2022/23 Performance Benchmark Report

June 2023

California Department of Transportation

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2022/23 Performance Benchmark Report

Prepared by the California Department of Transportation

June 1, 2023

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Introduction

This report presents Caltrans' efforts to date in reducing deferred maintenance through an assessment of current and projected performance accomplishments through 2027. In compliance with Federal and State requirements, Caltrans has prepared an assessment of progress against annual benchmarks associated with the four primary asset classes (pavement, bridge, transportation management systems, and drainage) for the 10-year period spanning 2018-2027.

The 2018 *California Transportation Asset Management Plan (TAMP)* and Senate Bill 1 (SB1) each established 10-year performance targets for the State Highway Operation and Protection Program (SHOPP) primary asset classes. The California Transportation Commission (Commission) SHOPP Guidelines require annual reporting to measure progress and develop projections toward meeting the defined performance targets for each of the four primary asset classes by 2027.

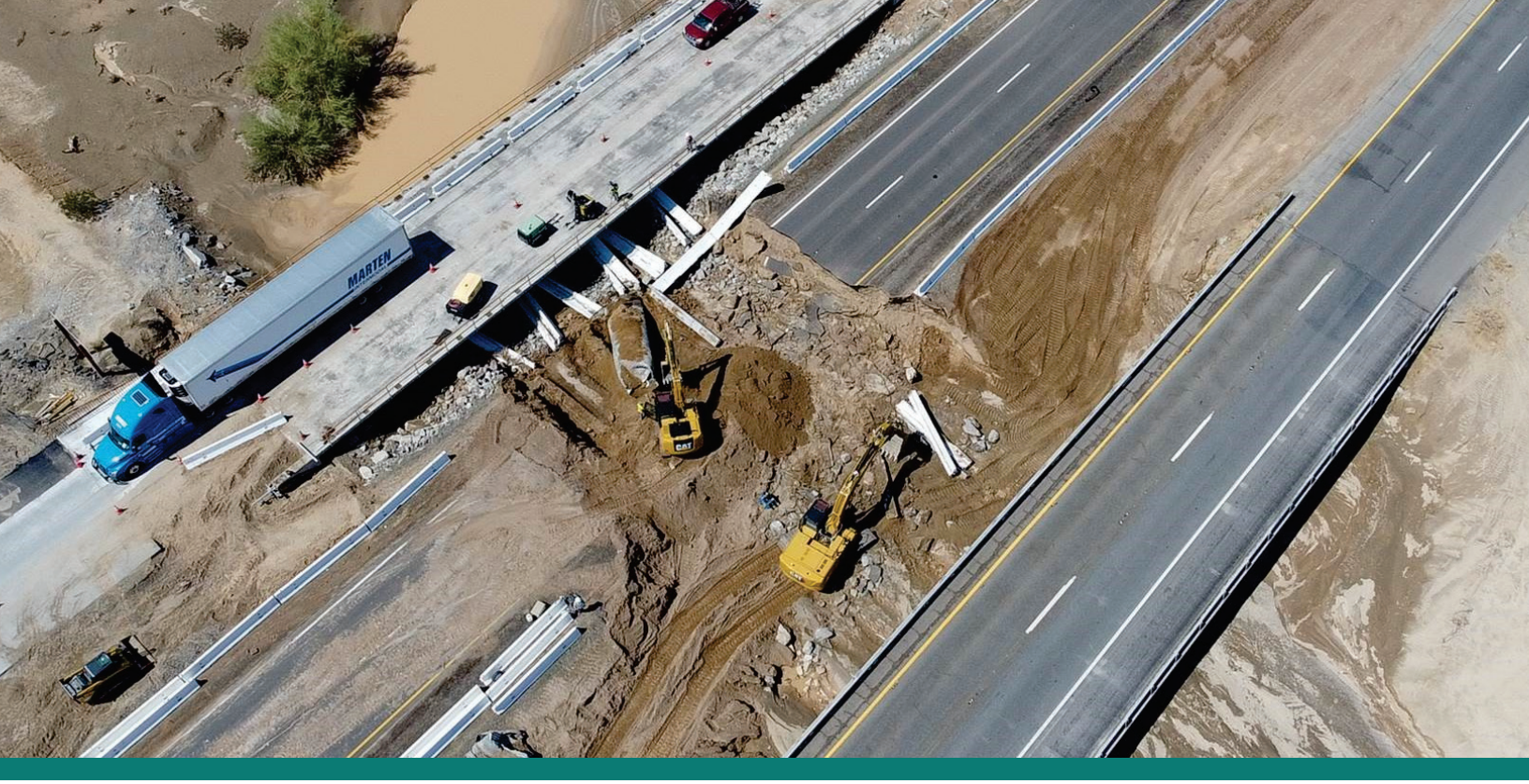
Benchmarks were initially adopted by the Commission in March 2018. This report presents conditions to date in addition to updated condition projections relative to the

Commission adopted benchmarks. The updated progress reflects Commission actions through March 2022, updated condition information where available, accomplishments expected from projects in the Ten-Year SHOPP Project Book, and updated Highway Maintenance projections.

SB1 includes two additional performance objectives. For pavement the Level of Service (LOS) is reported, based on cracking and spalling. For bridges the number of additional bridges fixed is reported by annual and cumulative count to date. These two metrics will be achieved through the same project accomplishments and maintenance strategies considered in the benchmark analysis for the core assets. The department is committed to reporting progress made toward these specific performance measures so that the Commission can evaluate progress.

The annual benchmarks report also includes a summary of condition assessments for eight supplementary assets (drainage pump plants, highway lighting, office buildings, overhead sign structures, bicycle and pedestrian infrastructure, roadside rest facilities, transportation related facilities, and weigh in motion scales).

As of the time of report preparation, the condition of pavements for 2022 was not available from the Automated Pavement Condition Survey (APCS). As such, the conditions of pavement and Level of Service (LOS) presented in this report for 2022 are based on a projection of pavement conditions that consider the prior year's condition assessment and project-level condition improvements delivered over the past year. The Department will amend this report with updated pavement data from the 2022 APCS when it becomes available.



Performance Summary

Caltrans continues to make progress in meeting performance targets set forth by SB1 and the TAMP. Since the passage of SB1 in 2017, Caltrans has delivered projects to address 14,856 lane miles of pavement, 578,285 linear feet of culverts, and 6,198 TMS elements, in addition to fixing a total of 1,512 bridges (an additional 828 above the historic baseline).

The projections presented in this report indicate that the condition of the four primary asset classes will continue to show improvement overall. Caltrans is currently meeting and is projected to exceed SB1 condition-based targets by 2027 for pavement, bridges, and drainage, as summarized in Table 1. The SB1 requirement to fix an additional 500 bridges was met last year and the trend to fix additional bridges well beyond the SB1 requirement is expected to continue. Transportation Management Systems (TMS) elements condition has been crossing back and forth our projection line and is projected to meet targets by 2027. The Pavement Level of Service (LOS) target has been met in the prior reporting periods and is projected to surpass targets through 2027.

Table 2 presents the status of progress towards achieving 2027 targets established by the Commission and set forth in the 2018 TAMP, coinciding with the SB1 timeframe. Caltrans is on track to meet or exceed TAMP targets by 2027 for pavement, drainage, and TMS. Current projected conditions for bridge indicate that Caltrans will be achieving fair targets but will fall short in achieving poor targets by 2027. Caltrans will continue to proactively monitor progress.

Table 1 – Progress Towards 2027 SB1 Targets

Asset Class	2027 SB1 Target	Status of Progress
Pavement	98% Good or Fair Condition;	On Track
	90% level of service (LOS) achieved for maintenance of potholes, spalls, and cracks	On Track
Bridges	Fix an additional 500 bridges	On Track/ Target Achieved
Culverts	90% Good or Fair Condition	On Track
TMS	90% Good Condition	On Track

Table 2 – Progress Towards TAMP Targets

Asset Class		Good	Fair	Poor	Status of Progress
Pavement	**Class 1**	60%	39%	1%	On Track
	Class 2	55%	43%	2%	On Track
	Class 3	45%	53%	2%	On Track
Bridges and Tunnels		48.5%	50%	1.5%	Action Required
Drainage (Culverts)		70%	20%	10%	On Track
TMS		90%	N/A	10%	On Track

On Track – Caltrans is on track to meet performance targets by 2027.

Monitor – Projected performance falls within uncertainty bounds, or performance metric under revision.

Action Required – Changes to plans are needed to assure that performance targets are achieved by 2027.

Pavement Class I

Overview

Pavement Class I is comprised of route segments classified as interstate, other principal arterials, and urban freeways and expressways. It includes Freight Network Tier I and II, and the Strategic Highway Network (STRAHNET) routes. Examples of Class I routes include Sacramento 80, Ventura 101, San Diego 8, Los Angeles 210, and Alameda 580. There are 27,150 assessed lanes miles of pavement on Class I roadways, representing over half of the 50,019 assessed lane miles of pavement on the State Highway System (SHS).

Changes in Asset Condition

Pavement condition changes over time because of construction activities, traffic loading, and environmental factors, such as aging and changes in temperature and moisture. Table 3 summarizes the condition of the Pavement Class I asset inventory for the most recent year, based on projected 2022 conditions, as well as the prior year's condition assessment from 2021 condition assessment data. As of the time of report preparation, the condition of pavements for 2022 was not available from the Automated Pavement Condition Survey (APCS). As such, the conditions of pavement and Level of Service (LOS) presented in this report are based on a projection of 2022 pavement conditions using the 2021 APCS and project-level condition improvements delivered over the past year.

Timing of the Condition Assessment

Reported annual pavement conditions and total lane miles are based on a phased data collection effort through the Automated Pavement Condition Survey (APCS) over an 11-month period, typically between January and November of the reporting year. Projects under construction will not be reflected in the condition assessment.

Condition is presented in percentages of good, fair, and poor, by lane miles corresponding to the condition at the end of calendar year. Definitions of these condition states can be found in Appendix A.

Table 3 – Pavement Class I Condition Summary

Condition	2027 Target	2021 Year End	2022 Year End (Projection)	Change in Condition
Good	60.0%	61.3%	63.1%	**1.8%↑**
Fair	39.0%	37.4%	36.1%	**-1.3%↓**
Poor	1.0%	1.3%	0.8%	**-0.5%↓**

Projected and Assessed Conditions

Pavement Class I benchmarks are presented in Figure 1 through Figure 3. These charts show projected year-end good, fair, and poor condition as percentages of total lane miles from 2018 through 2027. The assessed conditions through 2021 are presented in the charts with solid fill symbols.

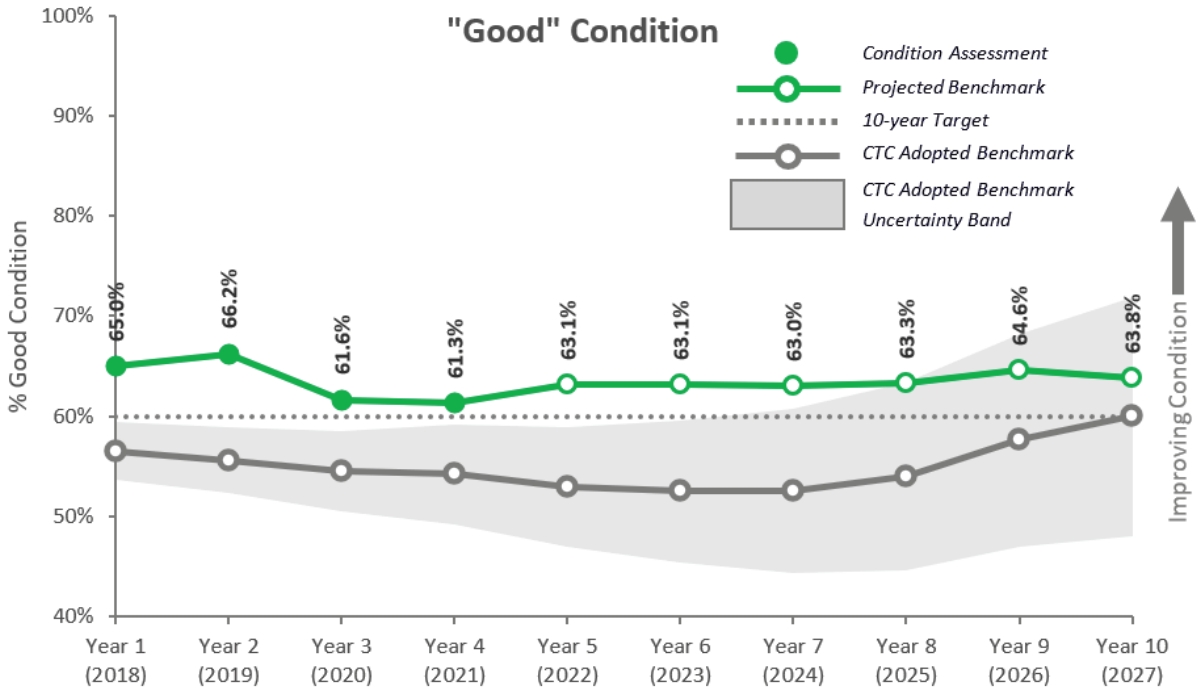


Figure 1 - Pavement Class I, Good

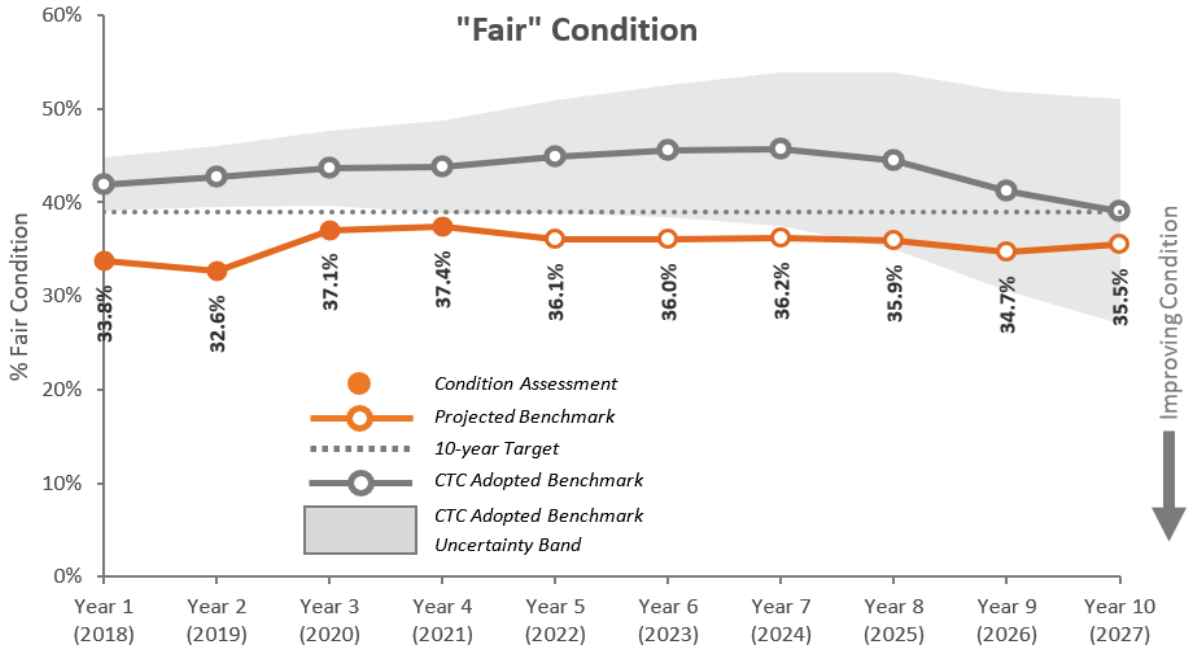


Figure 2 - Pavement Class I, Fair

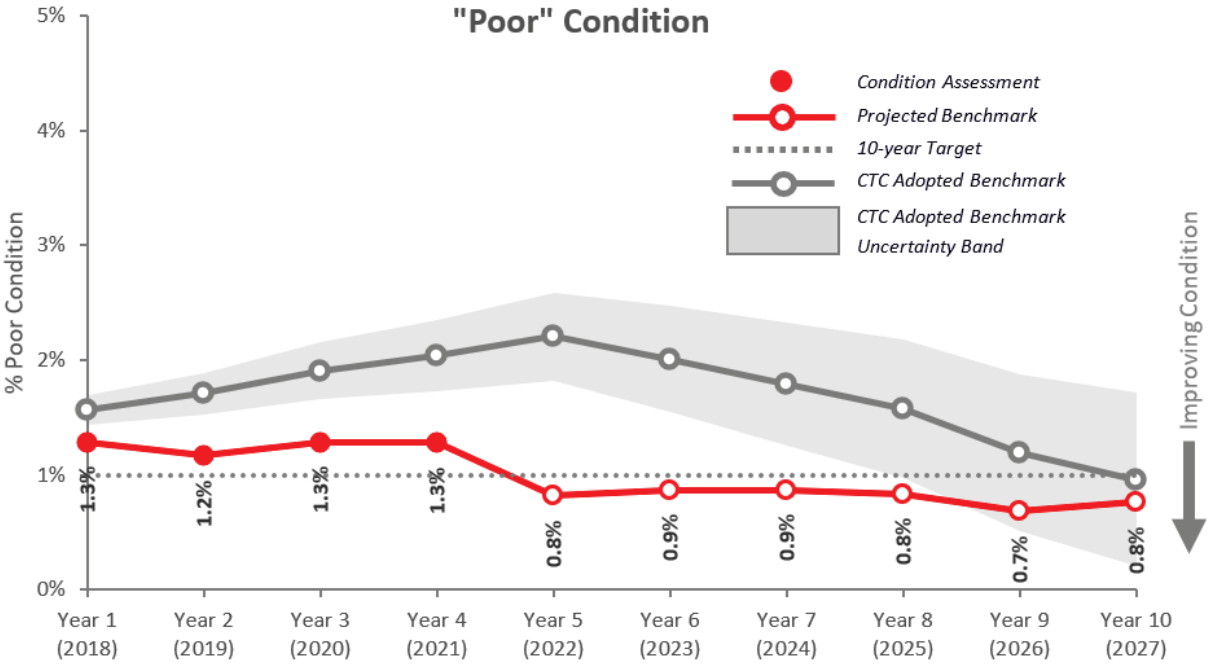


Figure 3 - Pavement Class I, Poor

Benchmark Observations

Projected 2022 Pavement Class I conditions suggest that all condition targets are currently being met. Improvements are anticipated over the prior year's conditions with decreases in both fair and poor lane miles and an increase in good condition pavements. This will need verification once the 2022 APCS pavement conditions become available. Projected pavement conditions in future years indicate relatively stable conditions through 2027. Continued delivery of pavement projects supported by the initiation of SB-1 funding has been a contributing factor to the observed condition improvements.

Pavement Class II

Overview

Pavement Class II is comprised of route segments classified as non-interstate National Highway System and Interregional Road System (IRRS). It includes Freight Network Tier III. Examples of Class II routes include Mendocino 20, Napa 29, Monterey 1, Riverside 74, and Orange 73. There are 16,276 assessed lanes miles of pavement on Class II roadways, representing approximately one-third of the 50,019 assessed lane miles of pavement on the State Highway System (SHS).

Changes in Asset Condition

Pavement condition changes over time because of construction activities, traffic loading, and environmental factors, such as aging and changes in temperature and moisture. Table 4 summarizes the condition of the Pavement Class II asset inventory for the most recent year, based on projected 2022 conditions, as well as the prior year's condition assessment from 2021 condition assessment data. As of the time of report preparation, the condition of pavements for 2022 was not available from the Automated Pavement Condition Survey (APCS). As such, the conditions of pavement and Level of Service (LOS) presented in this report are based on a projection of 2022 pavement conditions using the 2021 APCS and project-level condition improvements delivered over the past year.

Timing of the Condition Assessment

Reported annual pavement conditions and total lane miles are based on a phased data collection effort through the Automated Pavement Condition Survey (APCS) over an 11-month period, typically between January and November of the reporting year. Projects under construction will not be reflected in the condition assessment.

Condition is presented in percentages of good, fair, and poor, by lane miles corresponding to the condition at the end of calendar year. Definitions of these condition states can be found in Appendix A.

Table 4 - Pavement Class II Condition Summary

Condition	2027 Target	2021 Year End	2022 Year End (Projection)	Change in Condition
Good	55.0%	44.4%	46.9%	**2.5%↑**
Fair	43.0%	54.4%	52.4%	**-2.0%↓**
Poor	2.0%	1.2%	0.7%	**-0.5%↓**

Projected and Assessed Conditions

Pavement Class II benchmarks are presented in Figure 4 through Figure 6. These charts show projected year-end good, fair, and poor condition as percentages of total lane miles from 2018 through 2027. The assessed conditions through 2022 are presented in the charts with solid fill symbols.

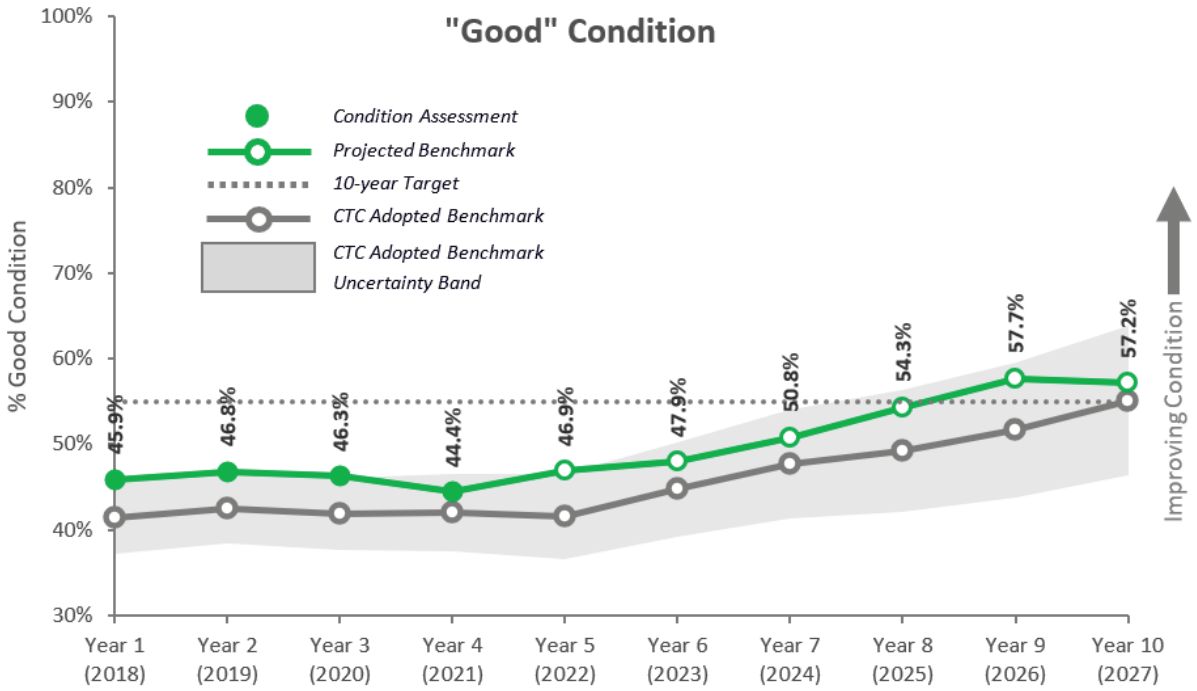


Figure 4 - Pavement Class II, Good

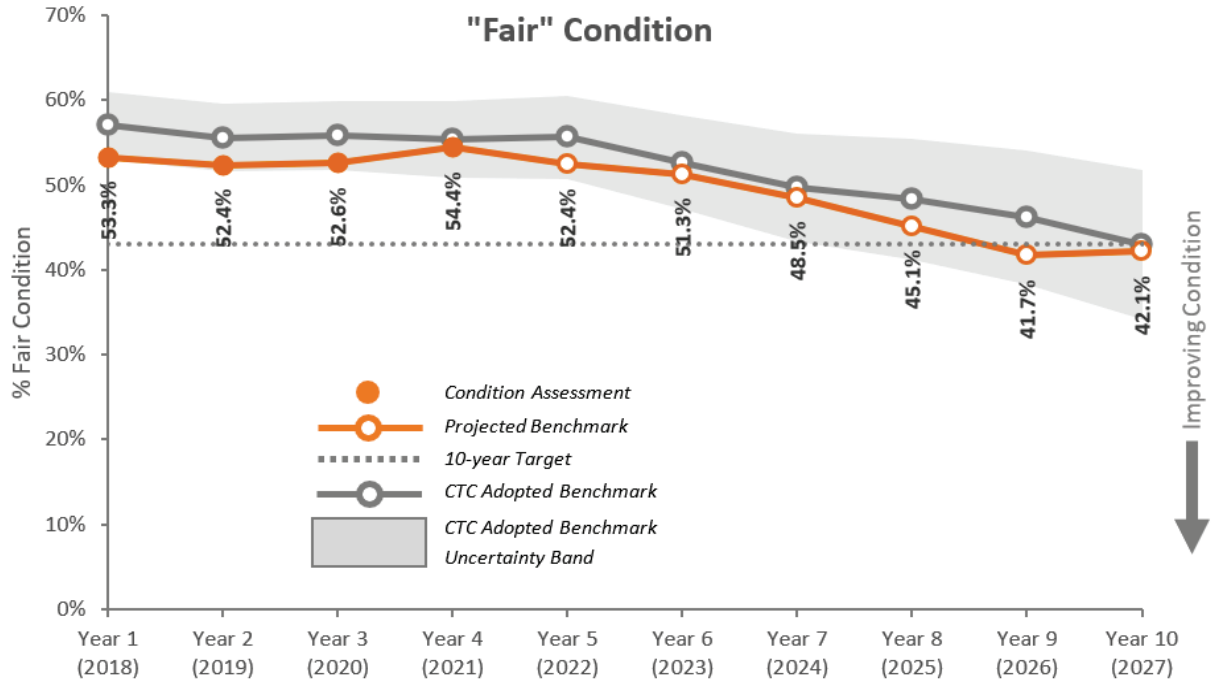


Figure 5 - Pavement Class II, Fair

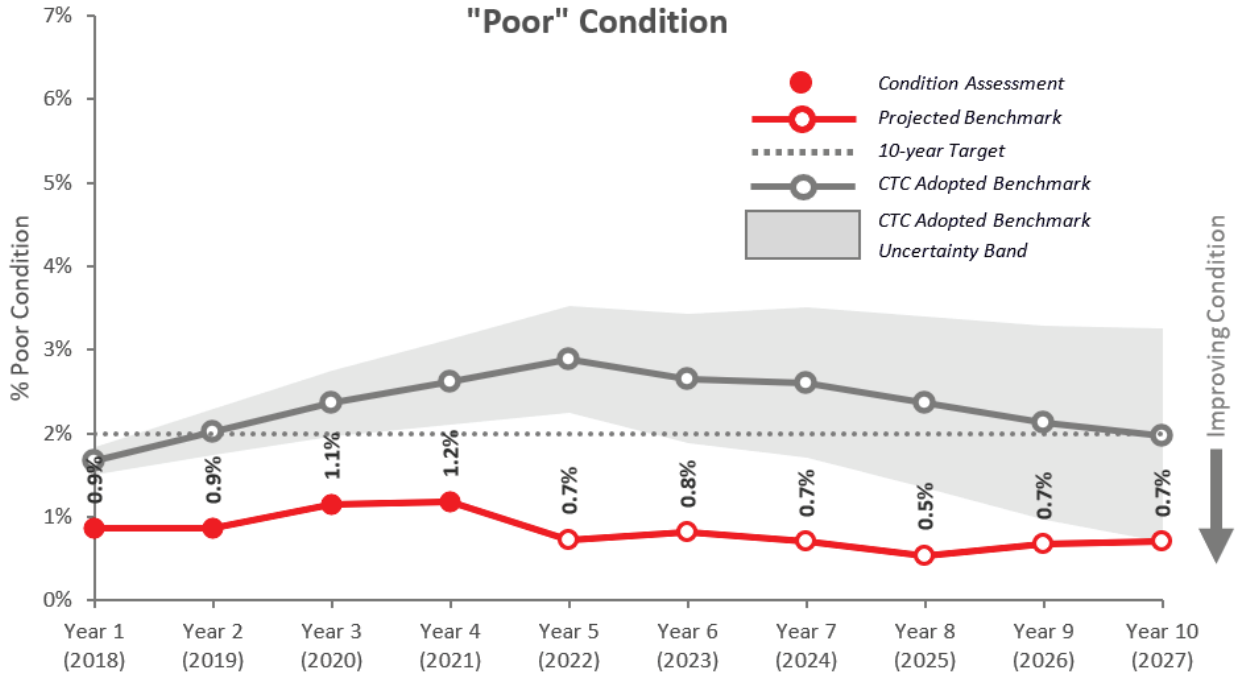


Figure 6 - Pavement Class II, Poor

Benchmark Observations

Projected 2022 Pavement Class II conditions suggest that all condition targets are currently being met. Improvements are anticipated over the prior year's conditions with decreases in both fair and poor lane miles and an increase in good condition pavements. This will need verification once the 2022 APCS pavement conditions become available. Projected pavement conditions in future years indicate relatively stable conditions through 2027. Continued delivery of pavement projects supported by the initiation of SB-1 funding has been a contributing factor to the observed condition improvements.

Pavement Class III

Overview

Pavement Class III is comprised of all other routes not included in Classes I and II. Examples of Class III routes: are Trinity 3, Humboldt 36, San Luis Obispo 58, and Mono 167. There are 6,593 assessed lanes miles of pavement on Class III roadways, representing approximately 13% of the 50,019 assessed lane miles of pavement on the State Highway System (SHS).

Changes in Asset Condition

Pavement condition changes over time because of construction activities, traffic loading, and environmental factors, such as aging and changes in temperature and moisture. Table 5 summarizes the condition of the Pavement Class III asset inventory for the most recent year, based on projected 2022 conditions, as well as the prior year's condition assessment from 2021 condition assessment data. As of the time of report preparation, the condition of pavements for 2022 was not available from the Automated Pavement Condition Survey (APCS). As such, the conditions of pavement and Level of Service (LOS) presented in this report are based on a projection of 2022 pavement conditions using the 2021 APCS and project-level condition improvements delivered over the past year.

Timing of the Condition Assessment

Reported annual pavement conditions and total lane miles are based on a phased data collection effort through the Automated Pavement Condition Survey (APCS) over an 11-month period, typically between January and November of the reporting year. Projects under construction will not be reflected in the condition assessment.

Condition is presented in percentages of good, fair, and poor, by lane miles corresponding to the condition at the end of calendar year. Definitions of these condition states can be found in Appendix A.

Table 5 - Pavement Class III Condition Summary

Condition	2027 Target	2021 Year End	2022 Year End (Projection)	Change in Condition
Good	45.0%	41.3%	44.5%	3.2%↑
Fair	53.0%	57.1%	54.8%	-2.3%↓
Poor	2.0%	1.6%	0.7%	-0.9%↓

Projected and Assessed Conditions

Pavement Class III benchmarks are presented in Figure 7 through Figure 9. These charts show projected year-end good, fair, and poor condition as percentages of total lane miles from 2018 through 2027. The assessed conditions through 2022 are presented in the charts with solid fill symbols.

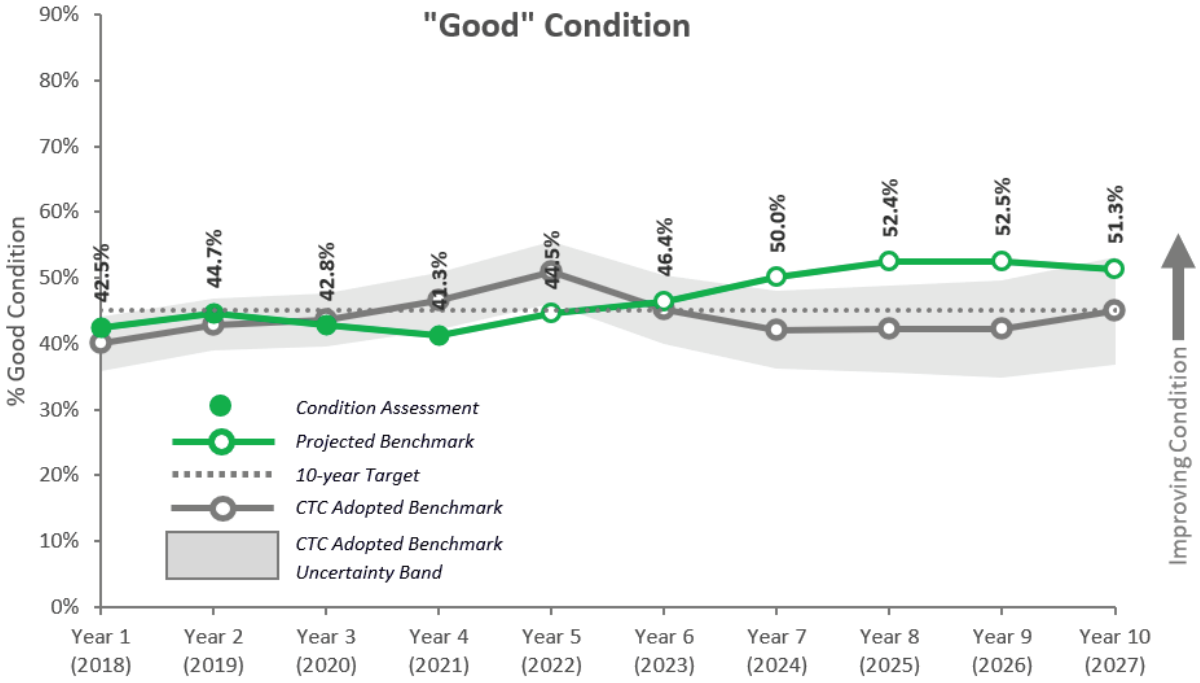


Figure 7 - Pavement Class III, Good

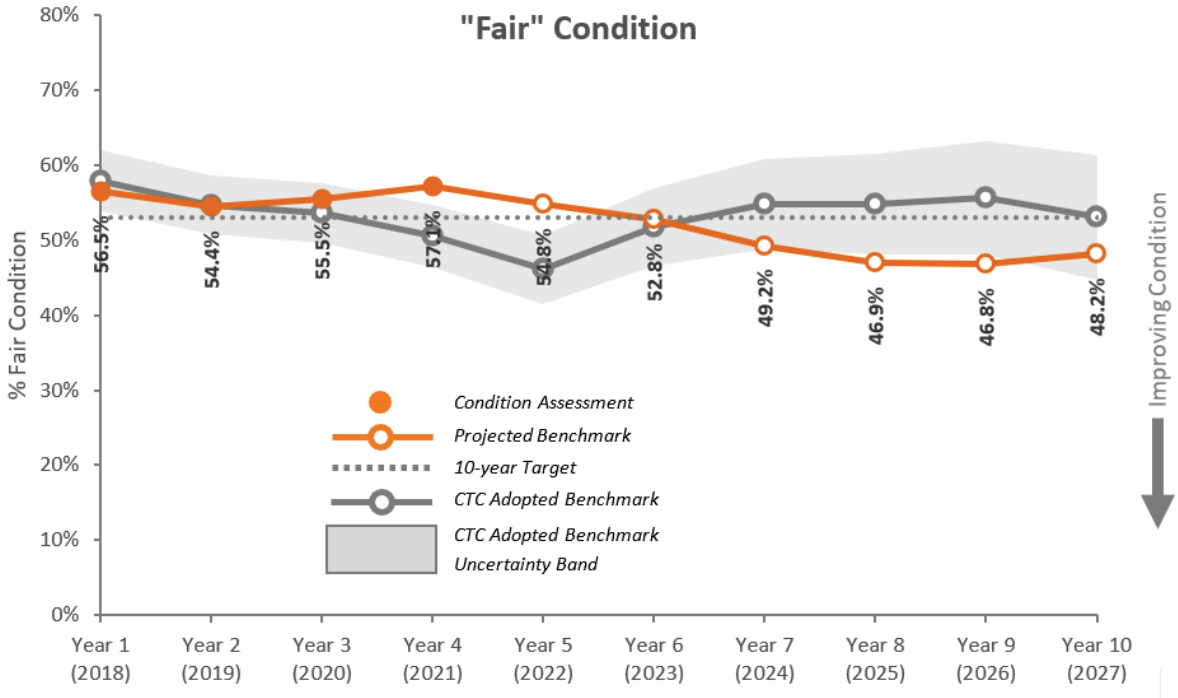


Figure 8 - Pavement Class III, Fair

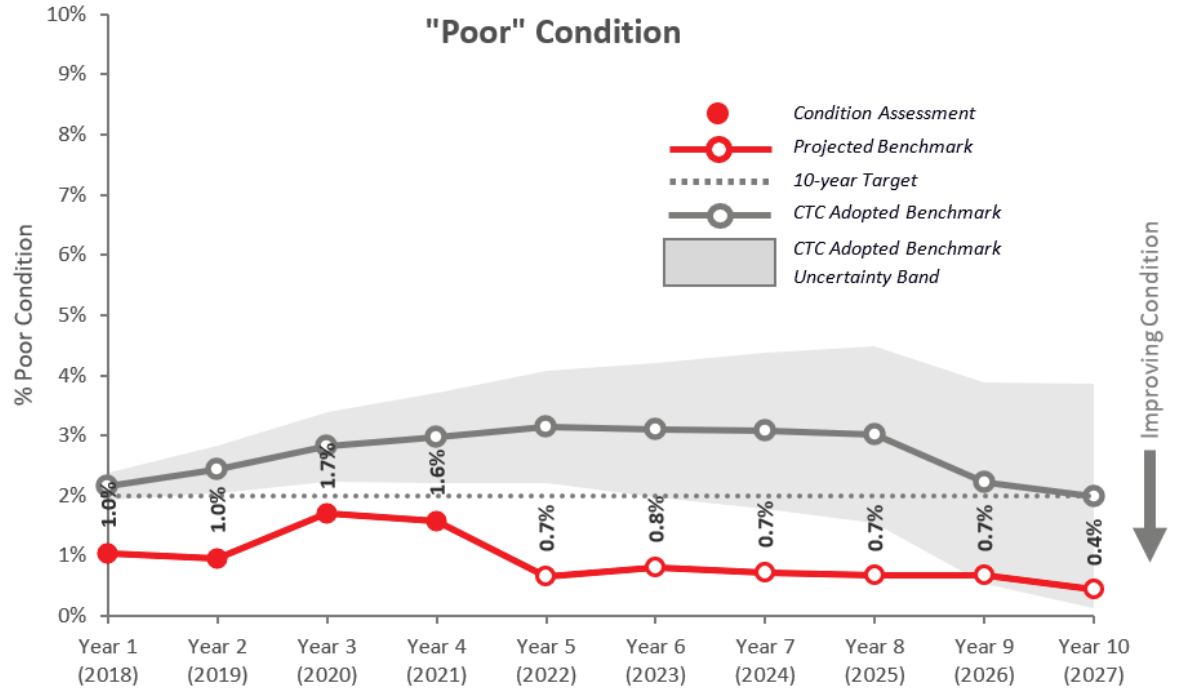


Figure 9 - Pavement Class III, Poor

Benchmark Observations

Projected 2022 Pavement Class III conditions suggest that all condition targets are currently being met. Improvements are anticipated over the prior year's conditions with decreases in both fair and poor lane miles and an increase in good condition pavements. This will need verification once the 2022 APCS pavement conditions become available. Projected pavement conditions in future years indicate relatively stable conditions through 2027. Continued delivery of pavement projects supported by the initiation of SB-1 funding has been a contributing factor to the observed condition improvements.

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Bridge and Tunnel Health

Overview

Caltrans is responsible for the maintenance of 13,229 bridges on the State Highway System (SHS), totaling over 249 million square feet of bridge deck area. These bridges are on average 50 years old and at the point that typically results in increased maintenance needs. Caltrans also maintains 60 tunnels totaling approximately 5 million square feet of liner area.

Changes in Asset Condition

Under requirements established through the federal Moving Ahead for Progress in the 21st Century (MAP-21) Act, the performance measure for bridge health is based on the total deck area, while tunnel health is based on the total structure's liner area. Both structure types are rated as good, fair, or poor condition.

Timing of the Condition Assessment

The reported annual bridge and tunnel health conditions are based on data collected over a multi-year inspection cycle. Most bridges are inspected every 2-years, with some bridges inspected every 4-years.

Table 6 summarizes the condition of the bridge and tunnel asset inventory for the most recent condition assessment and the prior year's condition assessment for a year-over-year comparison. Condition is presented in percentages of good, fair, and poor, relative to total bridge deck or tunnel liner area. The conditions presented in these benchmarks are based on a data set consistent with the subset of bridges Caltrans submitted for the National Bridge Inventory (NBI) in March of 2023. Definitions of these condition states can be found in Appendix A.

Table 6 – Bridge and Tunnel Health Condition Summary

Condition	2027 Target	2021 Year End	2022 Year End	Change in Condition
Good	48.5%	49.3%	47.1%	**-2.2% ↓**
Fair	50.0%	46.9%	48.2%	**+1.3% ↑**
Poor	1.5%	3.8%	4.7%	**+0.9% ↑**

Federal bridge inspection standards are utilized to assess good, fair, and poor conditions in all states. These standards establish a range of conditions that components of bridges are evaluated against. Per federal regulations, the overall condition reported for an individual bridge is the lowest of component ratings. A poor rating for a bridge *does not* mean that the bridge is unsafe for use. Any bridge determined to be unsafe for use would be immediately repaired or closed to traffic regardless of condition ratings.

Further information about federal bridge inspection standards can be found in Section 2.6 of the Commission adopted TAMP.

Projected and Assessed Conditions

Bridge and Tunnel Health benchmarks are presented in Figure 10 through Figure 12. These charts show projected year-end good, fair, and poor condition as percentages of total bridge deck and tunnel liner area from 2018 through 2027. The assessed conditions through 2022 are presented in the charts with solid fill symbols.

Note that due to the change in the fair target, as approved by the Commission in March 2021[1], the projected bridge conditions and associated uncertainty bands (represented by the grey shaded zones) were adjusted and are only shown for years 2020 through 2027.

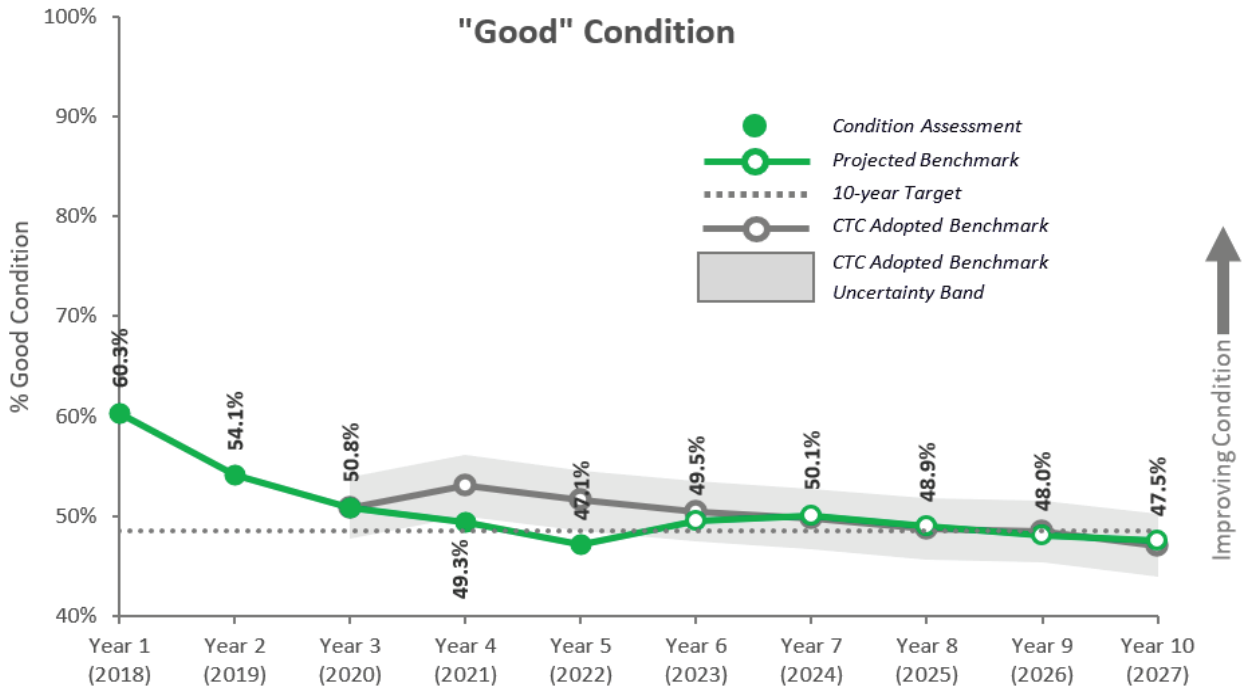

Figure 10 – Bridge and Tunnel Health, Good

[1] Recommended Asset Management Target Changes, March 2021, California Transportation Commission, Ref. 430 Action Item, https://catc.ca.gov/-/media/ctc-media/documents/ctc-meetings/2021/2021-03/24-4-30-a11y.pdf

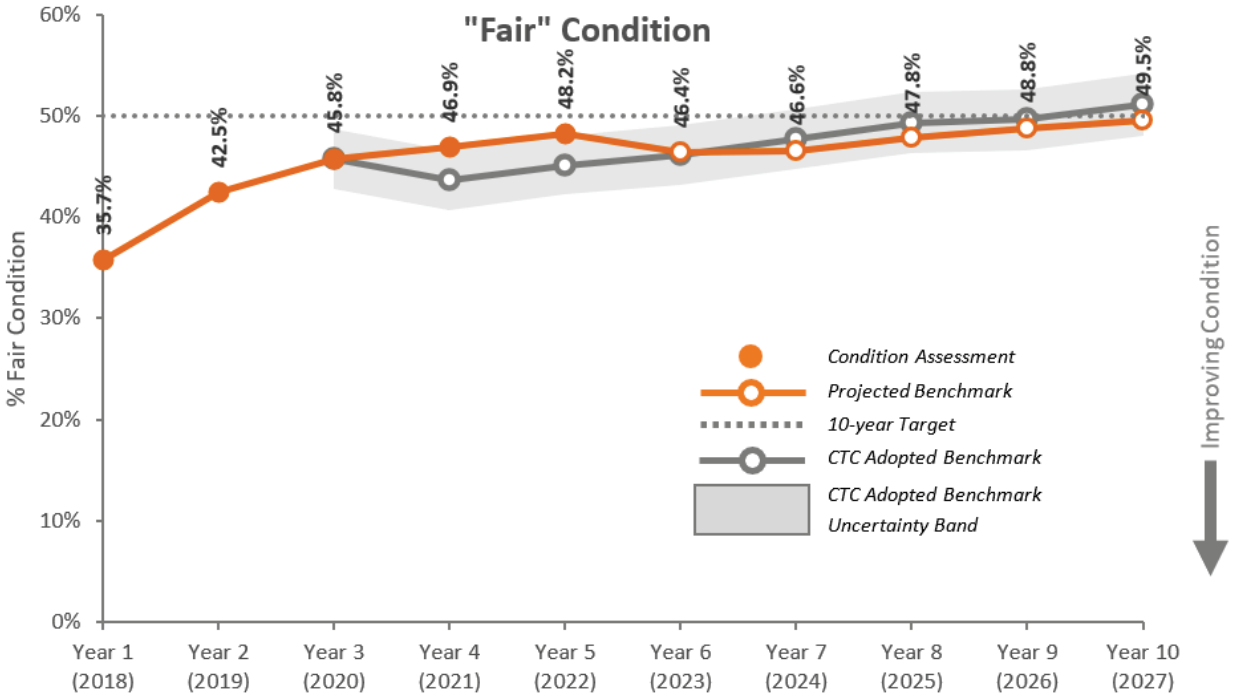

Figure 11 - Bridge and Tunnel Health, Fair

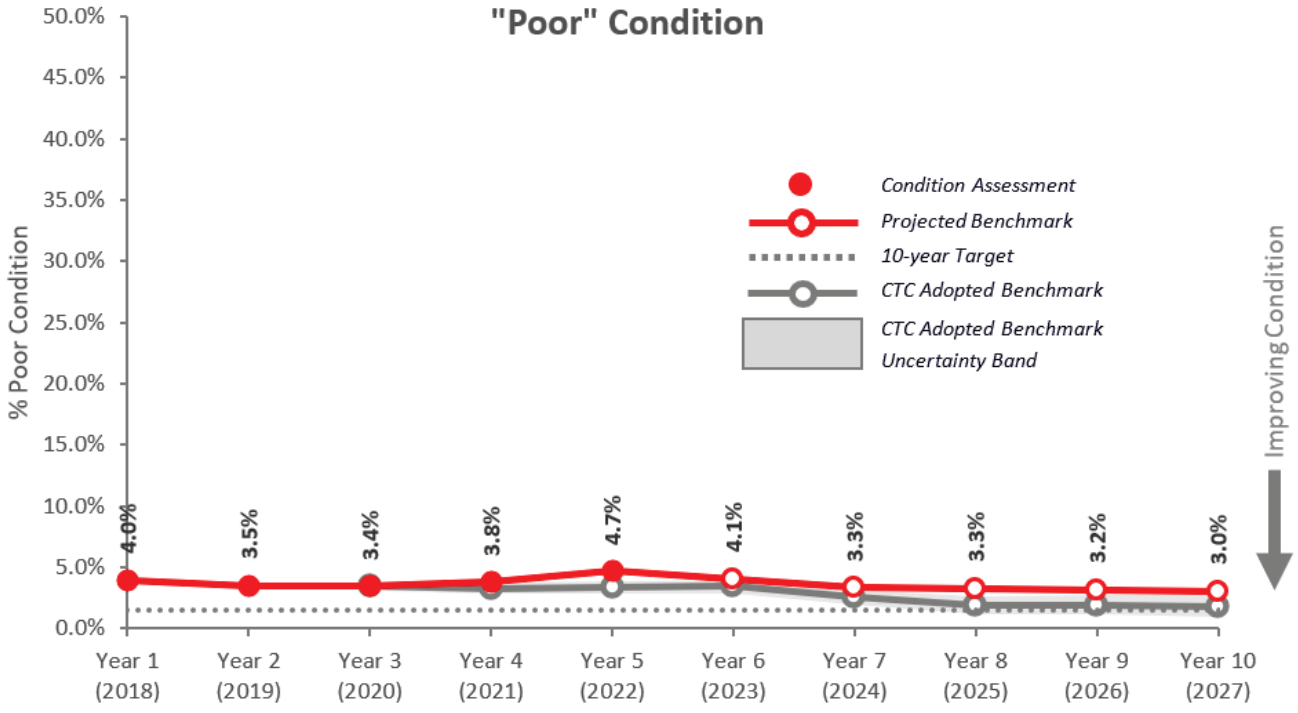

Figure 12 – Bridge and Tunnel Health, Poor

Benchmark Observations

The condition of poor bridges and tunnels has increased 0.9% over the prior year in large part due to several larger bridges, such as the Fort Sutter Viaduct in Sacramento and the Vincent Thomas Bridge in Los Angeles, moving from fair to poor condition in recent inspections. The crossings represent over one million square feet of poor bridge deck area on the SHS. Commensurate with the worsening poor, the percentage of good has decreased by 2.2%, while fair has increased by 1.3%.

The overall shift to more fair condition bridges is expected to continue through 2027 as the bridge inventory ages. More bridges are expected to move to a final fair condition state with no identified structural or safety issues, nearing the 50% fair target. As the age of bridges on the SHS surpasses the 50-year mark, more work will be needed to maintain existing conditions to keep pace with a deteriorating asset inventory.

The percentage of poor condition bridges is expected to gradually improve by 2027, as bridge projects programmed in the 2018 SHOPP supported by SB1 funding are reaching completion and condition improvements reflected in the biennial bridge inspections. Bridge focused initiatives are also expected to show improvements during bridge inspections, including a special program initiated in 2021 targeting poor condition bridge decks. The additional bridge-specific funding from the federal Infrastructure Investment and Jobs Act (IIJA) has resulted in acceleration of work on poor bridges, including the Vincent Thomas Bridge in Los Angeles, a large bridge that accounts for a significant portion of the current poor gap.

While Caltrans continues to aggressively target bridge work, current projections indicate that bridge conditions will fall short of targets. Compounding this, the overall project timeline for bridge rehabilitation and replacement projects remains a challenge. Caltrans is taking the following actions:

- Set up a process to immediately address bridges that become poor.
- Recommending continuous programming of poor bridges once identified.
- Continued use of long lead programming, particularly for bridge replacements over waterways.

- Look at all facets of project planning, design, and reinspection processes to reduce time between the identification of the need and measured condition improvement.

Drainage

Overview

Caltrans provides for the replacement or in-place rehabilitation of culverts and other highway drainage system elements that have lost serviceability because of age, wear, or degradation. Currently, the SHS includes 223,302 inspected and rated culverts totaling over 21.3 million linear feet, that drain rainwater, drainage channels, streams, and rivers away from highways in a controlled manner.

Changes in Asset Condition

The condition assessment of drainage assets is based on a visual inspection of five attributes: waterway adequacy, joints, materials, shape, and culvert alignment. Each attribute is scored, and culvert condition is calculated using a weighted average of attribute scores. Table 7 summarizes the condition of the drainage asset inventory for the most recent condition assessment (May 2023) as well as the prior year's condition assessment. Condition is presented in percentages of good, fair, and poor, by linear feet of drainage systems, corresponding to the condition at the end of calendar year. Definitions of these condition states can be found in Appendix A.

Timing of the Condition Assessment

The reported annual drainage asset conditions are determined based on the initial inspection and the expected improvements to the condition state upon completion of the restoration work. This assessment is updated monthly based on the available data.

Note, the methodology for reporting conditions for drainage was changed in June 2020 to comply with a findings and recommendations from an audit finding of drainage assessment practices by the Inspector General. In earlier reporting in the Performance Benchmarks and the State Highway System Management Plan, the condition of the statewide inventory of culverts included a projection of culvert conditions for assets that had not been initially inspected or ones requiring reinspection. This reporting practice has since been revised such that reported conditions represent only the culverts that have been assessed. Projected inventory and conditions are only applied for future years and are distinguished from the fully assessed inventory in the State Highway System Management Plan (SHSMP).

Table 7 - Drainage Condition Summary

Condition	2027 Target	2021 Year End	2022 Year End	Change in Condition
Good	70.0%	73.3%	74.2%	**0.9%** ↑
Fair	20.0%	16.7%	16.2%	**-0.5%** ↓
Poor	10.0%	9.9%	9.5%	**-0.4%** ↓

Projected and Assessed Conditions

Drainage benchmarks are presented in Figure 13 through Figure 15. These charts show projected year-end good, fair, and poor condition as percentages of total linear feet from 2018 through 2027. The assessed conditions through 2023 are presented in the charts with solid fill symbols.

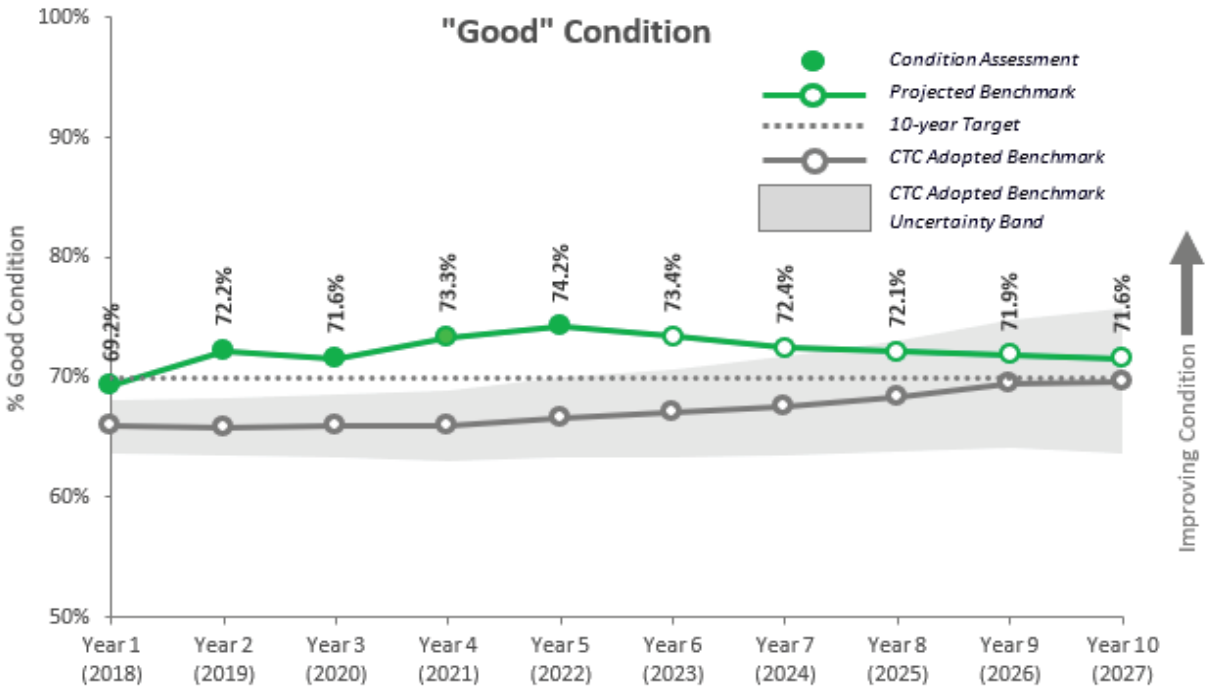

Figure 13 – Drainage, Good

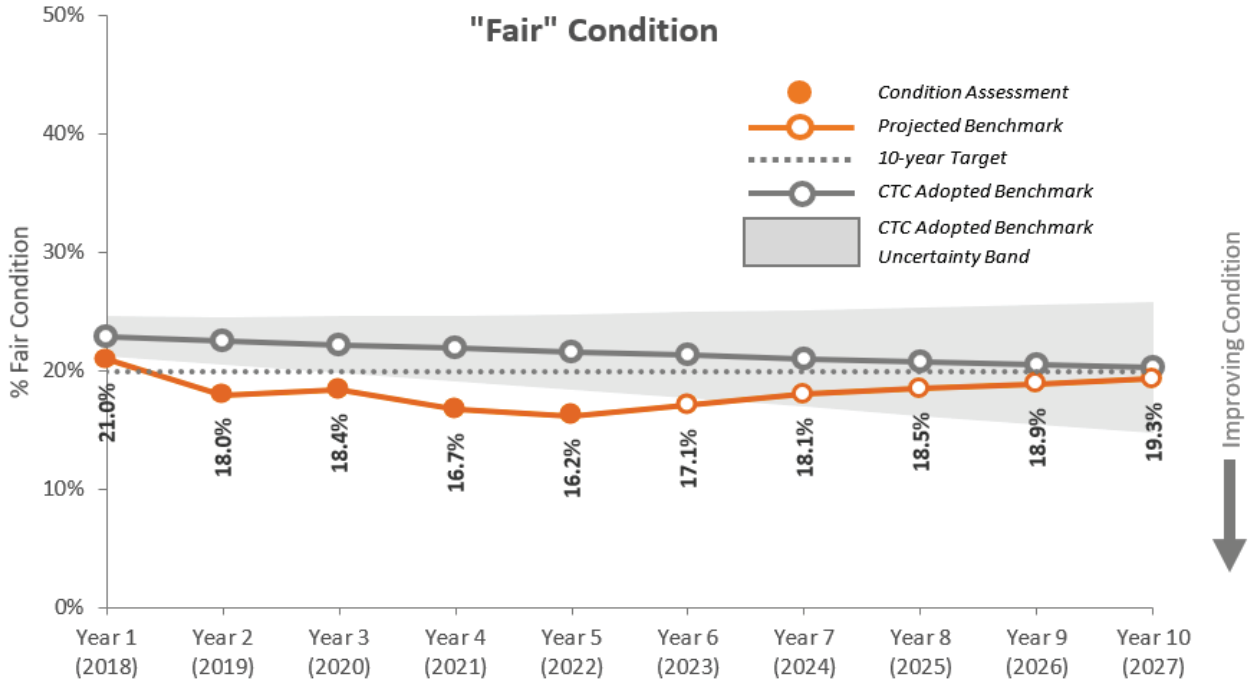

Figure 14 - Drainage, Fair

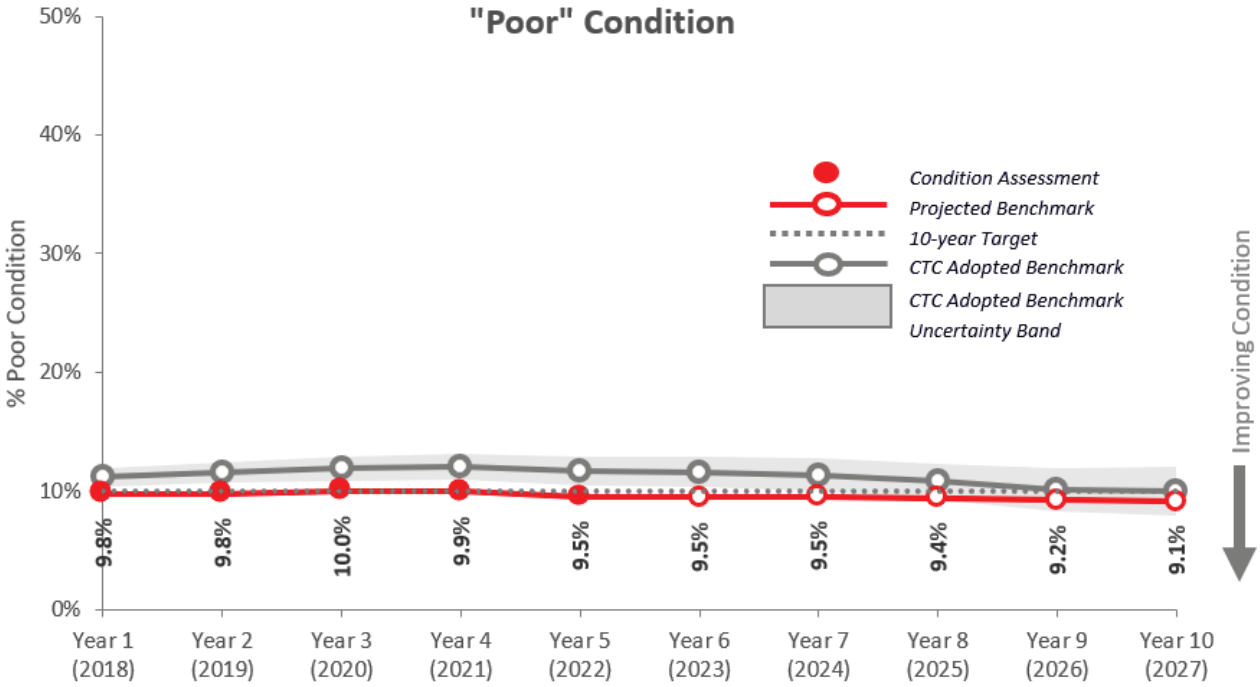

Figure 15 - Drainage, Poor

Benchmark Observations

The year-over-year assessed conditions for drainage continue to remain relatively consistent with slight improvement of conditions. Projections for poor condition drainage suggest little to no change over the next several years and meeting the poor target by 2027. Fair condition drainage is projected to increase in future years but will remain below the fair target.

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Transportation Management Systems

Overview

A Transportation Management System (TMS) is comprised of electrical/electronic TMS units that work together to reduce highway user delay, provide traveler information, and collect information on traffic behavior. There are over 20,000 TMS units on the SHS, comprised of closed-circuit televisions, changeable message signs, traffic monitoring detection stations, highway advisory radios, freeway ramp meters, roadway weather information systems, traffic signals, traffic census stations, and extinguishable message signs.

Changes in Asset Condition

TMS units are categorized as being in either good or poor condition. The condition of a TMS unit is based on the unit being within its expected life cycle and its functional availability. Table 8 summarizes the condition of the Transportation Management Systems asset inventory for the most recent year's condition assessment as well as the prior year's condition assessment. Condition is presented in percentages of good and poor by TMS units for the most recent condition assessment (March 2023) as well as the prior condition assessments. Definitions of these condition states can be found in Appendix A.

Timing of the Condition Assessment

The reported annual TMS asset conditions are determined based on the age of the TMS asset and an assessment of how the TMS asset is functioning. This assessment is currently being updated quarterly.

Table 8 - Transportation Management Systems Condition Summary

Condition	2027 Target	2021 Year End	2022 Year End	Change in Condition
Good	90.0%	78.7%	77.0%	**-1.7%** ↓
Poor	10.0%	21.3%	23.0%	**1.7%** ↑

Projected and Assessed Conditions

Transportation Management Systems benchmarks are presented in Figure 16 and Figure 17. These charts show projected year-end good and poor condition as percentages of total TMS units from 2018 through 2027. The assessed conditions through 2022 are presented in the charts with solid fill symbols.

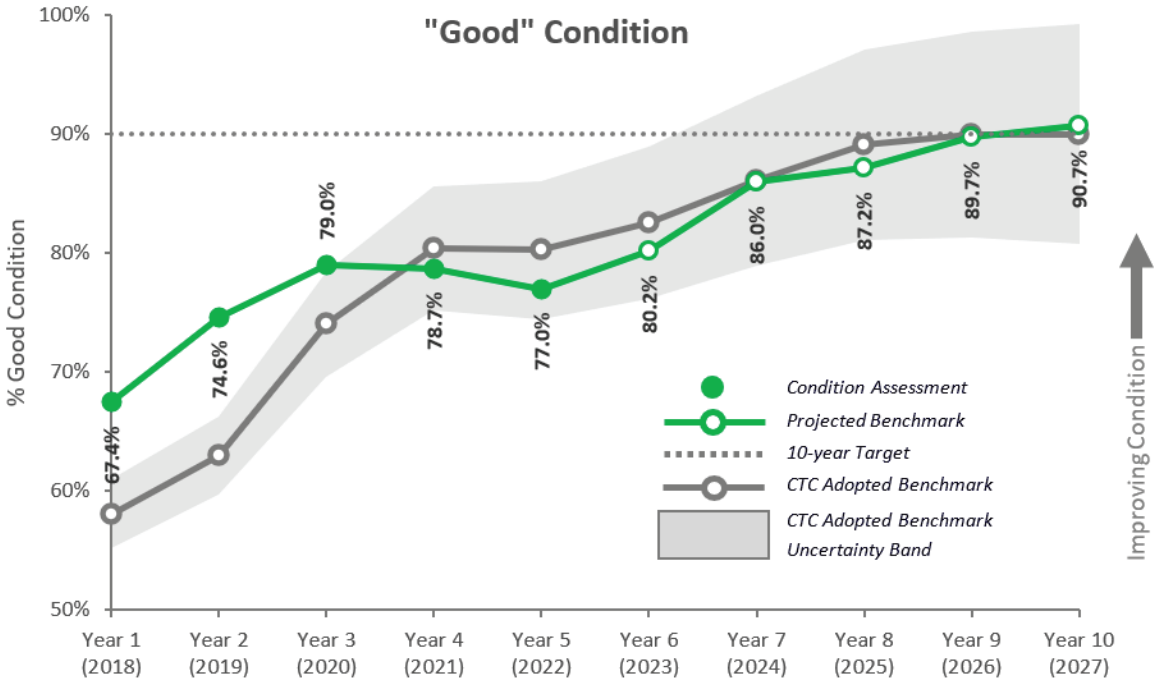

Figure 16 – Transportation Management Systems, Good

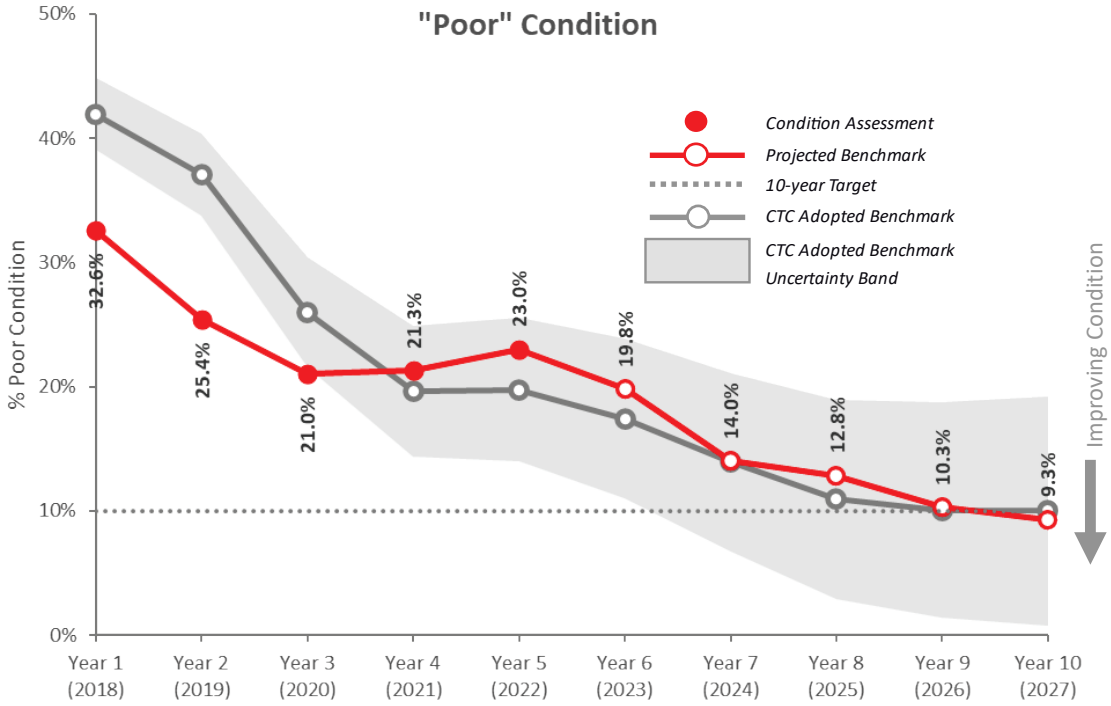

Figure 17 - Transportation Management Systems, Poor

Benchmark Observations

TMS showed an increase in poor condition by 1.7%. The projections suggest that TMS conditions are expected to improve in subsequent years through to 2027. Caltrans efforts to replace TMS components through the Highway Maintenance Program projects will be a significant factor in achieving the TMS targets.

Fix an Additional 500 Bridges

Overview

SB1 includes a performance requirement to fix not less than an additional 500 bridges over a 10-year period ending in 2027. Projects that improve the condition of the bridge from a lesser condition to a better condition, mitigate seismic or scour vulnerabilities, or address operational limitations are counted towards this goal. Prior to the passage of SB1, Caltrans was fixing an average of 114 bridges per year. For the purpose of counting towards the additional 500 bridges which should be fixed, Caltrans is reporting bridges fixed in excess of the annual baseline of 114 bridges between fiscal years 2017/18 and 2026/27.

Approach for Counting Fixed Bridges

The number of bridges fixed in the current and previous fiscal years is determined from an analysis of bridge project records and an estimate of when the work is effectively complete. For Major SHOPP projects, the *Expected Construction Work Complete (ECWC)* date is used, defined as the date when the primary construction work is largely

complete, the project limits are open to traffic, and benefits are realized by the travelling public. The ECWC date is estimated to be two-thirds the time between the Contract Award (CA) date and the Construction Contract Acceptance (CCA) date. For Highway Maintenance (HM) Program projects, bridges are counted as fixed in the year the contract is awarded, since the primary construction work is typically completed on average within a year of the CA date. Figure 18 presents the timeline for counting when bridges are considered fixed through the Major SHOPP and HM programs.

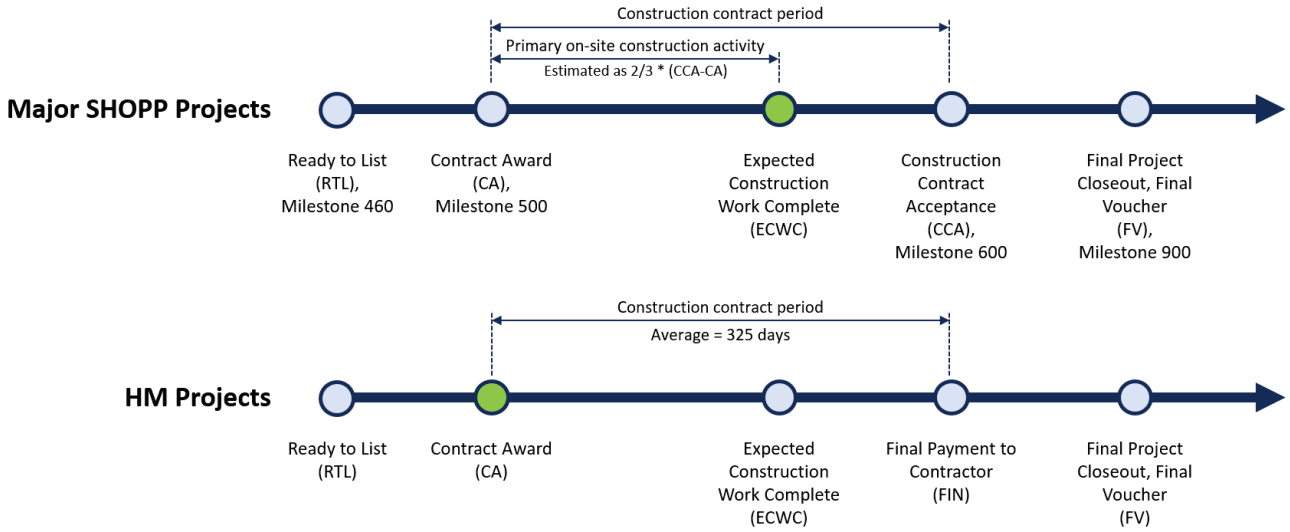

Figure 18 – Timeline for Counting When Bridges are Fixed

The use of different milestone dates between SHOPP and HM was adopted to support timely reporting of accomplishments using the most reliable project milestone data. Construction work on Major SHOPP projects typically span a period of 1 to 3 years, with the bridge portion of the work completed well before the formal closeout of the contract at CCA, especially on complex, multi-asset projects. Caltrans and the California Transportation Commission determined the ECWC date to be the most reasonable indicator of the date when the public would recognize the outcomes of the work.

For HM Program projects, the duration of the construction work period is much shorter than Major SHOPP projects, due to the types of treatments that can be applied in shorter durations. The time between Contract Award (CA) and the Final Payment (FIN)

for these projects on average is 325 days. Given the relatively short construction period, the CA date was used for HM projects. These HM projects will typically have a number of bridges included that have differing dates for when the improvements are experienced by the traveling public. In some cases, the improvements are done lane by lane over a period of nights.

Current and Projected Number of Bridges Fixed

Table 9 presents the number of bridges fixed annually from Fiscal Year (FY) 2017/18 to 2022/23. The data shows that over the course of these past fiscal years, Caltrans has fixed a total of 1,512 bridges. This represents an additional 828 bridges fixed relative to the baseline of 114 fixed bridges per year (or 684 bridges over six years), thereby meeting the SB1 requirement. Table 10 presents the breakdown of the counts of bridges in each fiscal year by the primary type of fix.

Note the number of bridges fixed in prior fiscal years have been reduced by a total of 48 bridges, 34 bridges of which were included in the baseline counts and 14 bridges where the work had been miscategorized in prior reporting as having fixed the bridge.

Table 9 – Fix an Additional 500 Bridges

Fix Bridges	FY 2017/18	FY 2018/19	FY 2019/20	FY 2020/21	FY 2021/22	FY 2022/23	Total
Baseline	114	114	114	114	114	114	684
Additional	84	130	34	248	49	283	828
Total	**198**	**244**	**148**	**362**	**163**	**397**	**1,512**

Table 10 – Count of Bridges by Type of Fix

Fix Bridges	FY 2017/18	FY 2018/19	FY 2019/20	FY 2020/21	FY 2021/22	FY 2022/23	Total
Health	194	234	133	324	143	327	1,355
Scour	1	6	3	8	8	44	70
Seismic	2	4	10	17	7	11	51
Goods Movement	1	0	2	13	5	15	36
Total	**198**	**244**	**148**	**362**	**163**	**397**	**1,512**

Table 9 & Table 10 Notes:

- FY 2017/18 count reduced by 16 bridges (15 bridges were included in the baseline, 1 bridge where the work was miscategorized as fixing the bridge)
- FY 2018/19 count reduced by 21 bridges (16 bridges were included in the baseline, 1 bridge was halted midstream by court order, 4 bridge where the work was miscategorized as fixing the bridge)
- FY 2019/20 count reduced by 8 bridges (3 bridges were included in the baseline, 5 bridges where the work was miscategorized as fixing the bridge)
- FY 2020/21 count reduced by 3 bridges (where the work was miscategorized as fixing the bridge)

A 10-year projection of bridges fixed is presented in Figure 18. The chart shows the total number of bridges anticipated to be fixed each year through FY 2026/27. Bridges fixed through the SHOPP are based on projects defined in the SHOPP Ten-Year Project Book. For bridges fixed through the HM Program, the first two years were based on projects that were in the approved HM workplan. For HM projects in the remaining years, the minimum of the first two years is used to conservatively estimate the number of bridges fixed in subsequent years, assuming consistent future HM funding.

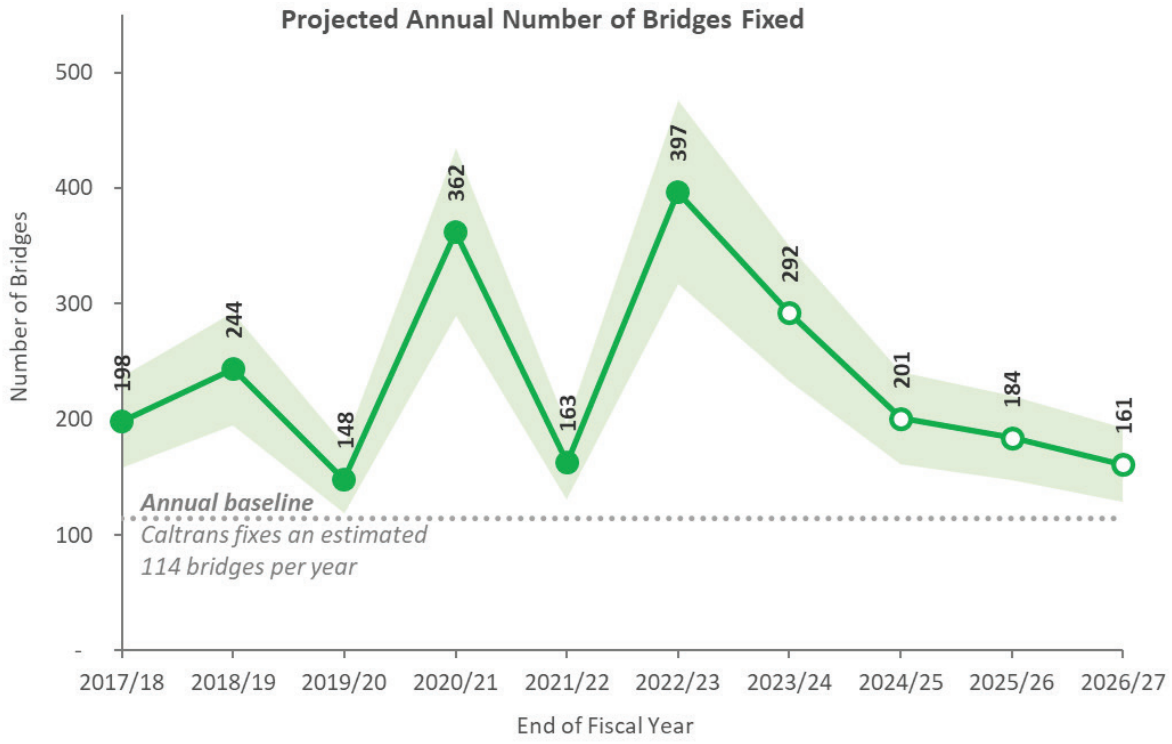

Figure 19 – Projected Number of Bridges Fixed Each Year

Figure 19 Notes:

- FY 2017/18 count reduced by 16 bridges (15 bridges were included in the baseline, 1 bridge where the work was miscategorized as fixing the bridge)
- FY 2018/19 count reduced by 21 bridges (16 bridges were included in the baseline, 1 bridge was halted midstream by court order, 4 bridge where the work was miscategorized as fixing the bridge)
- FY 2019/20 count reduced by 8 bridges (3 bridges were included in the baseline, 5 bridges where the work was miscategorized as fixing the bridge)
- FY 2020/21 count reduced by 3 bridges (where the work was miscategorized as fixing the bridge)

The bridges evaluated to be fixed in fiscal years through 2022/23 are presented in the chart with a solid fill symbol. The shaded area in the chart represents an upper and lower boundary, quantifying two primary uncertainties from assumptions used in the analysis. First, delays in delivery of bridge projects are difficult to predict and could account for a shift of up to 20% of the projected fixed bridges in any given year. Second, programming levels for Highway Maintenance (HM) work and fluctuations in annual HM funding can be a significant source of additional uncertainty.

Caltrans was expected to fix an additional 500 bridges beyond the established baseline of 114 bridges per year. Figure 19 presents the cumulative total number of bridges fixed to date, showing that an additional 828 bridges have been fixed since FY 2017/18, thereby meeting SB1 requirements.

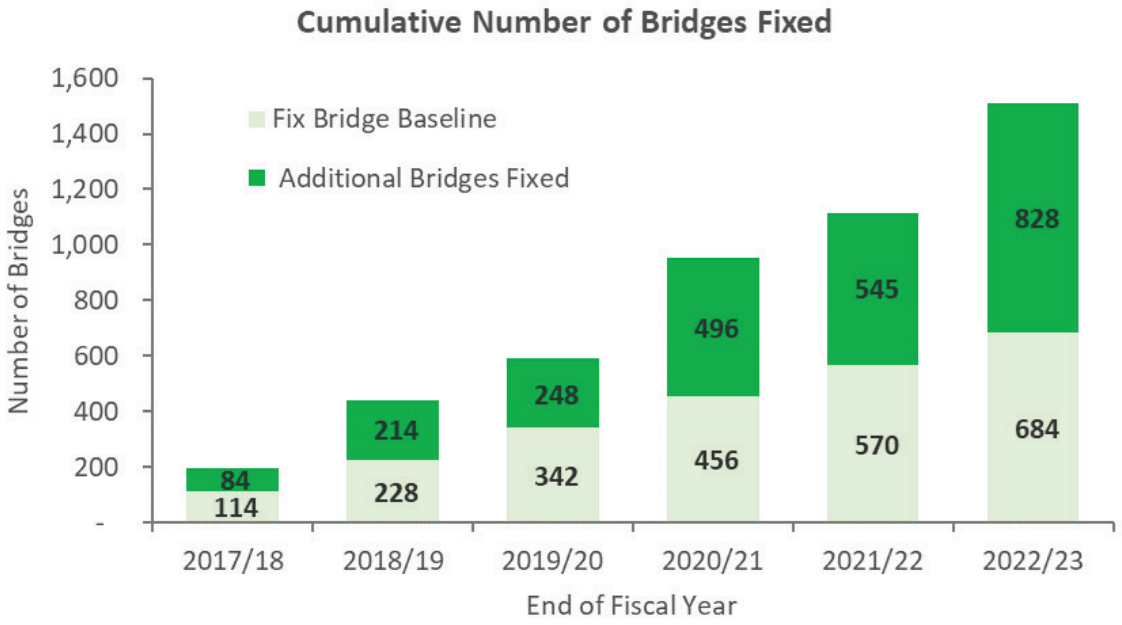

Figure 20 – Cumulative Total Number of Bridges Fixed to Date Above the Baseline

Figure 20 Notes:

- FY 2017/18 count reduced by 16 bridges (15 bridges were included in the baseline, 1 bridge where the work was miscategorized as fixing the bridge)
- FY 2018/19 count reduced by 21 bridges (16 bridges were included in the baseline, 1 bridge was halted midstream by court order, 4 bridge where the work was miscategorized as fixing the bridge)
- FY 2019/20 count reduced by 8 bridges (3 bridges were included in the baseline, 5 bridges where the work was miscategorized as fixing the bridge)
- FY 2020/21 count reduced by 3 bridges (where the work was miscategorized as fixing the bridge)

Level of Service (LOS)

Overview

SB 1 includes a performance requirement to achieve a Level of Service (LOS) for pavement cracking, spalls, and potholes of no less than 90 by 2027. LOS is a measure of how well the State Highway System is being maintained. In the March 2020 Commission meeting, the Department put forth and the Commission adopted an LOS criteria based on data captured in the Automated Pavement Condition Survey (APCS). APCS utilizes state of the art pavement condition assessment technology to capture pavement conditions on 100 percent of the State Highway System lanes. The pavement condition is typically updated annually and serves as the basis for statewide pavement condition analysis, reporting, and planning. The technical criteria for determining LOS are detailed in Appendix B.

As of the time of report preparation, the condition of pavements for 2022 was not available from the Automated Pavement Condition Survey (APCS). As such, the LOS numbers presented for 2020 are carried over from 2021. Table 11 summarizes the

assessments of LOS. The Department will amend this report for LOS once the 2022 APCS data becomes available.

Table 11 – LOS Summary

SB 1 Target	2021 Year End	2022 Year End (Projected)	Change
90	97	97	0.0%↔

Supplementary Asset Classes

Overview

The California Transportation Commission established four primary asset classes and eight supplementary asset classes under the Transportation Asset Management Plan Guidelines in June 2017 with a subsequent revision in 2021. Supplementary Assets include:

- Drainage Pump Plants
- Highway Lighting
- Office Buildings
- Overhead Sign Structures
- Bicycle and Pedestrian Infrastructure
- Roadside Rest Facilities
- Transportation Related Facilities
- Weigh in Motion Scales

Asset Conditions

Figure 21 through Figure 28 presents the trends in supplementary asset conditions, as assessed at the end of each calendar year. Conditions are shown for the 2016 end of calendar year (as reported in the 2017 SHSMP), 2018 (as reported in the 2019 SHSMP), 2020 (as reported in the 2021 SHSMP), and 2022 (as reported in the Draft 2023 SHSMP). Condition assessments were not available for the intermediate years, 2017, 2019, and 2021. Fair and poor target conditions are shown in the charts as grey dashed lines.

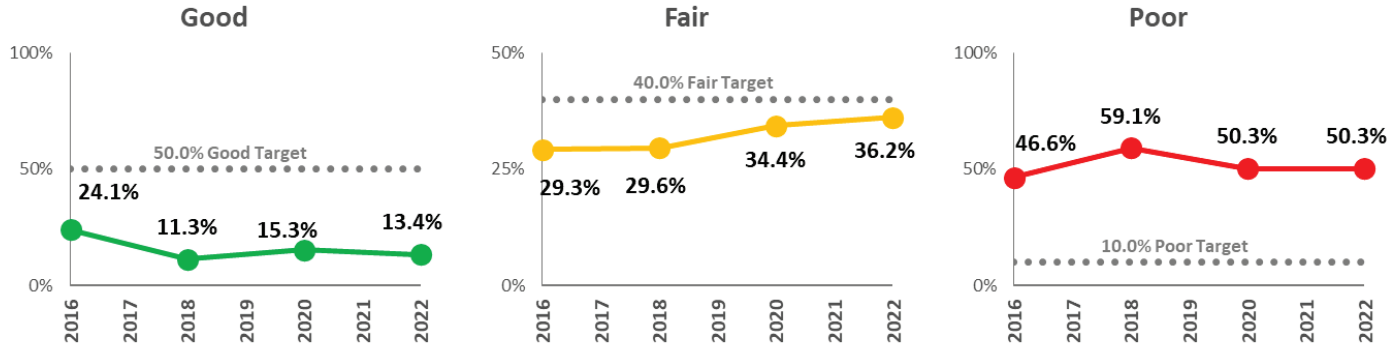

Figure 21 – Condition of Drainage Pump Plants

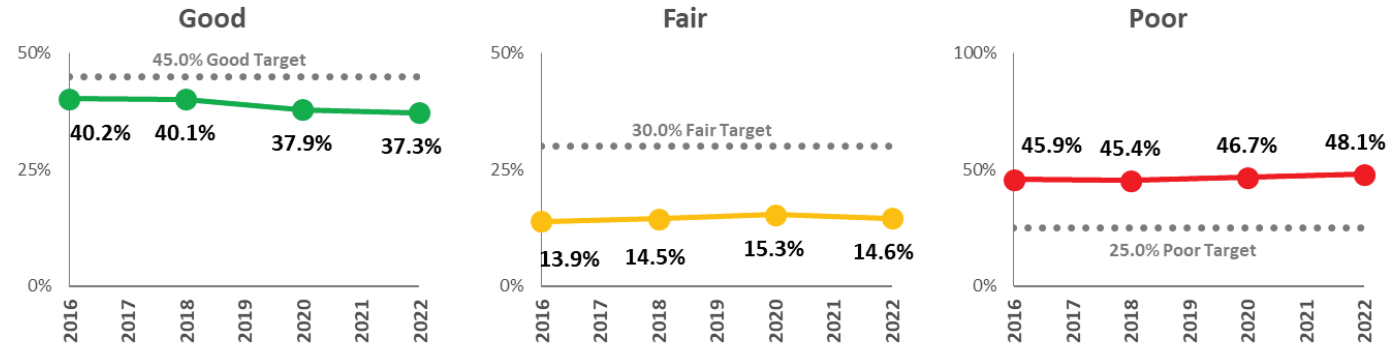

Figure 22 – Condition of Highway Lighting

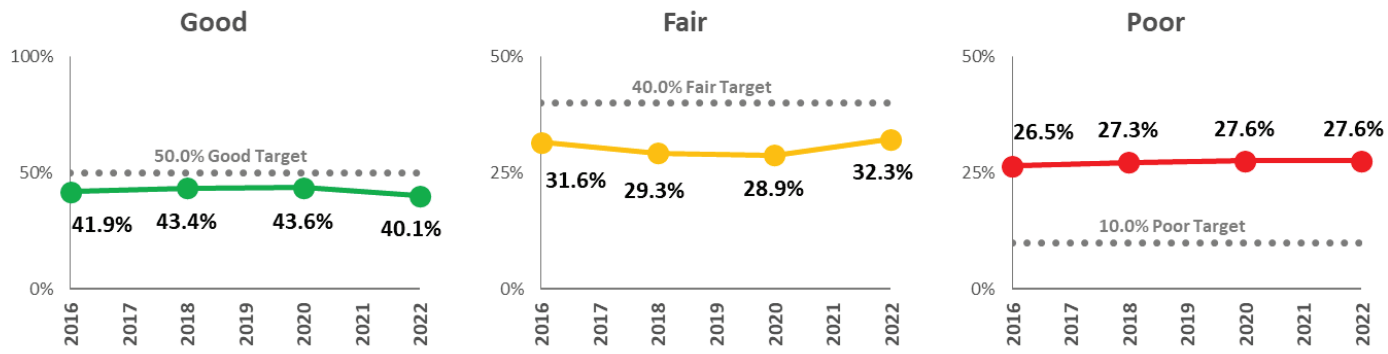

Figure 23 – Condition of Office Buildings

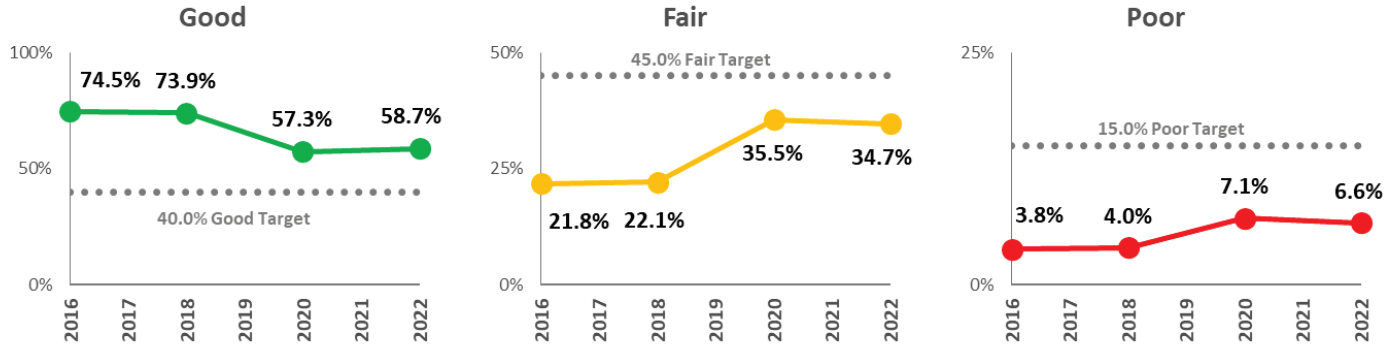

Figure 24 – Condition of Overhead Sign Structures

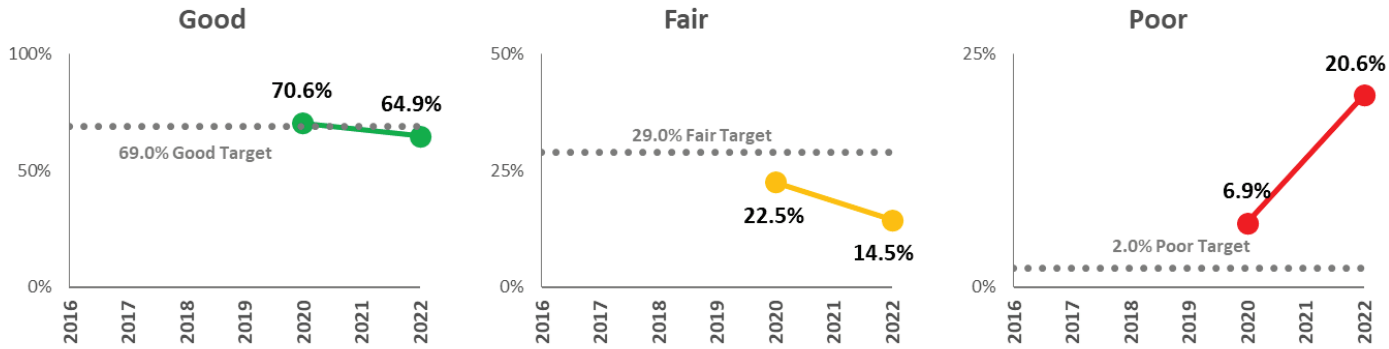

Figure 25 – Condition of Bicycle and Pedestrian Infrastructure

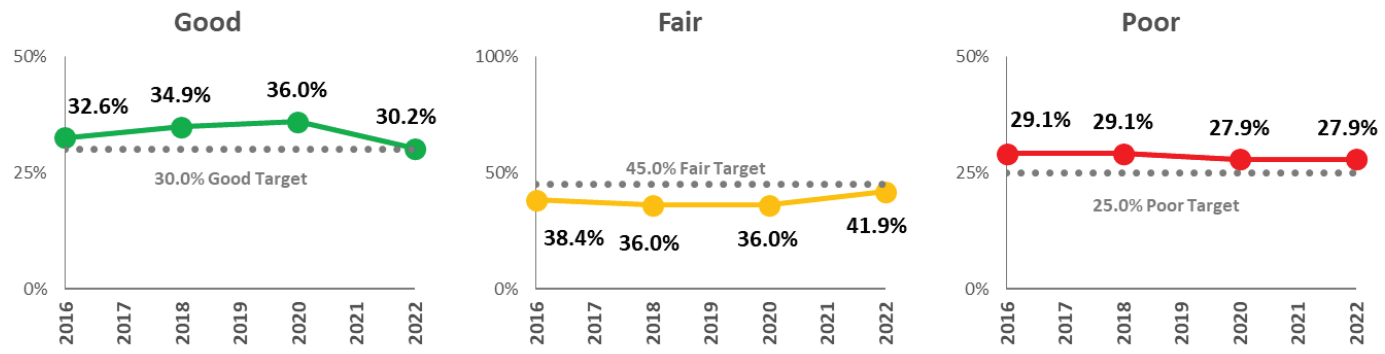

Figure 26 – Condition of Roadside Rest Facilities

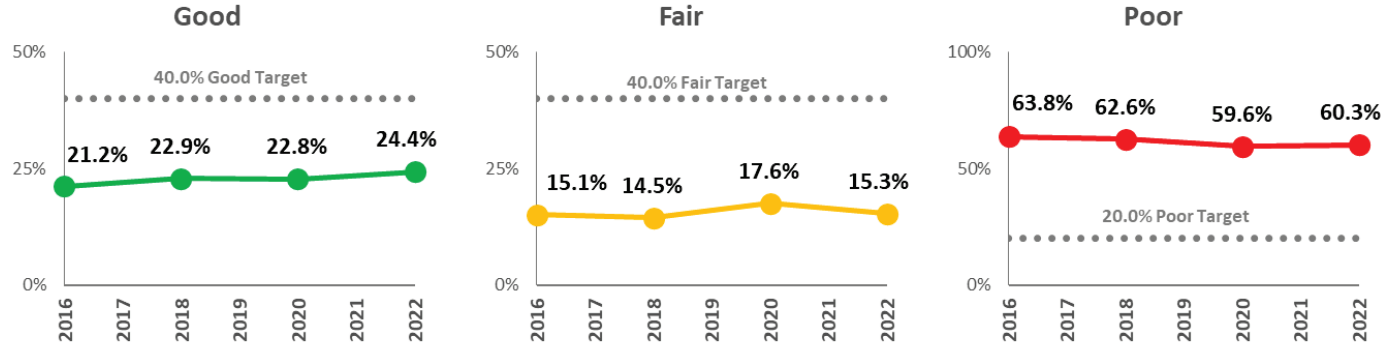

Figure 27 – Condition of Transportation Related Facilities

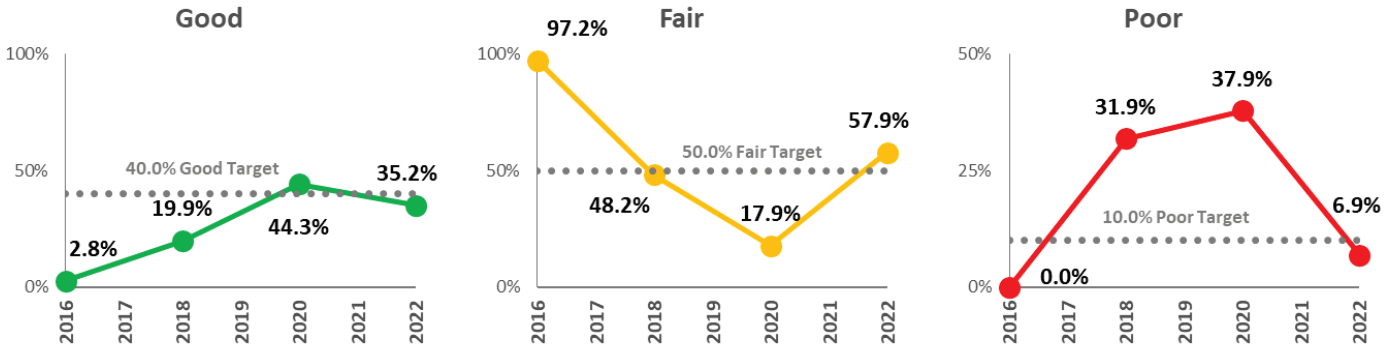

Figure 28 – Condition of Weigh in Motion Scales

Observations

For many of the supplementary assets, the reported conditions remained relatively level relative to two years ago. Two of the asset classes, however, indicate abrupt changes in conditions.

The condition of existing Bicycle and Pedestrian Infrastructure shows a significant increase in poor. This change can be attributed to refinements and maturity in the inventory data. The initial 2021 inventory was developed from the *Active Transportation Asset Inventory Pilot (ATAIP)*, a planning-led process to collect bicycle and pedestrian asset information and facility conditions on the SHS. This process relied on a range of information sources with known limitations, including Google and Caltrans imagery having gaps in coverage. The inventory data was subsequently refined during the development of the Caltrans Active Transportation (CAT) Plans, leading to a correction in the inventory condition breakdown and use in the 2023 SHSMP.

The changes to conditions shown for Weigh in Motion Scales are the result of a shift from a largely age-based condition criteria prior to 2022 to condition assessment-based criteria.

While funding to fully close performance gaps for supplementary assets has not been available to date, Caltrans continues to make investments towards maintaining and improving conditions.

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Appendix A: Definition of Good, Fair, and Poor Performance Metrics

Performance metric definitions for the four primary asset classes are presented in this section. These definitions are from the 2021 State Highway System Management Plan (SHSMP).

Pavement Class I, II, and III Metrics

Pavement condition is assessed based on the final rule of the Federal MAP-21 performance measures as of January 2017. Cracking, Rutting, and International Roughness Index (IRI) metrics are used to assess the condition of asphalt pavement; while cracking, faulting and IRI metrics are used to assess the condition of jointed plain concrete pavement (JPCP). For each of these metrics, the Federal Highway Administration (FHWA) has established thresholds, as presented in Table 18.

Table 12 – Pavement Performance Metrics

Metrics		Good	Fair	Poor
IRI (inches/mile)		<95	95-170	>170
Cracking (%)	Asphalt	<5	5-20	>20
	Jointed Concrete	<5	5-15	>15
	Continuously Reinforced Concrete	<5	5-10	>10
Rutting (inches)		<0.20	0.20-0.40	>0.40
Faulting (inches)		<0.10	0.10-0.15	>0.15

For each tenth-mile long section, condition is rated good if all three metrics for this section are rated good; poor if two or more metrics are rated poor; and fair, otherwise.

Lane miles in good, fair, and poor condition are tabulated for all sections to determine the overall percentage of pavement in good, fair, and poor condition.

Bridge and Tunnel Health Metrics

Caltrans and local agencies follow FHWA National Bridge Inventory (NBI) and National Tunnel Inspection (NTI) standards for inspecting all California bridges and tunnels. Inventory condition data is based on the most recent Bridge Inspection Reports (bridge and tunnel inspections are typically scheduled every two years) that document condition states of each individual structural element per these federal guidelines. The condition state of appropriate individual elements is then mathematically converted to a condition state (good, fair or poor) of three categories for bridges (deck, superstructure and substructure) and a single condition state for either tunnels or culverts.

Good, fair, and poor NBI ratings for bridge condition span the range from 0-9. A calculated value of 7 or greater is classified as being in good condition; 5 or 6 is classified as being in fair condition; and 4 or less is classified as being in poor condition. A bridge in poor condition is considered structurally deficient (SD) by federal guidelines. Thus, if any major component is classified as being in poor condition, the bridge will be considered SD. Being classified as SD does not imply a bridge is unsafe, just that deficiencies have been identified that require maintenance, rehabilitation, or replacement.

As a bridge is assigned a condition state for the deck, superstructure, and substructure individually, the lowest of the three ratings determines the overall rating of the bridge. Caltrans maintains all data in the Structures Maintenance and Investigations (SM&I) bridge management system databases. Table 14 and Table 15 describe the performance metrics that define the criteria for determining condition for good, fair, and poor Bridge and Tunnel Health.

Table 13 – Bridge Health Performance Metrics

Condition	Criteria
Good	Deck, superstructure, and substructure ratings are all Good, or the culvert rating is Good
Fair	The lowest of the three ratings for deck, superstructure, and substructure is Fair, or the culvert rating is Fair
Poor	The lowest of the three ratings for deck, superstructure, and substructure is Poor, or the culvert rating is Poor

Table 14 – Tunnel Health Performance Metrics

Condition	Criteria
Good	Less than 20% of the elements are classified as deteriorated
Fair	More than 20% of the elements are classified with minor deterioration
Poor	More than 20% of the elements are classified with significant deterioration

Drainage Metrics

The health condition assessment of Drainage Restoration assets is based on a visual inspection of five attributes: waterway adequacy, joints, materials, shape, and culvert alignment. Each attribute is scored, and culvert condition is calculated using a weighted average of attribute scores. Table 16 describes the performance metrics for determining condition for good, fair, and poor Drainage Restoration.

Table 15 – Drainage Performance Metrics

Condition	Criteria
Good	Overall health score between 80 to 100
Fair	Overall health score between 50 to 79
Poor	Overall health score between 0 to 49

Transportation Management System Metrics

TMS units are categorized as being in either good or poor condition. The condition of a TMS unit is based on the unit being within its expected life cycle and its functional availability. Table 17 describes the performance metrics for determining good, fair, and poor Transportation Management Systems.

Table 16 – TMS Performance Metrics

Condition	Criteria
Good	Within expected lifecycle and consistent functional availability
Fair	N/A
Poor	Beyond expected life cycle or is not meeting functional availability because of chronic down time

Appendix B: Criteria for Pavement Level of Service (LOS)

The Department recommends the Commission adoption of the following SB1 pavement LOS criteria that segregates the State Highway System lanes into segments that are each approximately 528 feet long and approximately 12 feet wide. Each segment will be evaluated for cracking and spalls or potholes depending on the material in accordance with the technical criteria below. Each segment will be deemed as passing or failing. The calculation used to determine the pavement LOS is a weighted average of the scores for asphalt and concrete segments.

The SB1 Pavement LOS is calculated using the following formula:

$$SB\ 1\ Pavement\ LOS = (FPS*W_F + RPS*W_R) \ / \ Total\ number\ of\ segments$$

where the Flexible Pavement Score (FPS) is defined as:

$$FPS = [Percent\ Passing\ Cracking + Percent\ Passing\ Potholes] / 2$$

the Rigid Pavement Score (RPS) is defined as:

$$RPS = [Percent\ Passing\ Cracking + Percent\ Passing\ Spalling] / 2$$

and the Weighting (W) is defined as:

$$W = Total\ number\ of\ flexible\ or\ rigid\ pavement\ segments$$

The technical criteria for determining if a segment passes or fails is shown in Table 17:

Table 17 – Pavement LOS Criteria

Attribute	Failure Criteria	Description
Cracking	cracking ≥ ½ inch	Any single crack at its widest point
Potholes	> 1 each pothole	Any potholes greater than 36 square inches in area
Spalling	≥ 1 sq. ft.	Cumulative area of spalling

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