reductions from CMAQ-funded projects, by pollutant

Performance Targets

State DOTs and MPOs are required to set 2- and 4-year numerical targets for the emissions reduction measure for each applicable pollutant. MPOs have the option of supporting State targets or setting their own region-specific numerical targets on a target-by-target basis.

Caltrans set statewide targets for emissions reductions in May 2018. These targets reflect a steady increase in the daily kilograms reduced for each pollutant for projects funded through the CMAQ program. MTC adopted regional targets in November 2018, based on the results of MTC's emissions reductions model, which accounts for projects within the CMAQ pipeline and vehicle fleet characteristics, among other factors.

Performance Measure	**Caltrans**			**MTC**		
	Baseline (2014-17)	**2-year Targets** (2018-19)	**4-year Targets** (2018-21)	**Baseline** (2014-17)	**2-year Targets** (2018-19)	**4-year Targets** (2018-21)
Total emissions reductions from CMAQ-funded projects, by pollutant						
Fine particulate matter – PM2.5 (kg/day)	904.25	**913.29** (+1%)	**922.34** (+2%)	24.5	**8.66**	**16.53**
Particulate matter – PM10 (kg/day)	2,431.21	**2,455.52** (+1%)	**2,479.83** (+2%)	31.29	**10.99**	**21.00**
Carbon monoxide – CO* (kg/day)	6,683.26	**6,931.90** (+1%)	**7,000.54** (+2%)	31,046.04	**8,373.38**	**14,963.60**
Volatile organic compounds – VOCs (kg/day)	951.83	**961.35** (+1%)	**970.87** (+2%)	2,248.93	**528.31**	**897.70**
Nitrogen oxide – NOx (kg/day)	1,753.36	**1,770.89** (+1%)	**1,788.43** (+2%)	2,179.66	**557.61**	**962.58**

** A regional target for carbon monoxide may not be required, as the San Francisco Bay Area's maintenance period for carbon monoxide ended as of June 30, 2018.*

***Two-year target is the expected emissions reduction per day for federal fiscal years 2018 and 2019; 2021 target is expected emissions reduction per day for federal fiscal years 2018 through 2021.*

2021 TIP Investments

Pollutant reduction calculations are performed for each CMAQ-funded project in the TIP. For emissions benefits targets, only those projects that will obligate CMAQ funds for the first time during the current performance period can be credited towards performance achievements during the period. Projects that have obligated CMAQ funds in prior years can still be credited for performance achievements of the traffic congestion targets (peak-hour excessive delay per capita and percent of non-SOV travel).

There are 20 projects programmed to obligate $33 million in CMAQ funds for the first time during the 2021 TIP (Table 20). During the first three years of the performance period (2018 through 2020), 59 additional projects contributed to the Bay Area's CMAQ emissions reductions targets for the period.

$33 million

Table 20
2021 TIP CMAQ Investments (2021 – 2024)

Total emissions reductions from CMAQ-funded projects, by pollutant*	
Fine particulate matter – PM2.5 (kg/day)	3.64
Particulate matter – PM10 (kg/day)	5.11
Carbon monoxide – CO (kg/day)	944.81
Volatile organic compounds – VOCs (kg/day)	73.39
Nitrogen oxide – NOx (kg/day)	130.45

Note: Based on latest available emissions reduction calculations; calculated by MTC.

** Does not include emissions from projects credited in prior years.*

The CMAQ-funded projects in the 2021 TIP with the largest emissions reductions for one or more pollutant include:

- San Ramon: Iron Horse Trail Bike and Pedestrian Overcrossing
- San Jose: West San Carlos Urban Village Streets Improvements
- Concord: Monument Boulevard Class I Path
- Santa Clara: Saratoga Creek Trail Phase 1
- Belmont: Ralston Avenue Corridor Bike-Pedestrian Improvements

In the Bay Area, CMAQ funds are programmed to projects through the One Bay Area Grant (OBAG) grant program. The CMAQ projects currently programmed in the 2021 TIP are the last of the projects awarded funding through the current OBAG cycle, OBAG 2. The next cycle of the program, OBAG 3, will begin in 2022. A significant influx of CMAQ projects is anticipated to be programmed into the TIP at that time.

LIMITATIONS

- *Limitations of self-reported data:* MTC relies on self-reported data from project sponsors to compile program level effects of investments on regional targets. This approach provides a great deal of new project-level data on a range of topics and in relatively short period of time. However, self-reported data may introduce into the analysis inaccurate data or inconsistent interpretations of the anticipated performance benefits resulting from similar project types. Staff is continuing efforts to improve the analytical approach to evaluating performance for quantification of benefits and improved consistency across projects.

- *External forces at play:* Performance in each goal area is influenced by a variety of factors that are not captured in the assessment of the effect of 2021 TIP investments on regional performance. For road safety and traffic congestion, growth or decline in economic activity is directly related to the total number of traffic fatalities and serious injuries as well as levels of congestion. The COVID-19 pandemic has also had significant effects on travel behavior in the Bay Area in recent months. These changes in roadway and transit safety trends, congestion and reliability, and mode shift are anticipated to continue into the 2021 TIP period as travel conditions start to slowly return to a "new normal." In the case of asset management, ongoing deterioration rates, and unanticipated events (earthquakes, wildfires, or flooding) can also affect the resulting state of good repair for regional assets.

- *Limitations of Current Tools:* The regional travel demand model was used to calculate performance for several measures in the previous TIP. However, the focus of the model on regional travel behavior, combined with the relatively small number of "modelable" projects included in the TIP (projects that are large enough in scope to be captured in the regional model), make it difficult to draw clear conclusions about the effect of TIP investments on measures for congestion, reliability, and mode share. For these reasons, the model was not used in the 2021 TIP federal performance report to assess potential changes in peak-hour excessive delay and non-auto mode share resulting from transportation investments in the TIP. MTC will continue to pursue new analytical approaches to quantify the impacts of near-term transportation investments on performance. Additionally, new tools may be needed to better analyze the effects of different project and program types on reaching the region's federal performance targets.