Independent Office of Audits and Investigations

June 14, 2022

Transmitted via email

Mr. Scott Eades
Acting SB1 Program Manager
California Department of Transportation

Final Report – Audit of 2019-20 SB 1 Efficiencies Report,

The Independent Office of Audits and Investigations (IOAI) has completed an audit of the California Department of Transportation's (Caltrans) SB 1 2019-20 Efficiencies Measures Report. The Road Repair and Accountability Act of 2017 requires Caltrans to, among other things, implement efficiency measures with the goal of generating at least $100 million per year in savings to invest in the maintenance and rehabilitation of the state highway system.

Caltrans' response to the draft report is included in this final audit report. The final audit report is a matter of public record and will be posted on IOAI's website.

A Corrective Action Plan (CAP) addressing the recommendations is due from Caltrans 60 days from receipt of this letter. The CAP should include milestones and target dates as applicable. Subsequent to the submission of the 60-day CAP, updated CAPs will be due every six months until all recommendations have been implemented.

We appreciate the assistance and cooperation of the department. If you have any questions, please contact David Wong, Audit Chief, at david.wong@dot.ca.gov or (916) 764-9677.

Sincerely,

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File: P3010-0669

California Department of Transportation
2019-20 SB 1 Efficiencies Report Audit

FINAL AUDIT REPORT

JUNE 2022

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SUMMARY, BACKGROUND, OBJECTIVES, SCOPE, AND METHODOLOGY

SUMMARY

The Independent Office of Audits and Investigations conducted an audit of the savings reported by the California Department of Transportation (Caltrans) in its 2019-20 SB 1 Efficiencies Report. The Road Repair and Accountability Act of 2017 requires Caltrans to, among other things, implement efficiency measures with the goal of generating at least $100 million per year in savings to invest in the maintenance and rehabilitation of the state highway system. In its 2019-20 SB 1 Efficiencies Report, Caltrans reported that it achieved well beyond its goal and saved $194.8 million due to various efficiencies it implemented during the fiscal year.

Our audit focused on the three highest value efficiency areas, which totaled $162.9 million out of the $194.8 million, or 84 percent. We determined that Caltrans did, in fact, achieve its goal of at least $100 million in savings during the year. Specifically, we determined that Caltrans adequately supported that it saved $120.3 million of the $162.9 million that we reviewed. Those savings consisted of the following:

- $85.7 million related to Storm Water Permit Credits: Caltrans' Division of Environmental Analysis reported $85.7 million in efficiency savings related to the mitigation of stormwater pollutants. Through a multi-year statewide field study, Caltrans learned that Open Grade Friction Course (OGFC) pavements that it previously installed on California roadways also provided environmental benefits by removing pollutants. In 2019, the State Water Resources Control Board (water board) granted Caltrans credits for its use of OGFC pavements. As a result, Caltrans realized these savings because it did not have to construct the traditional, and more costly, devices to 530 acres where the water board granted the OGFC credits.

- $34.6 million related to Project Bundling: In fiscal year 2019-20, Caltrans bundled (or combined) 30 projects into 14 contracts and reported efficiency savings. Bundling projects is the practice of combining several smaller projects into one larger project under a single contract. As recognized by the Federal Highway Administration, one of the major benefits of bundling construction projects is that, due to the economies of scale, one large project would cost less to deliver than several smaller projects.

However, our audit also revealed that Caltrans did not adequately support $42.6 million of the $162.9 million in reported savings during the fiscal year that we reviewed. The unsupported savings is summarized as follows:

- $5.6 million related to Project Bundling: Caltrans calculated that it saved $5.6 million for 10 projects that it bundled into four contracts; however, unlike the savings we validated above, Caltrans did not provide *individual* cost estimates for the 10 projects to compare with the bundled contract award amounts. Without individual project cost estimates, Caltrans could not demonstrate whether it realized the savings it reported directly because of its project bundling effort.

- $37.0 million related to Long-Life Pavement: While long life pavement is an industry recognized efficiency measure[1], the reported cost savings of $37 million will not be generated (or realized) until the distant future and, should therefore, not be counted in fiscal year 2019-20. Specifically, using Caltrans' cost savings methodology, initial savings of $221,289 would not be realized until 2036 and the balance of the reported savings ($34.7 million, or more than 93 percent) would not be generated until 2051– more than 30 years from now. As a result, these reported savings would not be readily available to reinvest into the state highway system. Although we determined that the cost savings were unsupportable for the fiscal year 2019-20, we do recognize the future potential savings.

The following table provides a summary of our findings:

Efficiency Areas Audited	Savings Reported	Savings Supported	Savings Unsupported
Storm Water Permit Credits for Open Graded Friction Course	$85,700,000	$85,700,000	$0
Project Bundling	$40,200,000	$34,600,000	$5,600,000
Long-Life Pavement	$37,000,000	$0	$37,000,000
Totals	**$162,900,000**	**$120,300,000**	**($42,600,000)**

Source: The Independent Office of Audits and Investigations.

[1] "Benefits of Partnering to Design Long-Life Pavements" Asphalt Value Proposition, National Asphalt Pavement Association 2020, https://www.asphaltpavement.org/uploads/documents/AVP_PerpetualPavement_Flyer.pdf

We acknowledge Caltrans' efforts to develop new and innovative efficiencies as well as its use of advanced technologies to generate savings. We also recognize that Caltrans continues to improve efficiency savings reporting practices and has implemented prior audit recommendations including, but not limited to, updating efficiency reporting guidance to Caltrans' divisions and programs, and pursuing and adopting industry best practices. As such, the intent of this report is to provide Caltrans with additional opportunities to improve its processes to quantify and report efficiency savings.

Caltrans responded and generally agreed with the audit results and recommendations. For a copy of the complete response, please see Appendix B.

BACKGROUND

With the passage of Senate Bill 1, or SB 1 (also known as the Road Repair and Accountability Act of 2017), the Legislature found that over the next 10 years, the state would face a $59 billion shortfall to adequately maintain the existing state highway system and the failure to act (then) would mean more drastic measures would be required to maintain the system. As such, SB 1 increases revenue for California's transportation system and, among other things, requires Caltrans to implement efficiency measures with the goal of generating at least $100 million per year in savings to invest in the maintenance and rehabilitation of the state highway system and to report the savings to the California Transportation Commission (Commission).

Caltrans' Financial Policy Board is responsible for making final decisions on department-wide financial policy issues, including the oversight of SB 1 efficiencies. In 2018, the Financial Policy Board approved the definition of efficiency savings as either a cost avoidance or a reduction in support or capital costs.

On a regular basis, Caltrans' executive management team encourages all programs, divisions, and units to identify and report innovative solutions to problems and find more efficient ways to conduct daily transportation business. Caltrans created a unit, called the SB 1 Program, to track, report, and provide internal oversight to all Caltrans programs who submit for consideration ideas for SB 1 efficiency savings. Caltrans requires its staff to submit their ideas on the SB 1 Program Efficiencies Fact Sheet. The fact sheet includes various factors such as a description of the efficiency and calculation methodology, the assumptions used, the associated benefits, and a list of documents used to calculate the efficiency. The efficiencies are then submitted to the SB 1 Program for initial review and, subsequently, to the Caltrans' Financial Policy Board for

final review and acceptance. Caltrans includes the approved efficiencies in its final annual efficiencies report that it submits to the Commission.

We also recognize that Caltrans continues to improve efficiency savings reporting practices and has implemented prior audit recommendations including, but not limited to, updating efficiency reporting guidance to Caltrans' divisions and programs, and pursuing and adopting industry best practices. See Appendix A for details related to prior audit corrective actions taken.

Caltrans' 2019-20 SB 1 Efficiencies Report identified 22 efficiencies with a total of $340.1 million in savings and categorized the efficiency savings into three categories as follows:

- **New Efficiencies** include, but are not limited to, ideas, innovative tools or processes, materials or applied research that avoid or reduce costs – in either capital or support areas which have not been identified in a prior efficiency report.

- **Recurring Efficiencies** are ongoing savings from efficiencies previously implemented or reported in an efficiency report. An example of a recurring efficiency is ongoing utility cost savings from the installation of Light Emitting Diode (LED) bulbs.

- **Additional Efficiencies** represent the application of a variety of tools Caltrans utilized to be good stewards of taxpayer dollars. These include legacy tools applied in new ways or to new projects. Examples of Additional Efficiencies are Value Analysis, Construction Manager/General Contractor (CMGC), National Environmental Policy Act (NEPA) assignment which allows Caltrans to streamline environmental review, and other tools Caltrans frequently employs to invest taxpayer dollars efficiently and effectively. These additional efficiencies are not counted towards achieving the SB 1 efficiency goal; however, these efficiencies represent strategic efficient investments.

COUNTED TOWARDS	SB 1 EFFICIENCY GOAL	-	-
NEW EFFICIENCIES	**RECURRING**	**ADDITIONAL EFFICIENCIES**	**TOTAL**
$174.3 Million	$20.5 Million	$145.3 Million	$340.1 Million

Source: Caltrans 2019-20 SB 1 Efficiencies Report.

While Caltrans reported a total of $340.1 million in the 2019-20 SB 1 Efficiencies Report, it counted $174.3 million in New Efficiencies and $20.5 million in Recurring Efficiencies, or $194.8 million total, towards the SB 1 efficiency goal.

For the purposes of this audit, we reviewed the three highest value efficiencies and provided a brief background of the efficiency savings in the Results section of this report.

OBJECTIVES

The audit objectives were to determine whether:

- The reported efficiency savings and the methodology used to calculate the savings were adequately supported.

- The estimated savings would be available for investment into the maintenance and rehabilitation of the state highway system.

SCOPE

The scope of this audit covered the 2019-20 Annual Efficiencies Report which included $194.8 million in savings for the period July 1, 2019, to June 30, 2020. We focused on the three largest efficiency savings areas, as follows:

- $85.7 million related to Stormwater Permit Credits
- $40.2 million related to Project Bundling
- $37.0 million related to Pavement Research, Long-Life Pavement

The three efficiency areas we reviewed totaled $162.9 million and represented 84 percent of the total reported savings. We conducted the fieldwork for this audit from February 1, 2021, through September 17, 2021.

METHODOLOGY

We performed a risk assessment, including identifying and evaluating whether key internal controls relevant to our audit objectives were properly designed, implemented, and operating as intended. Additionally, we assessed the reliability of data from Caltrans' project cost estimating system (Basic Engineering Estimate System) and project cost reporting system (Quality Management Reporting System). To assess the reliability of data generated by these systems, we interviewed personnel, reviewed information process

flowcharts and policies and procedures, examined existing reports, and traced data to and from source documents. We determined the data was sufficiently reliable for the purposes of our audit and related objectives.

We developed specific audit methodologies for each efficiency area and provided more detailed information within the respective sections of this report.

We conducted this audit in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

RESULTS AND RECOMMENDATIONS

SECTION 1: STORMWATER PERMIT CREDITS

Background

In its 2019-20 SB 1 Efficiencies Report, Caltrans' Division of Environmental Analysis reported $85.7 million in savings related to the mitigation of stormwater pollutants. Through a multi-year statewide field study, Caltrans learned Open Grade Friction Course (OGFC) pavements that it previously installed on California roadways also provided environmental benefits by removing pollutants, such as toxic metals and sediment from stormwater runoff.

The State Water Resources Control Board (water board) regulates, among other things, stormwater discharges from Caltrans' right of way (land, property, or interest acquired for or devoted to transportation purposes). The water board issued Caltrans a permit for the National Pollutant Discharge Elimination System (NPDES). The NPDES permit requires Caltrans to mitigate stormwater pollutant runoff on the state highway system for a minimum of 1,650 acres/units annually. Caltrans is also required to submit each year a Total Maximum Daily Load Status Review Report to the water board. Caltrans includes in this report the number of acres/units that complies with the water board's criteria and a description of the control measures Caltrans implemented to achieve on-going compliance with NPDES permit requirements over these acres/units. As a result of the field study, Caltrans requested the SWRCB to acknowledge the environmental benefits of OGC and allow Caltrans to claim NPDES Permit Credits for OGFC pavements. In 2019, the water board issued Caltrans credits related to stormwater treatment for 530 acres.

The NPDES credits allowed Caltrans to avoid the construction of traditional—and more costly—devices to address 530 acres due to the utilization of OGFC, and therefore realized the efficiency savings through cost avoidance. Caltrans calculated its initial savings (through cost avoidance) by multiplying the 530 acres of credit by the average cost of $176,000 to treat one acre of stormwater runoff. Caltrans then deducted the cost of the study, which totaled $7.5 million, from the initial savings amount to arrive at its final savings value. For convenience, we have restated the formula as follows:

(530 acres of credit x $176,000/acre) - $7,500,000 = $85,780,000

Audit Methodology

We interviewed key staff from Caltrans' Division of Environmental Analysis and reviewed available documentation to gain an understanding of the approach and any assumptions used to report the stormwater permit credit savings. Additionally, we performed the following:

- Reviewed the water board's March 2019 approval letter to confirm that it granted 530 credits to Caltrans. We also traced the credits to the 2016-17 and 2017-18 annual Total Maximum Daily Load Status Review Report that Caltrans submitted to the water board.

- Reviewed Caltrans' historical cost to construct traditional stormwater treatment devices to validate the average unit cost of $176,000. We also reviewed invoice documentation to validate the architectural and engineering pilot study cost of $7.5 million.

- Verified the project funding source for the stormwater treatment devices was from a source that would be readily available for investment into the maintenance and rehabilitation on the state highway system.

Results

We concluded that the methodology used by Caltrans to calculate $85.7 million in efficiency savings from stormwater permit credits is adequately supported and the estimated savings would be available for investment into the maintenance and rehabilitation of the state highway system.

SECTION 2: PROJECT BUNDLING

Background

Project bundling is the practice of combining several smaller projects into one larger project under a single contract. Caltrans bundles projects that have proximity or location overlap and contain similar scopes of work to leverage design expertise and achieve economies of scale. In fiscal year 2019-20, Caltrans bundled 30 projects into 14 contracts and reported efficiency savings of $40.2 million.

Caltrans calculated its efficiency savings value by adding the construction allocation amounts (cost estimates) of smaller individual projects and comparing it to the contract award for the larger bundled project.

Audit Methodology

We interviewed key staff from Caltrans' Division of Project Management and the Federal Highway Administration (FHWA) and reviewed available documentation to gain an understanding of the methodology and assumptions Caltrans used to report the Project Bundling efficiency savings. Additionally, we performed the following:

- Reviewed individual bid items to confirm the engineer's estimate (the most significant basis for construction capital allocation amounts) was consistent with historical project cost data.

- Reviewed and compared the engineer's estimates to the Commission's project allocation reports to validate the construction allocation amounts used in the calculations. We also traced contract award amounts to the contract award summaries for the combined projects.

- Reviewed Award Recommendation Letters prepared by Caltrans' Office of Engineering Services to identify other potential factors besides project bundling that may have contributed to the savings. The purpose of the Award Recommendation Letter is to provide explanations for the difference between the engineer's estimates and the apparent lowest bid. Federal regulations require recipients of federal funding to examine

the unit bid prices of the apparent low bid for extreme variations from the engineer's estimate. To meet this requirement, Caltrans contacts the apparent low bidder to discuss factors which influenced their bid and then documents their analysis in an Award Recommendation Letter.

- Interviewed FHWA engineers to gain an understanding of best practices with respect to project bundling. According to our interview with FHWA engineers, the Indiana Department of Transportation (Indiana) is considered a lead state for best practices for project bundling initiatives. The methodology for calculating $34.6 million in cost savings was consistent with Indiana's methodology. Indiana partnered with Purdue University to produce a transportation research study gathering data focused on project bundling[2]. FHWA also clarified to us that engineering estimates typically incorporate other factors such as market conditions and bidding environments that could impact total savings. We determined that Caltrans considered these factors when developing the engineer's estimates.

- Verified the source of project funding to determine if the savings would be available for investment in the maintenance and rehabilitation of the state highway system.

Results

Based on our audit procedures, we obtained reasonable assurance that the methodology used to calculate $34.6 million of the $40.2 million in reported efficiency savings was adequately supported and the estimated savings would be available for investment into the maintenance and rehabilitation of the state highway system.

However, we determined that $5.6 million of Caltrans' reported savings for 10 projects was not adequately supported. We determined that Caltrans bundled 10 projects into four contracts while they were in the design stage and before construction allocation. Consequently, the 10 projects did not have *individual* cost estimates to compare against the bundled contract award amount to determine if there was a savings. Without individual project cost estimates, Caltrans could not demonstrate whether the reported savings was derived from project bundling.

[2] Capital Program Cost Optimization through Contract Aggregation Process: https://docs.lib.purdue.edu/jtrp/1674/

Table 1
Bundled Projects

When Projects were Bundled	Number of Projects	Number of Contracts	Savings Reported
After Construction Allocation	20	10	$34.6 million
Prior to Construction Allocation	10	4	$5.6 million
Total	30	14	$40.2 million

Source: Caltrans' 2019-20 SB 1 Efficiencies Report

Recommendation

Caltrans should ensure that it reports savings using a consistent methodology and maintains proper supporting documentation.

SECTION 3: PAVEMENT RESEARCH, LONG-LIFE PAVEMENT

Background

In its fiscal year 2019-20 SB 1 Efficiencies Report, Caltrans reported that it achieved $37 million in savings using long-life pavement asphalt materials that were estimated to reduce maintenance and rehabilitation costs over a 60-year lifespan.

Caltrans partnered with the University of California Pavement Research Center (University of California) in the design of long-life pavement on the Sacramento I-5 project, and in the development of the methodology for calculating the efficiency savings. Caltrans calculated the savings value by comparing the 40-year rehabilitation costs of typical asphalt materials and construction specifications with that of the 60-year long-life asphalt material rehabilitation costs.

Audit Methodology

We interviewed key staff from Caltrans' Division of Research, Innovation & System Information, and the University of California, and reviewed documentation to understand the approach and assumptions Caltrans used to report the Long-Life Pavement efficiency savings. Additionally, we:

- Reviewed the University of California research study and related cost data to determine how University of California calculated the efficiency savings.

- Verified the source of project funding to determine if the savings would be available for investment in the maintenance and rehabilitation of the state highway system.

Results

Although long life pavement is a recognized efficiency measure by the National Asphalt Pavement Association, we concluded that Caltrans' $37 million in cost savings would not be generated until the distant future and, should therefore, not be counted in fiscal year 2019-20. Specifically, Caltrans' data indicated that initial savings would not be realized until 2036 and over 93 percent, or $34.7 million of the $37 million in reported savings, would not be generated until 2051 – over 30 years from now (see Table 2 below). As a result, the savings will not be

readily available to invest in the rehabilitation and maintenance of the state highway system.

Table 2
Caltrans Projected Cost Comparison
of Traditional vs Long-Life Pavement for I-5 Project

Year	Costs & Salvage Value	Traditional Pavement	Long-Life Pavement	Total Savings
2021		$44,821,343	$45,928,676	$(1,107,333)
2036	Maintenance Cost	$9,610,918	-	$221,289
2041	Maintenance Cost	-	$9,389,629	
2051	Maintenance Cost	$9,610,918	-	$34,715,745
2061	Rehabilitation Cost	$34,494,456	-	
2061	Maintenance Cost	-	$9,389,629	
2076	Maintenance Cost	$9,610,918	-	$3,171,603
2081	Salvage Value	$(6,439,315)	-	
Total	**-**	**$101,709,238**	**$64,707,935**	**$37,001,303**

Source: Maintenance and rehabilitation cost data provided by Caltrans' Division of Research, Innovation & System Information (DRISI)

Note: The cost comparison and savings amounts were not audited.

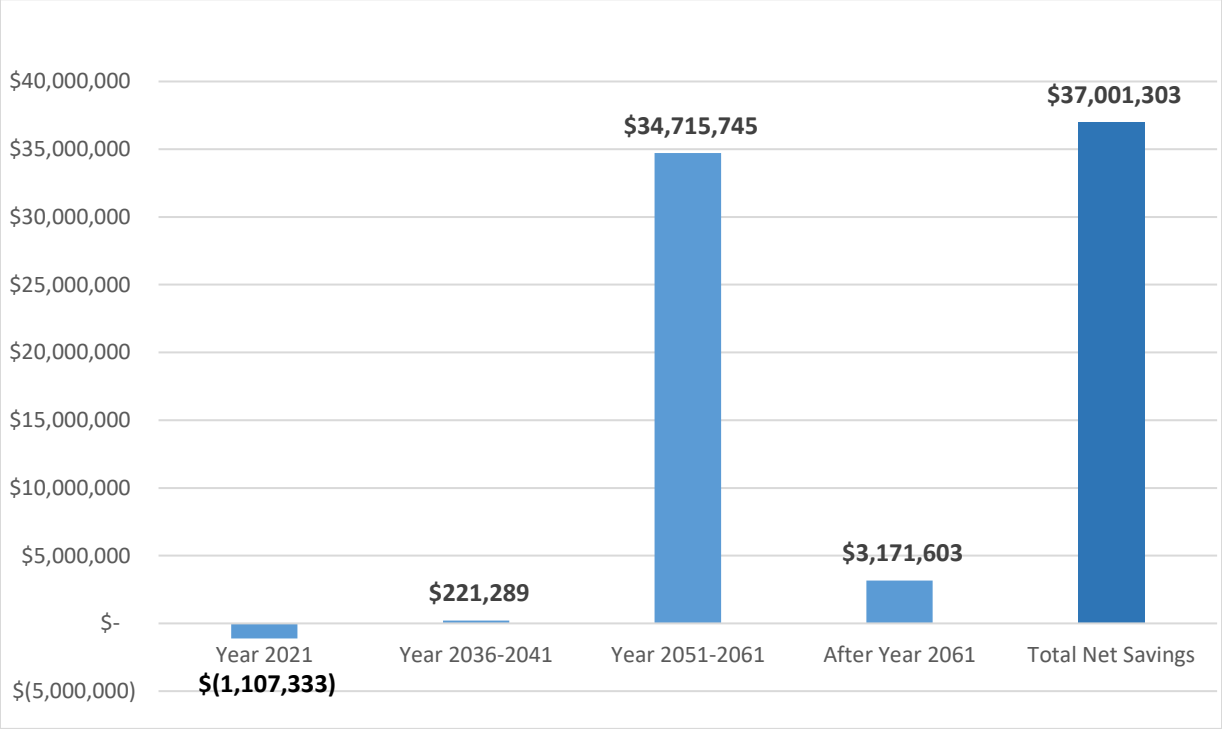
Based on the University of California's research study dated August 2018 and an article published by the National Asphalt Pavement Association (NAPA)[3], using long-life pavement materials is a recognized efficiency. The efficiency is estimated to generate cost savings because there will be reduced maintenance and rehabilitation costs in the future. For example, maintenance on the upper layer of pavement would be performed every 20 years instead of 10 to 15 years.

As noted in Figure 1 below, Caltrans' data illustrates the majority of the savings ($34.7 million) will not be generated until 2051 – over 30 years from now. Moreover, the use of long-life pavement is estimated to cost over $1.1 million in

[3] "Benefits of Partnering to Design Long-Life Pavements" Asphalt Value Proposition, National Asphalt Pavement Association 2020, https://www.asphaltpavement.org/uploads/documents/AVP_PerpetualPavement_Flyer.pdf

the initial years of the project's life. As a result, the estimated future savings does not provide funding to reinvest into the highway system until 2036 at the earliest.

Figure 1
Projected Maintenance and Rehabilitation Savings Timeline



Source: Maintenance and rehabilitation cost data provided by Caltrans' Division of Research, Innovation & System Information (DRISI), see Table 2.

Note: Year 2021 represents the higher initial cost of Long-Life Asphalt Pavement. Refer to Table 2 above.

When asked why the full $37 million was reported in the fiscal year 2019-20 annual report, staff in Caltrans' Division of Research, Innovation & System Information stated that they elected to take credit because "the research was completed and SB 1 funding allowed the project to start." However, any savings would be generated by a reduction in maintenance and rehabilitation costs in the distant future, not because the research was completed and not because the project was started in the present fiscal year. As noted in Table 2 above, maintenance and rehabilitation costs are not scheduled to occur until the year 2036 and the vast majority of the savings would not be realized until 2051.

In addition, staff in Caltrans' Division of Research, Innovation & System Information stated that its interpretation of SB 1 is that "the legislation does not say that only savings that result in making funding available for maintenance and rehabilitation projects in the present year be counted." We, however, respectfully disagree with this interpretation. We acknowledge the savings

would eventually be realized, albeit many years from now. Nevertheless, our interpretation of the SB 1 goal was for Caltrans to count as savings only those monies that it could put back into the state highway system each year. Specifically, the Road Repair and Accountability Act of 2017 requires Caltrans to, among other things, implement efficiency measures with the goal of generating at least $100 million *per year* in savings to invest in the maintenance and rehabilitation of the state highway system.

Recommendation

Clearly demonstrate and document when the savings will be generated and report the savings in the appropriate annual efficiency report.

Appendix A – Caltrans' Corrective Action Plan Summary

SB 1 Efficiency Measures Audit issued on July 23, 2018 (P3010-0641)

Efficiency Area	Audit Recommendation	Corrective Action Response and Status	Corrective Action Implemented
Improvements Needed for Reporting Efficiencies	**1.1** We recommend the SB1 Program Manager ensure the efficiency reports identify the definition of efficiency savings as adopted by Caltrans.	The Efficiency reports will include the definition of efficiency savings adopted by Caltrans. The definition was approved at the Financial Policy Board meeting on February 13, 2018.	Yes
-	**1.2** Ensure the Efficiency Report identify whether each efficiency results in cost avoidance or savings.	The Efficiency reports will specify whether each efficiency results in cost avoidance or savings.	Yes
-	**1.3** Ensure the Efficiency Report identify the methodology for calculating each efficiency.	The Efficiency reports will include the methodology for calculating each efficiency.	Yes
-	**1.4** Ensure the Efficiency Report identify assumptions and costs associated with each efficiency.	The Efficiency reports will include the assumptions and costs associated with each efficiency.	Yes
-	**1.5** Ensure the Efficiency Report identify efficiency savings that will not be available for investment in maintenance and	The Efficiency reports will specify how the savings will be invested in maintenance and rehabilitation of the state	Yes

Efficiency Area	Audit Recommendation	Corrective Action Response and Status	Corrective Action Implemented
	rehabilitation of the state highway system.	highway system, based on their funding source.	
-	**1.6** Ensure the Efficiency Report identify efficiency savings that are based on estimates and not actual savings.	The Efficiency reports will identify whether the calculation is based on estimated or actual savings per efficiency.	Yes
-	**1.7** Ensure the Efficiency Report identify how long each efficiency has been in place.	The Efficiency reports will specify how long each efficiency has been in place.	Yes
Savings Due to Acceleration of Work	**2.1** That time savings is calculated based on ready to list dates.	The actual ready to list date will be used in the calculation.	Yes
-	**2.2** The calculation of savings is based on up-to-date capital construction costs and ready to list dates.	Caltrans will use the actual estimated capital cost at the time the project is ready to list.	Yes
-	**2.3** The monthly escalation rate used is based on the programmed fund estimate rate.	Caltrans will use the approved escalation rate in effect when the project was programmed.	Yes
Streamlining Environmental Reviews	**3.1** Ensure the list of projects used to calculate savings is complete and accurate.	The list of projects meeting environmental milestones prepared by project management for the fiscal year are reviewed by the environmental program. The review is to ensure that the list of projects is complete an accurate and meets the	Yes

Efficiency Area	Audit Recommendation	Corrective Action Response and Status	Corrective Action Implemented
		requirements for NEPA assignment.	
-	**3.2** Ensure costs associated with the NEPA Assignment are taken into consideration when calculating efficiency savings.	Caltrans will calculate NEPA Assignment cost savings and include applicable expenses incurred including legal costs as shown in published reports to the legislature and FHWA.	Yes
-	**3.3** Ensure the monthly escalation rate used to calculate savings is the same rate used to program costs.	Caltrans will calculate de-escalation costs based on the escalation rate in effect at the time costs were programmed.	Yes
-	**3.4** Ensure that significant time lags between the final approval of environmental documents and the project approval are taken into consideration when calculating savings.	The average time savings, which is based on the most recent documented saving timelines in published reports (recent trend is more than 1 year) for major environmental documents, will be adjusted if there is a significant lag between environmental document approval and project approval.	Yes
-	**3.5** Work with the California State Transportation Agency to extend the waiver of sovereign immunity authority beyond December 31, 2019.	Caltrans is actively working with CalSTA to advance the legislation forward. In order to enact legislation before the expiration date, legislation would need to be introduced by February of 2019 for the	Yes

Efficiency Area	Audit Recommendation	Corrective Action Response and Status	Corrective Action Implemented
		Governor to approve by the fall of 2019.	
Value Analysis Studies	**4.1** Baseline and alternative cost estimates are calculated in accordance with accepted guidelines and are reasonable and supported.	Caltrans will review value analysis reports to ensure baseline and alternative cost estimates are in accordance with acceptable estimating practices and are reasonable.	Yes
-	**4.2** The net value of all implemented alternatives is reported, regardless of whether the alternatives result in savings or increased cost.	Caltrans will report on the net value of all innovations implemented, for each project evaluated.	Yes
-	**4.3** Costs associated with performing and producing the value analysis studies are taken into consideration when calculating efficiency savings.	Caltrans will calculate cost savings for innovations implemented and include applicable expenses incurred including staff time for team members performing the VA study, and consultant costs to conduct VA studies.	Yes
-	**4.4** The average salary rate used to calculate staff costs is supported, complete and current.	Caltrans will use the latest "cost of a PY" that is developed annually as part of the Capital Outlay Support finance letter. These costs are reviewed and approved by the Department of Finance and the Legislative Analyst Office as part of the budget process.	Yes

Efficiency Area	Audit Recommendation	Corrective Action Response and Status	Corrective Action Implemented
-	**4.5** Savings do not overlap with Construction Manager/General Contractor or other efficiencies.	Caltrans will compare projects in the annual report to other efficiency cost saving innovations to ensure that the same innovation is not duplicated.	Yes
Innovative Contracting Tools - Construction Manager/General Contractor	**5.1** The net value of all innovations is reported, regardless of whether the innovation results in estimated savings or increased costs.	For each project evaluated, Caltrans will report on the net value of all innovations implemented	Yes
-	**5.2** The costs associated with the CMGC process are reported to the Commission after the projects have been completed.	CMGC cost savings are evaluated both at time of contract award and completion of construction. • At the time of contract award, there are innovations that are implemented which would provide costs savings. Caltrans will include costs incurred to compensate contractor that provided input which results in potential innovations. The reported cost savings will account for both savings and expenses at time of award. • At the time of completion of construction, there may be additional savings due to reduced number	Yes

Efficiency Area	Audit Recommendation	Corrective Action Response and Status	Corrective Action Implemented
		of claims during the project and those cost savings may be reported at that time.	
-	**5.3** Savings do not overlap with Value Analysis or other efficiencies.	Caltrans will compare projects in the annual report to other efficiency cost saving innovations to ensure that the same innovation is not duplicated.	Yes
-	**5.4** Assumptions made for each innovation in estimating savings are identified and documented.	The CMGC evaluation reports will include the assumptions and costs associated with each efficiency.	Yes

SB 1 Efficiency Measures Verification Audit issued on July 25, 2019 (P3010-0648)

Efficiency Area	Audit Recommendation	Corrective Action Response and Status	Corrective Action Implemented
Streamlining Environmental Reviews - National Environmental Policy Act (NEPA) Assignment	**1.1** The efficiency savings calculation is based on the programmed capital construction amount and not the estimated capital construction amount. For transparency purposes, Caltrans should report significant methodology changes to efficiencies reported in previous fiscal years.	The 2019-20 Annual Efficiencies Report will calculate efficiencies based on the programmed capital construction amount and not the estimated capital construction amounts all future fiscal year calculations.	Yes
-	**1.2** The list of projects included in the calculation is reviewed	The 2019-20 Annual Efficiencies Report will ensure that projects	Yes

Efficiency Area	Audit Recommendation	Corrective Action Response and Status	Corrective Action Implemented
	to ensure that projects reported under the Acceleration of Work are not also reported under NEPA.	included on the NEPA list are not duplicating efficiencies found elsewhere.	
-	**1.3** The list of projects included in the calculation is reviewed for completeness and accuracy. Specifically, projects that are not subject to NEPA or those without project reports should be excluded from the list.	The 2019-20 Annual Efficiencies Report will exclude projects that are not subject to NEPA.	Yes
-	**1.4** Time lags between the final approval of environmental documents and the project approval are tracked to determine if efficiencies in this area can be achieved in the future.	The 2019-20 Annual Efficiencies Report will track the duration between final environmental document and project approval to determine if efficiencies can be achieved in this area.	Yes
Value Analysis	**2.1** Consider reporting cost avoidance for value analysis studies once the projects have been awarded using actual bid prices. This methodology will result in a more accurate estimation of efficiency savings because actual unit prices will be used rather than the engineer's estimated unit prices.	Project Delivery has developed a SB 1 VA Alternative Verification Form using the actual bid prices for reporting annual SB 1 efficiencies. A copy of the form can be found as Attachment 2.1. All future VA reporting will be done using this form with actual bid prices. This requirement has been communicated to all districts doing VA studies.	Yes

Efficiency Area	Audit Recommendation	Corrective Action Response and Status	Corrective Action Implemented
-	**2.2** Provide guidance to districts in order to ensure consistent methodology in updating initial cost estimates.	Project Delivery provided training on the new guidance to the districts.	Yes
-	**2.3** Perform quality assurance on the updated estimates prepared by the districts. Specifically, ensure: 1) Baseline and alternative unit prices for the same materials are the same. 2) The alternative estimate includes preparation work and materials, and the baseline mark-up should only reflect similar work and materials necessary to implement the baseline concept. The work and materials included in the mark-up should be specified. 3) Quantities should be updated for the alternatives based on plans and specifications. Also, if the baseline quantities contained in the study are not reasonable, they should be updated.	As part of the quality assurance program, Project Delivery has been providing VA Implementation Training statewide. The training includes instructions on how to handle baseline and alternative unit prices for the same material, baseline mark-up, updating quantities based on plans and specifications, and all other recommended items. As noted on attachment 2.5, nine districts have been trained to date, one districts will be trained by the end of the fiscal year and the remaining two districts do not have projects meeting the VA threshold.	Yes
Construction Manager / General Contractor	**3.1** Update the innovation matrix template to ensure that innovations implemented into the	Project Delivery has developed a new innovation matrix template for use on upcoming projects to	Yes

Efficiency Area	Audit Recommendation	Corrective Action Response and Status	Corrective Action Implemented
	final plans and specifications include quantity and price information for both the baseline concept and the innovation. In addition, assumptions made for each implemented innovation are identified and documented to support how the innovation resulted in an efficiency.	ensure that items 3.1a and 3.1b are being addressed. A copy of the matrix template is attached.	
-	**3.2** Update the innovation matrices based on the final unit prices.	All innovation matrices will be based on the final agreed unit prices. Efficiency savings in the 2019-20 Annual Efficiencies Report are based on final unit prices.	Yes
Overall	**4.1** Ensure that any efficiency savings not available for investment in maintenance and rehabilitation of the state highway system are separately identified in future reports to the CTC.	The SB 1 Program will ensure that the next Annual Efficiencies Report and subsequent reports identify efficiency savings not available for investment in maintenance and rehabilitation of the state highway system.	Yes
-	**4.2** Ensure that the efficiencies reported to the CTC include an explanation on how efficiencies will be available for investment in the maintenance or rehabilitation of the state highway system.	The SB 1 Program will ensure that the next Annual Efficiencies Report and subsequent reports explain whether efficiencies identified from non- SHOPP projects are available for investment in	

Efficiency Area	Audit Recommendation	Corrective Action Response and Status	Corrective Action Implemented
		maintenance and rehabilitation of the state highway system.	

SB 1 2018-19 Efficiencies Audit issued on January 11, 2021 (P3010-0666)

Efficiency Area	Audit Recommendation	Corrective Action Response and Status	Corrective Action Implemented
Acceleration of Work	**1.1** For transparency purposes, Caltrans should report significant methodology changes to efficiencies reported in previous fiscal years.	Clearer explanations for methodologies were used for the 20-21 Efficiencies report. The Department also streamlined the report and included an appendix.	Yes
-	**1.2** Maintain a complete and accurate list of projects used to calculate savings, as recommended in our previous audit.	Supporting documentation, including project lists, were included in the appendix for the 2020-21 report.	Yes
-	**1.3** Ensure the correct escalation rate is applied, as recommended in our previous audit.	When appropriate, all escalation rates were verified with the SME for the 2020-21 report.	Yes
-	**1.4** Report all assumptions and costs associated with the efficiency savings in the report to the CTC, as recommended in our previous audit.	Clearer assumptions for efficiencies were verified and included in the 2020-21 report.	Yes
-	**1.5** Clearly document and report in the Annual Efficiencies Report the	The 2020-21 report includes a new, clearer categorization; Type 1,	Yes

Efficiency Area	Audit Recommendation	Corrective Action Response and Status	Corrective Action Implemented
	specific "efficiency measures" implemented and if reported as an "Innovative Tool" explain how the efficiency is innovative in nature.	Type 2, and Type 3 - which is articulated in the new report.	
-	**1.6** Continue to evaluate and adopt best practices and parameters used by other organizations for reporting efficiency savings and documenting validation efforts. The adopted best practices and parameters should specifically include process improvements or innovations, and the number of years an efficiency can be reported.	Caltrans has met with other states in 2021 and are hosting a peer exchange in January 2022. Caltrans has/will evaluated practices for adoption into Caltrans practices.	Yes
Innovative Strategies in Striping Contracts	**2.1** Efficiency savings for striping contracts should be calculated using 2017-18 winning bid prices (since innovative strategies were implemented after 2017-18) as a baseline to compare to current fiscal year winning bid prices as recommended in our previous audit of Value Analysis efficiencies.	Baseline costs are reported in the appendix, where appropriate.	Yes

APPENDIX B – Caltrans' Response

State of California
DEPARTMENT OF TRANSPORTATION

California State Transportation Agency

Memorandum

Making Conservation a California Way of Life

To: DIANA C. ANTONY
Chief Deputy Inspector General
Independent Office of Audits and Investigations

Date: June 3, 2022

File:

From: SCOTT EADES
ACTING SB 1 PROGRAM MANAGER

Subject: **CALIFORNIA DEPARTMENT OF TRANSPORTATION SB 1 2019-20 EFFICIENCIES REPORT AUDIT**

Dear Ms. Antony,

The California Department of Transportation (Caltrans) appreciates the opportunity to provide a response to the draft audit report on the 2019- 2020 Caltrans Efficiencies Report Audit, dated May 20, 2022. The purpose of this audit was to determine if the savings reported in the 2019-20 Caltrans Efficiencies Report are supported and available for investment in the maintenance and rehabilitation of the state highway system, as required by Senate Bill 1 (SB 1).

The Independent Office of Audits and Investigations (IOAI) determined Caltrans was able to support $120.3 million of the $162.9 million in reported SB 1 cost savings and cost avoidance. This $120.3 million reflects a portion of the $340.1 million in total efficiencies submitted in the 2019-20 Caltrans Efficiencies Report. While the main objective for the audit was achieved, Caltrans would like to comment on IOAI's observations and findings:

Savings Related to Stormwater Permit Credits

Caltrans appreciates the IOAI's thorough review of the Stormwater Permit Credits efficiency. IOAI's review concluded all $85.7 million in claimed savings were adequately supported. The IOAI's analysis of the State Water Resources Control Board regulations and the National Pollution Discharge Elimination System aligns with Caltrans Division of Environmental Analysis position that the use of Open Grade Friction Course pavements results in environmental benefits by removing pollutants and avoiding construction of more costly devices to address stormwater runoff.

Savings Related to Project Bundling

The IOAI determined that $34.6 million of the $40.2 million in reported efficiency savings were supported, with $5.6 million which was not fully supported. This was due to 10 projects being bundled into four contracts in the design stage, without initial cost estimates to compare against bundled contract award amounts.

Project Bundling provides for cost savings and is a recognized cost savings measure by the Federal Highway Administration (FHWA). Methodologies to implement and measure savings from Project Bundling vary. Caltrans agrees with this finding and has implemented quality assurance measures to improve the savings calculation and will ensure a consistent methodology and supporting documentation is maintained.

Savings Related to Long-Life Pavement

The IOAI audited the long-life pavement efficiency and determined that the use of long-life pavement is an industry recognized efficiency measure but concluded that $37 million in claimed savings were unsupported. Caltrans respectfully requests IOAI continue work with us in further considering how long-life pavement can be supported as an efficiency as required by SB1.

Caltrans believes the use of long-life pavement is consistent with SB1 provisions specifically to use advanced technologies to reduce the cost of maintaining and rehabilitating streets and highways. This is also an example of Caltrans' commitment to innovation and partnership to ensure taxpayer dollars are invested wisely. The attached letter from UC Davis Civil and Environmental Engineering Professor John Harvey, who is the Director of the University of California Pavement Center discusses the collaboration that took place between academia, industry, and government to develop long-life pavement techniques, and the benefits derived from that partnership.

Caltrans is proud of the $37 million in savings from long-life pavement and will continue to look for more ways to increase the useful life of projects while reducing costs to taxpayers. We appreciate the collaboration with IOAI and will continue to work together to identify efficiencies as stewards of the SB1 and other taxpayer funds.

Attachment: May 27, 2022, letter from John T. Harvey, PhD, PE

c (Caltrans):
Steven Keck, Acting Director
Michael Keever, Chief Deputy Director
Angel Pyle, Acting Deputy Director of Finance
Donna Berry, Acting Chief Engineer
Dara Wheeler, Chief, Division of Research Innovation and System Information
Jeff Wiley, Acting Chief, Division of Project Management
Ramon Hopkins, Acting Chief, Division of Environmental Analysis
Shaila Chowdhury, Chief Environmental Engineer, Division of Environmental Analysis
Nick Burmas, Office Chief, Division of Research Innovation and System Information
Patrick Olsen, SB1 Efficiencies Manager

May 27, 2022

To Whom It May Concern,

I would like to take this opportunity to state my strong support for long-life pavement, both asphalt and concrete, as an efficiency and emphasize the long-term benefits that are gained through partnering, research, and using new materials, structural design, and construction strategies to deliver transportation infrastructure projects in California.

Senate Bill 1 (SB 1) provisions encourage use of innovative materials and advanced techniques to reduce costs and make efficient and financially responsible transportation decisions. I believe that the use of long-life pavement is a perfect example of how partnering between the university, government and industry, and collaboration on the hard work needed to move research and development to successful implementation, achieves those goals set forth in the SB 1 legislation.

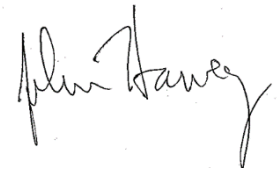
From my interactions in recent years with the legislative staffers and legislators who put SB 1 together my understanding was that their intention was to encourage innovation by Caltrans without great concern for the details of how that was accounted for. They were excited about collaboration between the University of California Pavement Research Center (UCPRC) and Caltrans to implement innovative practices, such as occurred on the Sac-5 rehabilitation project.

I regularly interact with the managers of the Federal Highway Administration unit in charge of life cycle cost analysis (LCCA) through several task groups and committees. Regarding the approach used to calculate the efficiency from the design and construction approach on the Sac-5 project, there is Federal Highway Administration (FHWA) and industry-wide acceptance of the use of LCCA to estimate the cost savings from the innovations on projects. Use of LCCA and the conversion of initial and future costs into a net present value is the standard and the only method routinely used for cost comparison of project alternatives. It is also Caltrans policy to use this approach when comparing alternatives for new pavement reconstruction and major rehabilitation. The development of the Caltrans LCCA method was the product of collaboration by Caltrans, the FHWA, and the UCPRC in 2003. In fact, potential reductions in road user delay costs through less frequent construction work zones for future maintenance were not included in the LCCA for calculation of efficiency from the Sac-5 project although they are part of FHWA recommendations and typically included in Caltrans practice.

Most of the projects that will generate large efficiencies from innovations in transportation infrastructure, such as Caltrans' largest assets which are pavement and bridges, will accrue those savings over decades. There are few opportunities for instantaneous cost savings. This is because most assets are long-lived with functional lives of 50 years or more. They often require small percentage increases in initial costs that have large payback over their functional lives. I

strongly believe that it is imperative that these types of innovative approaches are fully recognized as contributors to the vision of the efficiency provisions in SB 1. If not, then the intent of the bill to foster innovation to produce more cost-effective transportation assets that will benefit users for many years to come will not be applicable to a large sector of what a transportation agency does.

Respectfully,



John T. Harvey, PhD, PE

Professor, Civil and Environmental Engineering, UC Davis
Director, University of California Pavement Research Center
Director, City and County Pavement Improvement Center