



INSPECTOR GENERAL

California Department of Transportation

The Delta Ferries

Program Audit



Independent Office of Audits and Investigations

Bryan Beyer, Inspector General

Diana Antony, Chief Deputy

November 2022

P4000 0415



For questions concerning the contents of this report, please contact (916) 323-7111 or email ioai.reports@dot.ca.gov.



Inspector General

California Department of Transportation

Bryan Beyer, Inspector General

Diana Antony, Chief Deputy

November 7, 2022

Tony Tavares, Director
California Department of Transportation

Final Report – Delta Ferries, Program Audit

Dear Director Tavares:

Pursuant to Government Code, Section 14461, the Independent Office of Audits and Investigations (IOAI) has completed its audit of the Sacramento-San Joaquin River Delta ferries.

Enclosed is the final report, which includes Caltrans' response to the draft 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. The CAP should be sent to ioai.reports@dot.ca.gov.

If you have any questions, please contact Juanita Baier, Audit Chief, at (916) 323-7111.

Sincerely,

Bryan Beyer, CIG
Inspector General

Gavin Newsom, Governor

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Tony Tavares
November 7, 2022

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Terms Used in Report

Term/Acronym	Definition
Caltrans	California Department of Transportation
Committee	Assembly Committee on Transportation
IOAI	Independent Office of Audits and Investigations

Summary

The California Department of Transportation (Caltrans) operates two short-segment ferries in the Sacramento-San Joaquin River Delta 24 hours per day, seven days per week, at no charge to passengers. The ferries serve as an extension of the State Highway System as they allow vehicle-access to and from Ryer Island along State Route 84 and State Route 220. Our audit focused on the cost of providing ferry operations, the number of vehicles that used the ferries, and the number of days the ferries were out of service. We also evaluated the extent to which Caltrans has assessed alternatives to ferry operations, such as building new bridges or relinquishing ferry operations to other jurisdictions.

In this report, we conclude that Caltrans has not yet fully analyzed the long-term costs and benefits of providing ferry services to Ryer Island compared to other alternatives. Consequently, we think it would be prudent for Caltrans to complete a comprehensive analysis of various transportation options for the island before it invests tens of millions of additional dollars on the existing ferry system.

Our review found that over the last few years the ferries were frequently out of service, which limited their reliability and usefulness to the regional community. For instance, we found that the two ferries were out of service due to various reasons an average of 116 days and 78 days per year, respectively. We also found that, compared to a nearby bridge that also provided access to the island, a relatively low number of vehicles utilized the ferry service each year. According to Caltrans' data, approximately 137,000 vehicles used the two ferries combined, while approximately 256,000 vehicles used the bridge – a difference of about 87 percent.

We also found that Caltrans spent about \$4 million each year operating the ferries 24 hours per day, seven days per week, while charging no tolls for the service. In addition, Caltrans is planning to spend at least \$20 million more to repair one of the ferry's fenders and upgrade its concrete ramps within the next couple of years. Complicating the decision to spend money on this repair, however, is that Caltrans will also need to consider new environmental regulations that could potentially go into effect January 1, 2026. If that happens, the new requirements intended to reduce harmful greenhouse gas emissions may affect the existing ferries and their operation. Costs related to becoming compliant will likely be very expensive, given that Caltrans will either need to make extensive changes to the ferries' existing diesel-fuel-burning engines or purchase two new ferries. If Caltrans purchases two new ferries, then the money it spends on repairing the existing ferries will be wasted.

The low utilization of the ferries coupled with their high operational costs and additional costs needed to repair and possibly replace them underscores the necessity for Caltrans to conduct a thorough, long range analysis of all potential options. To date, however, Caltrans has performed only a limited analysis of various options involving replacement bridges or the relinquishment of the ferries to a third party. The long-term costs and benefits of its ferry operations relative to other alternatives has not yet been fully addressed.

Introduction

Background

Ryer Island is approximately 11,700 acres and consists mostly of farmland, ranch houses, and recreational areas. According to the 2020 U.S. Census data, we determined that Ryer Island's population was 302. Ryer Island is located on the eastern edge of Solano County in the Sacramento–San Joaquin River Delta with the Steamboat Slough on the southeastern side, the Cache Slough on the western side, and the Miner Slough on the northern side. Ryer Island has three access points: the southern access point with the Real McCoy II ferry at State Route 84, the eastern access point with the J-Mack ferry at State Route 220, and the northern access point with the Miner Slough Bridge at State Route 84.

The delta ferries are an extension of the State Highway System

The Delta ferries are part of the California Department of Transportation's (Caltrans) movable bridge system and are considered an extension of the California State Highway System. As shown in Figure 1, State Route 84 runs north and south on the west shore of the island. At the southern access point of the island, the Real McCoy II extends State Route 84 from the Rio Vista area through Ryer Island crossing over the Cache Slough. State Route 220 runs east and west in the middle of the island and on the eastern access point, the J-Mack extends State Route 220 from the Walnut Grove area to Ryer Island crossing over the Steamboat Slough.

The Real McCoy II and J-Mack ferries are the only two vehicle ferries owned and operated by the state. These ferries provide residents and visitors access to Ryer Island. Both ferries operate on a continuous, 24 hours per day, seven days per week, schedule that is free of charge to riders.

The J-Mack, which was put into operation in 1969, uses a diesel-powered engine and runs on a cable. Once the vehicles are loaded onto the ferry, it takes them across the Steamboat Slough, traveling approximately 400 feet (or about three minutes in duration). The J-Mack can accommodate up to six vehicles per trip and runs on demand with one crew member (who must hold a license from the U.S. Coast Guard as a Ferryboat Mate or Ferryboat Master).

The Real McCoy II, which was put into place in 2011 (after having replaced the original Real McCoy), uses a diesel-powered engine with hydraulic propulsion – it does not utilize a cable like the J-Mack. The Real McCoy II travels approximately 800 feet across the Cache Slough (or about 5 minutes in duration) and can accommodate up to eight vehicles. The Real McCoy II runs every twenty-minutes with its origin on the Rio Vista side of Cache Slough. The Real McCoy II requires two crew members to operate: a Ferryboat Master and a Deckhand. The Deckhand does not need a license from the U.S. Coast Guard.

Figure 1: Map of Ryer Island in Relation to the Surrounding Region



Source of map data: Mapquest <https://www.mapquest.com/search/Ryer%20island%20ca> (accessed September 7, 2022).

Scope and Methodology

The purpose of this audit was to evaluate the cost of operating the ferries in relation to ridership data, and to evaluate Caltrans' analysis of feasible alternatives to the ferries. We gained an understanding of the delta ferries' operations, policies, and procedures and assessed key internal controls significant to the audit objectives. We interviewed personnel responsible for ferry operations in Caltrans' District 4, Division of Equipment, and several ferry operators. We reviewed documentation supporting operating expenses, usage (ridership) data, out-of-service documentation, and other relevant information.

In performing this audit, we relied on electronic data obtained from Caltrans' Delta Ferries Operation Management related to operating cost, downtime, vehicle counts, and other relevant information. To evaluate the data, we reviewed existing information about the data, interviewed Caltrans staff members knowledgeable about the data, and performed electronic testing of the data. We determined the data related to the ferries' operating costs and downtime to be sufficiently reliable for the purpose of populating annual operating costs and downtime information. We found Caltrans' data on vehicle count to be of undetermined reliability. Although this determination may affect the precision of some numbers we present, there is sufficient evidence in total to support our findings, conclusions, and recommendations. For perspective, Appendix A includes additional information on out of service days, average daily vehicle usage, and operating costs by month.

We conducted this audit in accordance with generally accepted government auditing standards. These 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.

Audit Results

The Delta Ferries Were Often Out of Service, Which Limited Access to and from Ryer Island

Two of the three access points to and from Ryer Island involve the delta ferries: the Real McCoy II and the J-Mack. These ferries help maintain continuity along State Route 84 (over the Cache Slough) and State Route 220 (over the Steamboat Slough). We found, however, that the ferries have been frequently out of service due to a variety of reasons, which has limited their reliability and usefulness as a method of transportation for both residents and visitors of the area.

Mechanical problems, water conditions, and staff shortages routinely affected the ferries' reliability. As shown on Table 1, over the last five fiscal years, these issues collectively took the Real McCoy II and the J-Mack ferries out of service for approximately 116 days (32 percent of the time) and 78 days (21 percent of the time), respectively, per year. The frequency of this downtime caused disruption in traffic flow and forced residents and visitors to use alternative routes, such as using the other ferry (when possible) or using the Miner Slough Bridge, located along State Route 84 at the northern access point of the island.¹

Data we reviewed demonstrated that mechanical issues, averaging about 98 days per year, were the leading cause of service disruptions for the Real McCoy II even though the ferry was put into place in 2011 (after having replaced the original Real McCoy).

Table 1: Average Number of Days the Ferries Were Out of Service, by Reason (For the Last Five Fiscal Years, Ending June 30, 2022)

Fiscal Year Ending June 30,	Real McCoy II				J-Mack				Combined Total
	Mechanical	Staffing	Weather & Water Conditions	Subtotal	Mechanical	Staffing	Weather & Water Conditions	Subtotal	
2018	30.6	0.3	-	30.9	4.3	0.8	9.0	14.1	45.0
2019	69.2	1.0	-	70.2	2.1	-	35.4	37.5	107.7
2020	272.3	-	-	272.3	101.8	8.0	-	109.8	382.1
2021	17.3	37.3	-	54.6	2.4	62.7	-	65.1	119.7
2022	98.7	47.1	4.0	149.8	2.2	158.6	1.2	162.0	311.8
5-Year Average	97.6	17.1	0.8	115.6	22.6	46.0	9.1	77.7	193.3

Source: Data provided by Caltrans.

¹ On July 14, 2021, auditors visited the ferries and were able to ride on each of them. On August 26, 2022, the Inspector General and two managers from our office traveled to observe the ferries; however, the Real McCoy II was out of service (and out of the water), forcing the observers to access the island using the J-Mack, which was open and operational.

In one particularly egregious example, the Real McCoy II was out of service for 101 continuous days in fiscal year 2019-20 because it struck a portion of the dock and required emergency repair. The J-Mack was out of service because of mechanical issues for an average of approximately 23 days per year over the past five fiscal years.

Another factor adversely affecting ferry operations was staffing. Caltrans' data indicated that staffing issues caused the Real McCoy II and the J-Mack to shut down an average of 17 days and 46 days, respectively, per year. Caltrans uses two 12-hour shifts to cover its around-the-clock ferry schedule. However, Caltrans has only a limited number of individuals who hold the requisite licenses to operate the ferries. As of October 2022, Caltrans has eight full-time and three part-time authorized positions for licensed ferryboat masters who are legally allowed to operate the ferries. Caltrans also has four full-time authorized deckhand positions, who assist the ferryboat masters on the Real McCoy II. However, of these 15 positions, Caltrans had only nine positions filled (60 percent): six ferryboat masters and three deckhands. With six vacant positions, we suspect it would be challenging to adhere to the ferries' continuous operating schedule, especially when the nine employees it has require time off from work. According to Caltrans, it is hard to recruit and retain these employees because the level of pay is significantly less than what these individuals can make in the private sector.

Furthermore, the U.S. Coast Guard requires the ferries to be dry-docked for an inspection at least once every five years. These inspections (along with any associated repairs to bring the ferries into compliance) typically take the ferries out of service for two to three months at a time. The inspections ensure the ferry boats are structurally suitable for service; are equipped with proper appliances for lifesaving, fire-prevention, and firefighting; are capable of accommodating the crew and passengers; are in a condition to be operated safely; and are compliant with applicable marine safety laws and regulations. The two ferries were last inspected toward the end of 2019. During this time, the Real McCoy II was taken offline for about 145 days, and the J-Mack was taken offline for about 87 days.

Weather and water conditions represented the remaining categorical factor that limited ferry operations. For instance, the J-Mack was taken off-line more often than the Real McCoy II over the past five fiscal years due to poor water conditions generally caused by unusually high tides and storms (an average of about nine days compared to less than one day, respectively). The J-Mack is more susceptible to water-related service disruptions because it uses a cable-system to guide the ferry from shore to shore. Under certain conditions, Caltrans must drop the cable to the bottom of the water channel to prevent debris from building-up, which can overstress the cable and cause it to break. When Caltrans takes this safety precaution, the J-Mack is temporarily rendered inoperable.

In 2021, Caltrans hired a consultant to conduct research of similar ferries operated by other state, regional, and local agencies. The consultant sent out surveys to 11 agencies seeking information about the operational challenges each entity faced with respect to their ferries. Two entities responded and provided the consultant with an interesting data point. Although the two agencies reported some challenges with staffing and finding qualified ferry operators, each entity reported their ferries having a relatively low number of days out of service. Specifically, the two agencies reported that their ferries were out of service for an

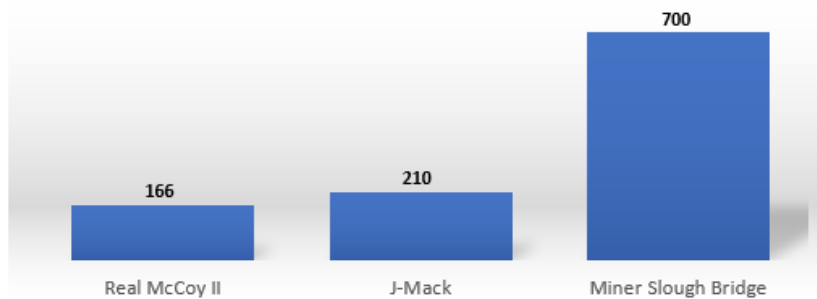
average of 2.5 days and 8.9 days per year. Although it may not be completely fair to draw a direct comparison to the delta ferries without knowing the agencies' reporting methodology and the circumstances of their ferry operations, it nonetheless raises some important questions as to why these agencies reported having significantly fewer days out of service than the delta ferries.

Moreover, Caltrans is planning to take the Real McCoy II out of service for at least an 18-month period to replace the ferry's fender and boat ramp in 2025. According to Caltrans, the current fender system has missing, split, and broken parts that need replacement. At the same time, Caltrans will also upgrade the concrete boat ramp to allow for larger-sized vehicles. Despite Caltrans' stated need to undertake this project, it will nevertheless adversely affect residents and visitors who would typically use this ferry as an access point to and from the island. During this lengthy shutdown, drivers who would normally take the Real McCoy II will instead need to take an alternate route to the J-Mack or to the nearby Miner Slough Bridge.

Few Vehicles Typically Used the Delta Ferries

Ryer Island is a relatively small geographic area (consisting of approximately 11,700 acres) with just over 300 residents². These residents along with anyone visiting the area for business or recreation must travel to and from the island using either the two ferries or the Miner Slough Bridge. Based on the previous five fiscal years, the daily average number of vehicles that utilized the Real McCoy II and J-Mack ferries was 166 and 210, respectively (refer to Figure 2). Peak hours of usage for the ferries were generally between 12:00 p.m. and 6:00 p.m., where an average of 170 vehicles, or about 45 percent of the total daily average, utilized the ferries (refer to Figure 3 on the following page).

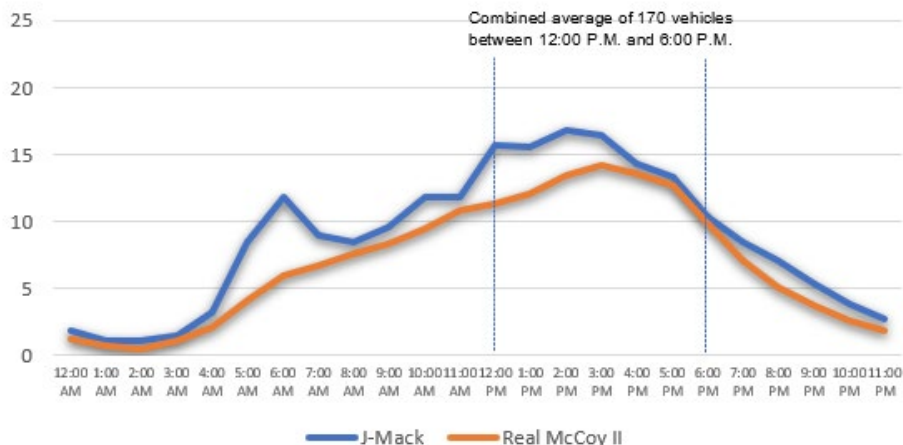
Figure 2: Daily Average Number of Vehicles Using the Ferries
(For the Last Five Fiscal Years, Ending June 30, 2022)



Source: Analysis by the Independent Office of Audits and Investigations using data provided by Caltrans.

² Based on the 2020 U.S. Census data, we determined that Ryer Island had 302 residents.

Figure 3: Average Daily Vehicles Using the Ferries, by Hour of the Day (For the Last Five Fiscal Years, Ending June 30, 2022)



Source: Analysis by the Independent Office of Audits and Investigations using data provided by Caltrans.

In contrast, however, the average annual number of vehicles that utilized the Miner Slough Bridge during the same period was much higher than the two ferries. Specifically, the daily average number of vehicles that used the Miner Slough Bridge was 700 compared to only 376 that used the two ferries combined.³ We note, however, that it is possible that some of this difference could have been due to the various reasons the ferries were out of service, causing vehicles to utilize the bridge, instead. Nevertheless, the bridge remains the more popular method—if not the more reliable method—of travel to and from the island.

The Cost to Operate the Delta Ferries Was About \$4 Million Per Year; Caltrans Plans to Spend an Additional \$20 Million to Replace One of the Ferries’ Fenders and Upgrade Its Ramp

As shown in Table 2, on the following page, data from the last five years indicates that Caltrans has spent an average of about \$4 million per year to operate the Real McCoy II and J-Mack ferries. Most of these costs came from labor, which represented about \$2.3 million (59 percent) per year. Labor costs included the salaries and benefits of the ferry operators. In addition, since these employees were salaried, Caltrans incurred these labor costs regardless of the ferries’ operational status.

The remaining \$1.6 million (41 percent) in average annual costs related to servicing, equipment, repair, fuel, and other related ferry expenses.

³ Usage for the Miner Slough Bridge was taken from Caltrans’ 2020 Annual Average Daily Traffic report.

Table 2: Summary of Annual Operating Costs of the Ferries

Fiscal Year Ending June 30,							
	Labor	Service, Dry Dock, & Other	Total	Labor	Service, Dry Dock, & Other	Total	
2018	\$ 1,455,107	\$ 260,171	\$ 1,715,278	\$ 894,936	\$ 478,138	\$ 1,373,074	\$ 3,088,352
2019	1,575,242	171,212	1,746,454	919,292	323,082	1,242,373	2,988,828
2020	1,192,784	3,221,742	4,414,527	861,694	1,790,414	2,652,107	7,066,634
2021	1,416,076	207,212	1,623,289	948,181	208,644	1,156,825	2,780,113
2022	1,300,477	1,142,004	2,442,481	1,119,354	277,967	1,397,321	3,839,802
5-Year, Annual Average	\$ 1,387,937	\$ 1,000,468	\$ 2,388,406	\$ 948,691	\$ 615,649	\$ 1,564,340	\$ 3,952,746
5-Year, Combined Annual Average	Labor	\$ 2,336,629	59%				
	Service, Dry Dock, & Other	\$ 1,616,117	41%				

Source: Analysis by the Independent Office of Audits and Investigations using data provided by Caltrans.

*Other includes the costs associated with equipment, fuel, emergency repairs, and general office supplies. In 2020, the Real McCoy II required emergency repair at a cost of \$2,565,770.

About \$1 million of this annual amount was attributable to the Real McCoy II. Among the more significant of these costs were those associated with a one-time emergency repair in 2019 for the Real McCoy II when the ferry struck its fender system, causing considerable damage to both the ferry and portions of the dock. The cost to fix the ferry and dock was \$2.6 million. Another significant expense for the ferries included the costs associated with the U.S. Coast Guard inspections. During the last five years, Caltrans spent a total of nearly \$1.8 million to have both ferries inspected and repaired: it spent about \$1.4 million for the J-Mack in 2019 and about \$451,000 for the Real McCoy II in 2020.⁴

As previously discussed, Caltrans is planning to repair the Real McCoy II's fender system and upgrade its ramp in 2025. This project is scheduled to cost about \$20 million and proposes to replace the ferry's existing timber fender system with a steel fender system that is covered with rubber-facing material. The project also proposes to modify the ferry's deck surface and replace both existing concrete ramps with new ones. For perspective, Caltrans paid about \$4.3 million in 2011 to purchase the Real McCoy II.

By comparison, the annual cost to maintain the Miner Slough Bridge—which was built in 1933 and later widened in 1953—was far lower than the cost of the ferries. Data we reviewed from Caltrans revealed that it costs an average of \$62,584 per year to maintain the bridge.

⁴ The J-Mack was inspected from September 9, 2019, through December 5, 2019, and the Real McCoy II was inspected from September 28, 2019, through February 20, 2020.

Or, put in another way, it costs Caltrans approximately \$.24 per vehicle to maintain the bridge versus \$28.80 per vehicle to operate the ferries.⁵ Importantly, however, this data does not include the one-time initial costs of either method of transportation. Nevertheless, the difference in annual maintenance costs is an important factor in comparing overall costs between the ferries and bridges over a long-term period. The Miner Slough Bridge has been in operation for about 90 years (or 70 years after its upgrade). Caltrans has determined that the bridge requires replacement and plans to begin construction of a new bridge within the next couple of years at an estimated cost of \$58.3 million. However, since Caltrans will build the new bridge next to the existing one, the project is not anticipated to materially disrupt the flow of traffic during construction.

Caltrans Operates the Two Ferries 24 Hours Per Day, 7 Days Per Week at No Cost to Passengers

To operate each of the ferries on a continuous, around-the-clock schedule, Caltrans utilizes two 12-hour shifts: the first shift runs from midnight to noon and the second shift runs from noon to midnight. According to Caltrans, an advantage of having these shifts—above and beyond the transportation service itself—is that it allows for security coverage of the ferries at night and flexibility to move them when water conditions change.

Furthermore, fire protection for the island as well as other emergency-related services have historically played a key role in Caltrans' reasoning for operating the ferries around-the-clock. Presently, the Montezuma Fire Protection District (which absorbed the Ryer Island Fire Protection District in 2006) provides the primary fire and emergency services for the island. It is in Rio Vista, approximately three miles south of where the Real McCoy II is located. In November 2003, as a result of a lawsuit, the Superior Court of Solano County ordered Caltrans to operate the Real McCoy—the predecessor of the current Real McCoy II—24 hours per day, seven days per week⁶. In its order, the court stated that the ferry provided critical access to the residents of Ryer Island for emergency services, including police, ambulance, and fire services.

The court further declared that it is fundamentally necessary for emergency services to be able to access persons needing such services in a timely and safe manner. Consequently, the court ruled that continuous operation of the ferry 24 hours per day, seven days per week was necessary to preserve public health, safety, and welfare. However, the court also stated that Caltrans could close the ferry for the minimum amount of time necessary to address various emergency

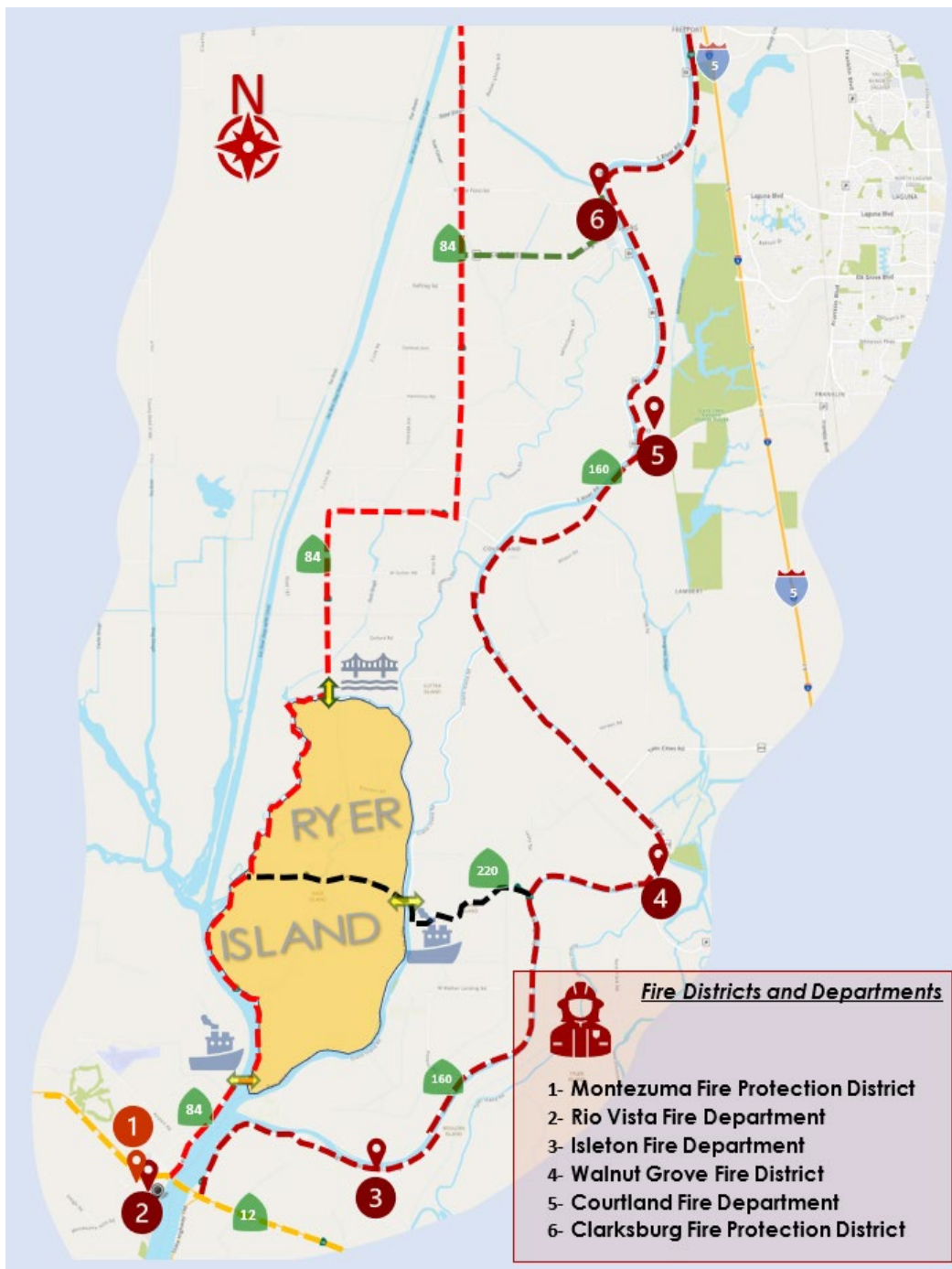
⁵ We calculated the per-vehicle bridge maintenance cost by dividing \$62,584 (the average annual maintenance costs) by 255,500 (the estimated annual average number of vehicles using the bridge). Similarly, we calculated the per-vehicle ferry operating costs by dividing \$3,952,746 (the average annual operating costs) by 137,240 (the average annual number of vehicles using the ferries, combined).

⁶ The 2003 Court Order was specific to the Real McCoy ferry (the predecessor of the Real McCoy II ferry); the order did not include the J-Mack ferry.

circumstances, such as mechanical breakdowns, work stoppages, or inclement weather.

As depicted in Figure 4 on the following page, in addition to the Montezuma Fire Protection District, there are five other fire departments near Ryer Island: the Rio Vista Fire Department and Isleton Fire Department to the south, the Walnut Grove Fire District to the east, and the Courtland Fire Department and Clarksburg Fire Protection District to the north-east of the island. However, considering how often the ferries are out of service, the Clarksburg Fire Protection District and the Courtland Fire Department may be able to provide the quickest response to the island since they have a more direct path to the Miner Slough Bridge. According to Caltrans, when both ferries are out of service, the Montezuma Fire Protection District relies on these two entities to respond to emergencies.

Figure 4: Map of Ryer Island in Relation to Nearby Fire Districts and Departments



Source of map data: Mapquest <https://www.mapquest.com/search/Ryer%20island%20ca> (accessed September 7, 2022). Source of fire districts and departments: Google

We searched for “fire departments near Ryer Island ca” on September 7, 2022 and plotted the locations of the fire districts and departments on the map.
[https://www.google.com/search?q=fire+departments+near+Ryer+Island+ca&tbm=icl&ei=uYpRY8mvNdChkPIP_272ksAU&ved=0ahUKEwiJ8KrYr-6AhXQEEQIHdseCVYQ4dUDCAk&og=fire+departments+near+Ryer+Island+ca&gs_lcp=Cq1nd3Mtd2l6LWxvY2FsEAXQAFqAYABoAHAAeACAAQCIQCSAQCYAQA&scient=gws-wiz-local#rfti=hd::si::mv:\[\]38.5933525,-121.31769009999998\],\[38.1171013,-121.7138581\];tbs:lr!1m4!1u3!2m2!3m1!1e1!1m4!1u2!2m2!2m1!1e1!2m1!1e2!2m1!1e3!3sIAE,lf:1,lf_ui:2](https://www.google.com/search?q=fire+departments+near+Ryer+Island+ca&tbm=icl&ei=uYpRY8mvNdChkPIP_272ksAU&ved=0ahUKEwiJ8KrYr-6AhXQEEQIHdseCVYQ4dUDCAk&og=fire+departments+near+Ryer+Island+ca&gs_lcp=Cq1nd3Mtd2l6LWxvY2FsEAXQAFqAYABoAHAAeACAAQCIQCSAQCYAQA&scient=gws-wiz-local#rfti=hd::si::mv:[]38.5933525,-121.31769009999998],[38.1171013,-121.7138581];tbs:lr!1m4!1u3!2m2!3m1!1e1!1m4!1u2!2m2!2m1!1e1!2m1!1e2!2m1!1e3!3sIAE,lf:1,lf_ui:2)

Because Caltrans Has Not Conducted a Complete Cost Analysis of Its Ferry Operations Relative to Various Alternatives to Them, It Cannot Be Certain Which Option Would Yield the Most Long-Term Value

On January 20, 2020, the Assembly Committee on Transportation (committee) sent a letter to Caltrans requesting various cost and usage data of the current ferries as well as an analysis of the costs and feasibility of other transportation options for the island. The letter specifically identified several potential alternatives for Caltrans' consideration, including building bridges, privatizing the ferries, relinquishing the ferries to a local authority, and creating a community services district. The committee requested Caltrans to provide the information by February 28, 2020. Refer to Appendix B for a copy of the letter.

On May 28, 2020, Caltrans responded to the committee by providing data concerning the annual costs of ferry operation, the number of vehicles the ferries served, and the number of days the ferries were out of service. Caltrans also briefly discussed in its response each of the alternatives identified in the committee's letter. Those alternatives, as well as our analysis of Caltrans' response, are described in more detail, below. Refer to Appendix C for a copy of Caltrans' response to the committee.

Building replacement bridges

Caltrans reported to the committee that the cost to construct two bridges to replace the ferries would be more than \$230 million (\$130 million for a bridge on State Route 84 and \$100 million for a bridge on State Route 220). In the letter, Caltrans stated that it based these estimates on preliminary information from the U.S. Coast Guard regarding the vertical clearance requirements of a nearby bridge. Further, the letter indicated that Caltrans also compared its estimate to another bridge in Sacramento that serves approximately 25,000 vehicles per day. In its response, Caltrans ultimately concluded that "costs to replace the Ryer Island ferries appear to be prohibitive based on the small comparative annual volume of vehicle trips."

As part of our audit, however, we learned that Caltrans' conclusion was not based on its typical and more thorough process for analyzing project costs (refer to the text box on the following page for examples). Caltrans' comparative analysis in this instance lacked many of the details we would have expected to find given the complexity and scale of such a project. In fact, one of Caltrans' policies (Deputy Directive 107), states that it "ensures investments in California's transportation system are cost effective and efficient from the initial capital expenditure to the later maintenance and operations expenditures. Caltrans uses Life-Cycle Cost Analyses to ensure that the costs over the life of a facility are considered when making project decisions." Additionally, another of its policies (Structure Policy Directive SPD 1-7) states that "[at] a minimum, a Bridge Life-Cycle Cost Analysis must be performed when requested by the Districts and one of the alternatives is a replacement, or when the Structure Design team deems that the [cost analysis] will help determine the most cost-effective alternative over the life of a bridge project."

Given the emphasis placed on cost analysis in its policies, we would have expected Caltrans to have completed a longer-range cost analysis, including a projection of its costs for each alternative over various periods of time, such as 10, 20, 50, or even 75 years and compared them to the costs of maintaining the status quo. To date, however, Caltrans has not done this type of long-range, comparative analysis. Without having completed such an analysis, Caltrans could not have been certain when it responded to the committee that it knew which option was the most cost effective or efficient. Consequently, its conclusion that building a bridge appeared to be cost-prohibitive might have been premature.

We asked Caltrans to provide us with more information concerning the estimates included in its response to the committee, such as whether it had prepared any of the studies listed in the text box. In turn, staff informed us they based their estimates on a comparison of bridges they believed would be similar in the region. They also told us they had only a few days to prepare their analysis for the committee; whereas the more typical and robust analyses would have taken several months to complete. They also said that, in this instance, they used many assumptions since they did not have the necessary data. Normally, they would have considered various constraints and possibly other locations for the bridge, but given the short turnaround, they assumed the bridge could only be built in the exact same location as the ferries. They further indicated that a proper analysis would compare the life-cycle cost of the alternatives being compared. The well-intentioned staff who put together the cost estimates, however, appeared to only have had enough time to roughly pencil their math equations and designs of the

Early Planning Studies and Tools

Feasibility Study – To establish whether a project, structure alternative, or other project component is feasible; help identify viable options or alternatives; and assist in the early development of project scope.

Structure Project Initiation Report Cost Estimate – To determine a well-defined scope, reliable construction cost range and support cost estimate.

Structure Project Study – Project Development Support – To program only the support costs needed to achieve project approval.

Bridge Life-Cycle Cost Analysis – To compare two alternatives by evaluating the total investment over a certain period. This analysis can be done by considering only the initial construction cost and remaining service life of two alternatives or it can be more detailed by factoring the future maintenance costs of each alternative. Project costs that occur in the future are discounted back to their present value to compare costs that occur at varying points in time.

Advance Planning Studies – To program all structure support and construction costs. This is a comprehensive study that is typically prepared for inclusion into project initiation documents in the project initiation phase or project reports during the project approval and environmental document phase of a project.

Source: Division of Engineering Services, Caltrans

bridges using only a few pieces of paper; they did not appear to have had enough time to prepare their analysis using a formal study, which would have included precise computer-aided designs, additional variables, and more detailed information. We have included a copy of the engineer's handwritten estimates in Appendix D.

Moreover, staff provided us with two partially completed Bridge Life-Cycle Cost Analysis forms they had prepared in February 2020, presumably in connection with the response to the committee's request. Both forms described replacing the ferries with a new bridge and calculated the estimated maintenance costs for each of the proposed projects. However, the fields on the forms related to the comparative alternatives were left completely blank, which limited the usefulness of this analysis. Further, aside from the name of the bridge and route description on each form, the two forms were nearly identical, including the estimated cost related to maintenance work for each bridge, which was calculated at \$13,745,520 over a 75-year period. We have included a copy of these forms in Appendix D.

Since that time, however, Caltrans could have used one of the many project analysis tools or early planning studies at its disposal. For instance, two of these tools would have been very informative and appropriate for this scenario. The first is a Feasibility Study, which Caltrans typically completes when it needs to establish whether a project (or structure in this case) is capable of being completed and whether there are other viable alternatives. According to Caltrans, this type of study is ideal when a project is large and controversial and when there are multiple options under consideration. As we discuss more below, Caltrans may have attempted to conduct an analysis of this type in 2021 but it ultimately did not select its proposal for funding. The other tool at Caltrans' disposal is the aforementioned Bridge Life-Cycle Cost Analysis, which Caltrans uses to compare total investment costs (initial construction costs plus ongoing service, repair, and maintenance costs) of two or more projects over a long period of time (refer to Appendix E for Caltrans' guidance for this type of analysis). According to engineering staff we spoke with at Caltrans, these two types of studies would normally take between four and six months to complete. Had Caltrans conducted either one of these types of studies following its response to the committee, it would have been in a much better position to opine—more conclusively—on the value of ferry operations relative to other alternatives.

Earlier this year, Caltrans did conduct two additional, albeit less formal, studies concerning ferries. The first one, titled *Delta Ferries Funding Options and Operational Models*, was completed in March 2022 by a third-party consultant. This study focused on acquiring and consolidating various funding, operational, and management information from other state jurisdictions that operate similar short-segment ferries. The consultant sent detailed surveys to 11 other states which have ferry operations but received a response from only two: Kentucky and Louisiana. Among other information, the two respondents reported having significantly fewer days of ferry downtime per year compared to California's delta ferries. However, the consultant concluded that with only two respondents, its limited survey findings preclude an examination of operational best practices for short-segment ferries. Furthermore, the study did not address—nor does it seem it was intended to address—any other alternative options or methods of transportation.

Caltrans completed a second study internally, titled *Delta Ferry Issue Assessment*, in May 2022. This 12-page document describes some of the challenges facing ferry operations in the delta and presents recommendations related to staffing, ferry replacement, hours of operation, and costs of operations and maintenance. Although the document points out various alternatives to using ferries, such as bridges, the document itself does not include or serve as an analysis of such alternatives. Instead, the document includes a brief summary of an unsuccessful internally-generated grant proposal from 2021 that would have, if Caltrans had selected it, funded an analysis of five alternatives to the current ferry operations: (1) raising staff wages, (2) relinquishing control of its ferries to a local jurisdiction, (3) replacing its ferries with other types of ferries or bridges, (4) changing the operating hours for ferry service, and (5) contracting out its ferry operations to a private vendor. Although this document identifies several of the key issues raised by the committee, it too does not serve as a standalone analysis of ferry operations and alternatives. Consequently, neither of the two studies conducted by Caltrans this year really helps with its overall evaluation of its ferry operation's value relative to any of its alternatives.

Other options of privatizing, relinquishing to a third-party, and establishing a community services district for the ferries

In its letter to the committee, Caltrans stated that it explored the potential for privatizing the ferries and had contacted the San Francisco Bay Area Water Emergency Transportation Authority for more information on its operations. Caltrans opined that it likely has the authority under the Streets and Highways Code, Sections 30800 through 30814 to contract its ferry service to a private ferry operator. However, when we asked Caltrans to provide us with more information concerning this option, it stated that after it had reached out to the San Francisco Bay Area Water Emergency Transportation Authority, individuals there said there was no private entity interested in taking over the delta ferries.

Furthermore, Caltrans stated that it explored relinquishing its ferries and segments of State Routes 84 and 220 to a local jurisdiction but, as with the example above, it did not receive any interest. Caltrans recognized that even if it chose to relinquish segments that serve Ryer Island, it would likely require ongoing operational funding from the State. Therefore, if saving money is a priority, then this option may not likely yield the desired result. Given the operational challenges Caltrans has had with keeping the ferries running, it is unclear whether a local jurisdiction would be any more successful in maintaining the ferries, staffing its operations, and providing continuous service.

Moreover, Caltrans recognized in its response that a community service district could provide more local control over ferry service as well as local representation. When we asked Caltrans for more information on this option, it stated that it held various internal meetings, but that this option would ultimately be determined by the residents of Ryer Island, since they would be the ones who would take responsibility of creating and maintaining a special district in their community.

Even though Caltrans recognized privatizing the ferries, relinquishing the ferries to a local jurisdiction, and establishing a community service district as potential options, it did not take any additional steps to determine which of these options—

including the status quo—would be most beneficial and cost effective. Toward that end, we would have expected, at a minimum, to see cost comparisons of these scenarios over time along with an analysis of which option would be most beneficial for residents and visitors of the island, as well as for the State. Until it does so, Caltrans cannot be certain that its current ferry operations represent the most optimal choice.

Caltrans Could Also Consider Other Options

In addition to the options discussed in the previous section, Caltrans has several other options it could consider, as described below.

Reducing hours of operation

As we described earlier, Caltrans operates the ferries 24-hours per day, seven days per week, but it could analyze the pros and cons of reducing its hours of operation. As part of this analysis, we suggest having Caltrans review the status of the court's 2003 order with respect to the continuous operation of the Real McCoy II and determine whether it has any flexibility to modify the current operating schedule of that ferry.

To the extent allowed by law, Caltrans could analyze the effect of maintaining hours of operation focused on the most popular days or times as opposed to providing a continuous, around-the-clock service. Not only could this change in operating hours yield some cost reductions, but it could also allow for greater flexibility with staffing and reduce some of the pressure Caltrans has with trying to staff difficult-to-fill shifts overnight. If Caltrans reduced hours of operation to only one 12-hour shift, for example, then it could reduce labor and other variable types of costs, such as fuel and normal wear and tear. On the other hand, Caltrans would also have to consider maintaining security coverage overnight and changes to water conditions, among other things, that may adversely affect the ferryboats' positioning. Ultimately, Caltrans would need to conduct more analysis of these types of costs and determine if a change in operational hours is ultimately cost-effective.

Charging a ferry toll

Currently, Caltrans operates the ferries free of charge. Although this is a beneficial service to residents and visitors to the Island, it is expensive. California law, however, may give Caltrans some flexibility to charge passengers a toll. For instance, the Streets and Highways Code, Section 30800 states:

The department has exclusive jurisdiction and, except as provided in this article, may grant upon the terms, limitations, conditions, and restrictions and under the supervision as in its judgment are necessary or proper, franchises, privileges, or licenses for the construction or operation of toll bridges, toll roads, and toll ferries and for the taking and keeping of tolls from the bridges, roads, and ferries situated wholly or in part within the state.

Furthermore, the Streets and Highways Code, Section 100.5 states:

The department may impose a charge of not to exceed one dollar per vehicle for the use of such ferries between the hours of 11 p.m. and 5 a.m....

Based on these code sections, Caltrans could consider the pros and cons of charging a toll to offset a portion of its annual operating costs for non-emergency utilization. Tolls could be static or range in cost by factoring vehicle size or type, the number of passengers, residency, or times of the day.

For perspective, we calculated the amount a toll could potentially offset in costs by using two scenarios: a flat rate of \$3 per vehicle or \$7 per vehicle between the hours of 5:00 a.m. and 11:00 p.m. (both scenarios assumed a flat rate of \$1 per vehicle between the hours of 11:00 p.m. and 5:00 a.m.). Based on historical vehicle counts, our hypothetical analysis of Caltrans charging a \$3 toll per vehicle would have yielded a cost offset of roughly 10 percent of the ferries' annual average operational costs, whereas a \$7 toll per vehicle would have yielded a cost offset of roughly 23 percent. A more thorough analysis would be needed to account for additional variables, including any deterring effects a toll might have on the volume of ridership.

Complying with potentially new zero-emission requirements

The California Air Resources Board, the state entity charged with protecting the public from harmful effects of air pollution, is in the process of revising regulations that could potentially, among other things if adopted, require Caltrans to replace its current diesel-fuel ferries with zero-emission ferries.⁷ If the regulations ultimately take effect in its current form, Caltrans will presumably need to consider additional options that comply with the zero-emission requirements, including the purchase of two new ferries. The cost of purchasing two new ferries would likely be in the tens of millions of dollars. Therefore, the timing is critical for Caltrans to analyze all potential options and determine which of them is the best value before it spends millions on upgrades and replacements for the existing ferries that may later be found to be outdated or unnecessary.

Recommendations

To ensure Caltrans spends transportation funds efficiently and effectively with respect to its ferry operations in the Sacramento-San Joaquin River Delta, we recommend it conduct a complete, long-term cost-benefit analysis of its ferry operations compared to various alternatives of providing ferry service. This analysis should be completed before it invests additional money in non-emergency repairs, upgrades, or replacements. In addition to analyzing costs, this analysis should consider a wholistic view of the transportation needs of the residents of Ryer Island and of its visitors, including emergency and non-

⁷ The proposed regulation, as of September 30, 2022, was titled "Commercial Harbor Craft Regulation" (OAL Matter Number 2022-0721-09).

emergency access. At a minimum, the analysis should evaluate the pros and cons of the following options:

- a. Maintaining ferry operations at the status quo,
- b. Building bridges to replace one or both ferries,
- c. Relinquishing the ferries to a third-party operator (contractor, local jurisdiction, or special district),
- d. Determining alternate hours of ferry operation, and
- e. Charging tolls to ride the ferries.

Appendix A – Data Tables

Appendix A – Data Tables

Table A.1 - Out of Service Days by Month ⁸

Real McCoy II

Fiscal Year Ending June 30,	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Annual Total
2018	0.4	0.2	2.2	1.3	1.5	1	15.6	4.5	1.2	0.6	0.7	1.7	30.9
2019	5	4.5	3.8	0.9	1.3	1.1	1.8	9.2	1	1.2	10.5	30	70.3
2020	31	31	3.6	31	30	31	31	19.6	0.1	22	31	11	272.3
2021	3	5.9	11.4	4.5	1.3	4.8	1.5	13.5	2	1.5	3.8	1.3	54.5
2022	5	3.8	5.2	10.7	6.3	6	13.8	23.8	31	30	9	5.2	149.8
5-Year Total	44.4	45.4	26.2	48.4	40.4	43.9	63.7	70.6	35.3	55.3	55	49.2	577.8

J-Mack

Fiscal Year Ending June 30,	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Annual Total
2018	0.3	0.2	0.4	0.7	0.3	0.5	0	0.1	0.8	10.8	0	0.1	14.1
2019	0	0	0.2	0	0	0	10.6	8.8	17.9	0	0	0	37.5
2020	0	5.5	21.7	31	30	13.6	0.3	0	0	0.8	1.4	5.5	109.8
2021	10.2	3	8.2	8.2	4.5	0.5	3.4	6.3	2.7	5.1	10	3	65.1
2022	22.1	3	5.2	16.5	18	20.3	24.8	5.9	2.4	4.4	17.5	21.9	162
5-Year Total	32.6	11.7	35.7	56.4	52.8	34.9	39.1	21.1	23.8	21.1	28.9	30.5	388.4

Source: Analysis by the Independent Office of Audits and Investigations using data provided by Caltrans.

⁸ The ferries operate 24 hours, 7 days per week and in some instances, they were out of service several hours per day.

Appendix A – Data Tables

Table A.2 - Average Daily Vehicle Usage, by Month

Real McCoy II

Fiscal Year Ending June 30,	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Annual Daily Average
2018	332.0	350.1	300.0	299.0	254.1	228.7	107.7	210.9	219.9	277.9	294.2	287.4	263.5
2019	261.7	378.4	309.6	279.6	256.1	229.9	236.9	155.3	236.4	244.3	181.9	0.0	230.8
2020	0.0	0.0	137.6	0.0	0.0	0.0	0.0	64.8	153.8	46.0	0.0	114.6	43.1
2021	180.8	168.0	105.6	149.1	163.3	121.5	155.6	87.9	202.5	235.0	180.7	246.5	166.4
2022	229.5	230.1	201.6	136.8	147.4	125.0	110.7	31.3	0.0	0.0	128.0	157.5	124.8
5-Year Daily Average	200.8	225.3	210.9	172.9	164.2	141.0	122.2	110.0	162.5	160.6	156.9	161.2	165.7

J-Mack

Fiscal Year Ending June 30,	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Annual Daily Average
2018	304.7	316.9	270.6	259.0	220.5	228.6	215.9	262.3	221.4	151.1	301.3	295.5	254.0
2019	298.2	447.2	345.6	282.4	234.6	216.5	184.7	146.4	79.5	251.0	337.0	364.8	265.6
2020	467.3	361.5	94.9	0.0	0.0	137.6	245.3	291.2	239.1	288.9	283.7	220.8	219.2
2021	144.0	248.4	252.0	212.0	213.4	287.2	215.8	203.5	221.1	254.7	189.9	94.8	211.4
2022	64.9	95.6	39.9	88.8	37.1	47.8	16.7	152.2	245.0	265.1	100.7	38.1	99.3
5-Year Daily Average	255.8	293.9	200.6	168.4	141.1	183.6	175.7	211.1	201.2	242.1	242.5	202.8	209.9

Source: Analysis by the Independent Office of Audits and Investigations using data provided by Caltrans.

Appendix A – Data Tables

Table A.3 - Operating Costs by Month

Real McCoy II

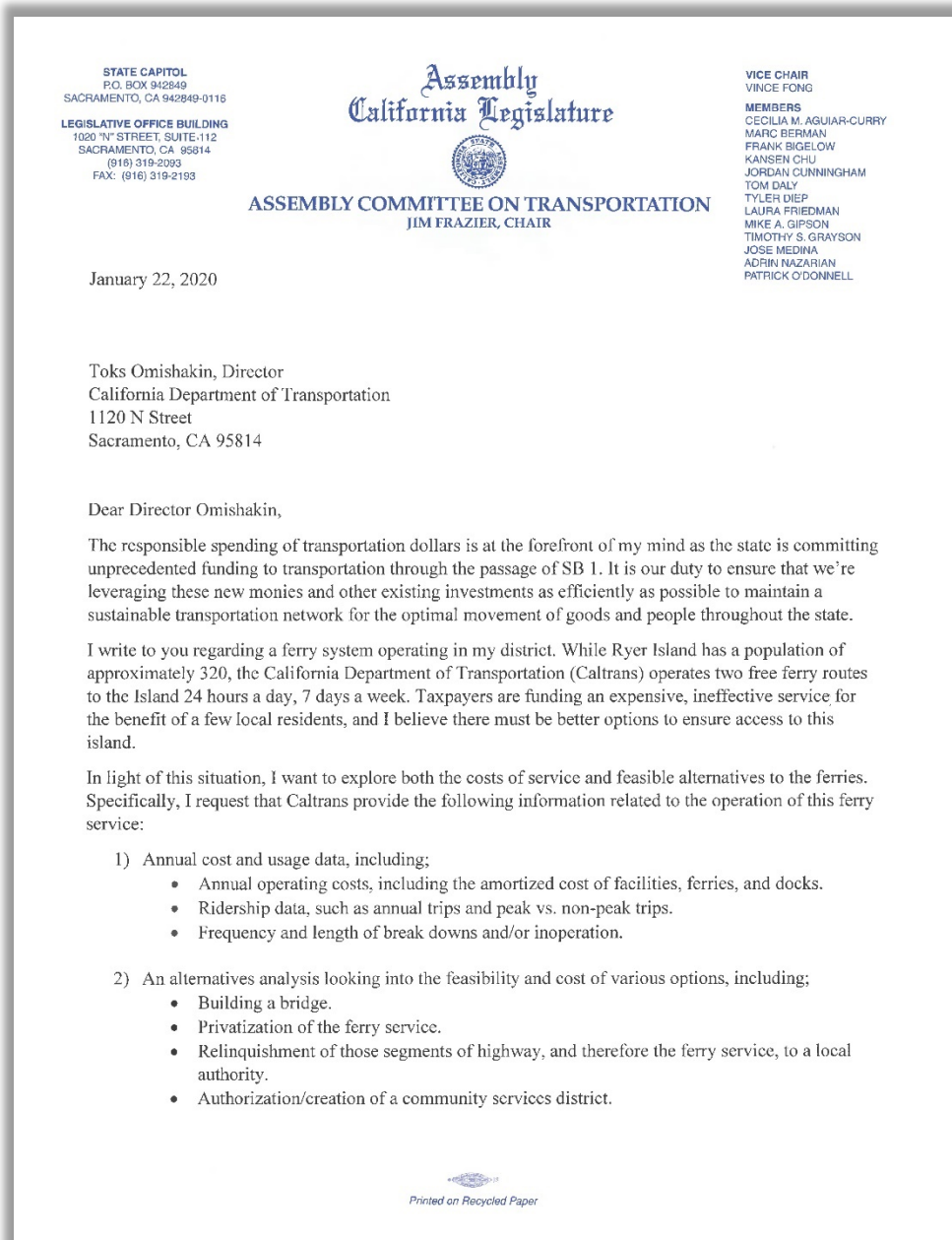
Fiscal Year Ending June 30,	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Annual Total
2018	\$134,136	\$118,257	\$123,176	\$135,665	\$132,330	\$139,792	\$123,898	\$114,688	\$224,315	\$158,845	\$165,380	\$144,796	\$1,715,278
2019	158,442	157,303	144,163	164,546	155,032	151,012	150,854	152,907	159,159	136,185	122,888	93,964	1,746,454
2020	108,721	132,865	185,825	787,232	696,907	654,665	768,481	505,653	163,999	147,706	132,093	130,381	4,414,527
2021	148,412	160,305	35,401	161,985	146,707	119,855	164,832	126,276	140,634	154,063	134,459	130,360	1,623,289
2022	144,844	168,533	171,500	148,749	151,253	185,220	141,282	286,441	334,555	336,281	203,515	170,306	2,442,481
5-Year Total	\$694,553	\$737,263	\$660,064	\$1,398,177	\$1,282,230	\$1,250,544	\$1,349,347	\$1,185,965	\$1,022,662	\$933,081	\$758,335	\$669,807	\$11,942,028
5-Year Average	\$138,911	\$147,453	\$132,013	\$279,635	\$256,446	\$250,109	\$269,869	\$237,193	\$204,532	\$186,616	\$151,667	\$133,961	\$2,388,406

J-Mack

Fiscal Year Ending June 30,	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Annual Total
2018	\$124,519	\$100,377	\$110,912	\$111,751	\$150,939	\$118,350	\$138,863	\$96,045	\$123,612	\$88,247	\$96,009	\$113,452	\$1,373,074
2019	128,681	120,155	103,371	89,714	82,982	100,022	120,710	116,348	75,918	104,334	122,450	77,687	1,242,373
2020	104,015	88,182	391,555	493,443	532,680	242,607	83,157	107,174	97,742	200,346	195,690	115,515	2,652,107
2021	88,206	79,637	200,724	86,473	87,117	77,289	90,148	100,988	85,885	104,806	86,245	69,307	1,156,825
2022	82,725	95,060	78,019	119,169	73,608	76,654	85,959	227,623	197,873	168,551	97,804	94,276	1,397,321
5-Year Total	\$528,147	\$483,411	\$884,582	\$900,550	\$927,326	\$614,921	\$518,837	\$648,179	\$581,030	\$666,283	\$598,198	\$470,237	\$7,821,701
5-Year Average	\$105,629	\$96,682	\$176,916	\$180,110	\$185,465	\$122,984	\$103,767	\$129,636	\$116,206	\$133,257	\$119,640	\$94,047	\$1,564,340

Source: Analysis by the Independent Office of Audits and Investigations using data provided by Caltrans.

Appendix B – Assembly Committee on Transportation Letter, Dated January 22, 2020



I would like this information no later than February 28th. If you have any questions, please contact Eric Thronson, Chief Consultant with the Assembly Transportation Committee at (916) 319-2093.

These ferries are a large investment which serve a limited population. I want to be certain that we are providing the best service across transportation modes with the most reasonable use of state funds for all of California's citizens. Thank you for your attention to this matter.

Sincerely,



HONORABLE JIM FRAZIER, CHAIR
Assembly Committee on Transportation

cc: David Kim, Secretary, California Transportation Agency

Appendix C – Caltrans' Response to the Assembly Committee on Transportation, Dated May 28, 2020

STATE OF CALIFORNIA—CALIFORNIA STATE TRANSPORTATION AGENCY

GAVIN NEWSOM, Governor

DEPARTMENT OF TRANSPORTATION

OFFICE OF THE DIRECTOR
1120 N STREET
SACRAMENTO, CA 95814
PHONE (916) 654-6130
FAX (916) 653-5776
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www.dot.ca.gov



Making Conservation
a California Way of Life.

May 28, 2020

The Honorable Jim Frazier, Chair
Assembly Transportation Committee
1020 N Street, Room 112
Sacramento, CA 95814

Dear Assemblymember Frazier:

Thank you for your letter regarding the Ryer Island ferry system operated and maintained by Caltrans in the Sacramento-San Joaquin River Delta. We understand that service interruptions on the Real McCoy II or J-Mack ferries cause significant concerns for your constituents who live and work in the Delta and rely on the ferry system for their transportation needs. We are committed to working with you and our local partners to provide appropriate access to Ryer Island.

As requested, detailed information on the annual operating costs, ridership, and frequency and length of breakdowns of the Real McCoy II and J-Mack ferries are provided in the attachment to this letter. In summary:

- The five-year average annual cost to operate the Ryer Island ferries is approximately \$3.4 million (Fiscal Years 2014-15 through 2018-19). The Real McCoy II costs about \$2.2 million to operate each year and the J-Mack costs approximately \$1.1 million to operate each year.
- On average, the Real McCoy II and J-Mack ferries serve about 175,000 vehicles each year (based on data from Fiscal Years 2016-17 through 2018-19). The ferries serve an average of 350 vehicles to 700 vehicles each day (daily vehicle trips peak in August and decline through February).
- The Real McCoy II has averaged approximately 72 days out of service each year and the J-Mack has averaged about 28 days out of service each year (based on data from Fiscal Years 2011-12 through 2018-19).

"Provide a safe, sustainable, integrated and efficient transportation system to enhance California's economy and livability"

The Honorable Jim Frazier
May 28, 2020
Page 2

Since 2013, Caltrans has received \$978,551 in federal Ferry Boat Program funds under the Fixing America's Surface Transportation Act for the Delta ferries. These funds are available for capital expenses to construct or improve ferries and their facilities and do not fund regular maintenance or repair activities. Caltrans has been using these federal funds to improve the Real McCoy II Ferry infrastructure, specifically to replace the fender system, reconstruct the existing concrete ramp, and improve the landing equipment.

As requested, we have explored the feasibility and cost of several options to improve or replace the Ryer Island ferry service, including constructing bridges, privatizing ferry operations, relinquishing segments of State Routes 84 and 220 to local jurisdictions, and creating a community service district.

Caltrans expects that the costs to construct a bridge to replace the J-Mack ferry on State Route 220 would be more than \$100 million. The cost to construct a bridge to replace the Real McCoy II ferry on State Route 84 is expected to be more than \$130 million. These estimates are based on preliminary information from the U.S. Coast Guard about the vertical clearance requirements, which are based on the Rio Vista Bridge.

These estimated bridge costs are similar to the latest projections for the I Street bridge replacement between Sacramento and West Sacramento—a planned mechanical lift bridge that is estimated to cost more than \$210 million in total. For comparison, the planned I Street bridge is expected to serve approximately 25,000 vehicles each day. The costs to replace the Ryer Island ferries appear to be prohibitive based on the small comparative annual volume of vehicle trips.

Caltrans has explored the potential for privatizing these ferries and has contacted the San Francisco Bay Area Water Emergency Transportation Authority for more information on its operations. The Water Emergency Transportation Authority contracts ferry service out to the Blue and Gold Fleet, which operates a fleet of 15 passenger-only ferry vessels in the San Francisco Bay Area. Streets and Highways Code sections 30800 through 30814 likely provide Caltrans with the authority to contract service to a private ferry operator in a similar manner.

Caltrans previously explored relinquishment of the ferries and segments of State Routes 84 and 220, but did not receive any interest from local jurisdictions. While Caltrans is also open to further discussion on relinquishment of the highway segments that serve Ryer Island, any relinquishment likely would require ongoing operational funding from the State.

"Provide a safe, sustainable, integrated and efficient transportation system to enhance California's economy and livability"

The Honorable Jim Frazier
May 28, 2020
Page 3


A community service district could provide more local control over ferry service and direct representation through an elected board. State law in Government Code sections 61010 through 61014.5 requires the residents of the unincorporated area to initiate the formation of such a district.

It is not clear how privatization, relinquishment, or creation of a community services district would make the operation of these ferries more cost-effective when comparing labor costs and equipment. While Caltrans could potentially transfer operations of the ferry to another private or public entity, Caltrans does not have clear statutory authority to transfer ownership of the ferries and related facilities. Caltrans is open to participating in further discussions with residents of the island, Solano County, Sacramento County, or the Water Emergency Transportation Authority, in conjunction with your office, to explore these options further. Caltrans also is exploring options to procure an additional ferry boat to provide more reliable service to Ryer Island.

We agree that responsible fiscal management requires periodic investigations into possible alternatives to the current ferry system serving Ryer Island. I hope the information provided is helpful, and I look forward to continuing to explore the feasibility of alternatives for operating these ferry services.

If you have further questions, please do not hesitate to contact me at (916) 654-6130 or Tony Tavares, Caltrans District 4 Director, at (510) 286-5900 to discuss this matter further or if there are questions regarding the information provided.

Sincerely,



TOKS OMISHAKIN
Director

c: David Kim, Secretary, California Transportation Agency

Enclosure
Annual Cost and Usage Data

Enclosure – Annual Cost and Usage Data

1. Annual Operating Costs

Real McCoy II Operating Costs								
Fiscal Year	Labor ¹	Equipment	Other ²	Service/Repair	Fuel	Dry Dock ³	FY Subtotal	5-Year Avg.
FY 14-15	\$1,417,887	\$18,713	\$4,152	\$521,457	\$57,622	\$0	\$2,019,831	\$2,226,613
FY 15-16	\$1,268,821	\$41,718	\$0	\$498,490	\$26,356	\$525,973	\$2,361,357	
FY 16-17	\$1,370,983	\$15,449	\$0	\$783,312	\$71,777	\$0	\$2,241,521	
FY 17-18	\$1,461,535	\$12,472	\$11,370	\$377,061	\$91,270	\$0	\$1,953,708	
FY 18-19	\$2,198,748	\$22,417	\$4,082	\$241,257	\$90,142	\$0	\$2,556,646	
Total	\$7,717,974	\$110,769	\$19,604	\$2,421,577	\$337,167	\$525,973	\$11,133,063	

J-Mack Operating Costs								
Fiscal Year	Labor ¹	Equipment	Other ²	Service/Repair	Fuel	Dry Dock ³	FY Subtotal	5-Year Avg.
FY 14-15	\$515,117	\$9,456	\$0	\$31,023	\$19,207	\$1,015,426	\$1,590,229	\$1,133,186
FY 15-16	\$860,355	\$14,987	\$28	\$110,767	\$8,785	\$0	\$994,922	
FY 16-17	\$875,314	\$15,036	\$65	\$88,653	\$23,926	\$0	\$1,002,994	
FY 17-18	\$896,121	\$11,963	\$93	\$114,014	\$30,423	\$0	\$1,052,614	
FY 18-19	\$919,291	\$12,219	\$782	\$62,832	\$30,047	\$0	\$1,025,171	
Total	\$4,066,198	\$63,661	\$968	\$407,289	\$112,388	\$1,015,426	\$5,665,930	

¹ Labor costs are fully loaded rates, including direct wages/salaries and benefits.

² Other category includes miscellaneous costs such as office supplies, cleaning supplies, grease, or tools for inspections.

³ Dry dock costs occur approximately every five years for facilities to remove the ferries from the water to meet U.S. Coast Guard requirements for inspections and repairs.

Enclosure – Annual Cost and Usage Data

Real McCoy II and J-Mack Combined Operating Costs								
Fiscal Year	Labor ¹	Equipment	Other ²	Service/Repair	Fuel	Dry Dock ³	FY Subtotal	5-Year Avg.
FY 14-15	\$1,933,004	\$28,169	\$4,152	\$552,480	\$76,829	\$1,015,426	\$3,610,060	\$3,359,799
FY 15-16	\$2,129,176	\$56,705	\$28	\$609,257	\$35,141	\$525,973	\$3,356,279	
FY 16-17	\$2,246,297	\$30,485	\$65	\$871,965	\$95,703	\$0	\$3,244,515	
FY 17-18	\$2,357,656	\$24,435	\$11,463	\$491,075	\$121,693	\$0	\$3,006,322	
FY 18-19	\$3,118,039	\$34,636	\$4,864	\$304,089	\$120,189	\$0	\$3,581,817	
Total	\$11,784,172	\$174,430	\$20,572	\$2,828,866	\$449,555	\$1,541,399	\$16,798,994	

¹ Labor costs are fully loaded rates, including direct wages/salaries and benefits

² Other category includes miscellaneous costs such as office supplies, cleaning supplies, grease, or tools for inspections.

³ Dry dock costs occur approximately every five years for facilities to remove the ferries from the water to meet U.S. Coast Guard requirements for inspections and repairs.

Enclosure – Annual Cost and Usage Data

2. Ridership Data

The Real McCoy II and the J-Mack ferries carry approximately 350-700 vehicles per day. Daily vehicle trips peak in August and decline through February. Please note that average ridership data below has been adjusted for the number of days where the ferries are out of service.

Real McCoy II Average Daily Ridership Per Month – Fiscal Years 2016-17 to 2018-19

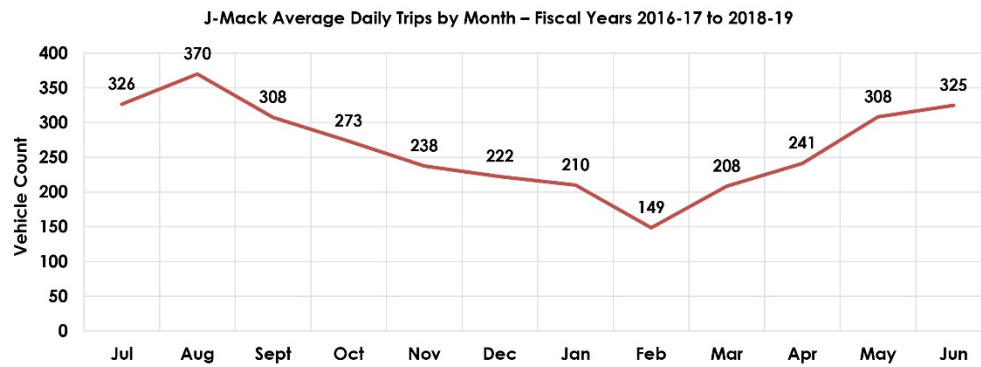
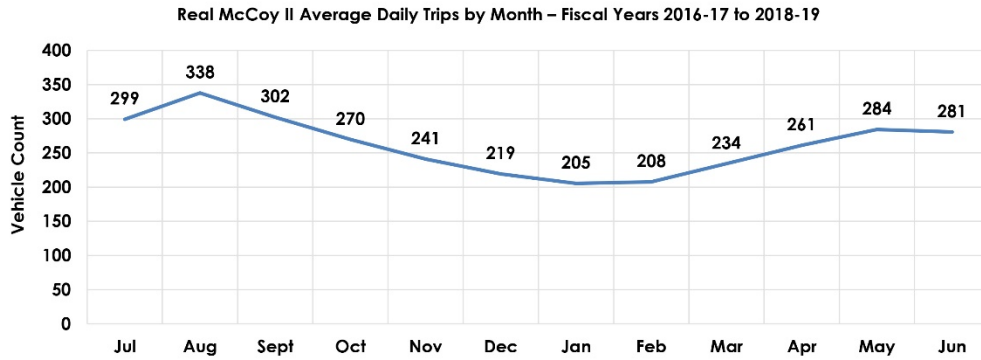
	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	April	May	June
FY 2016-17	205	259	275	216	213	199	154	58	231	261	314	274
FY 2017-18	332	350	300	299	254	229	104	211	220	278	294	287
FY 2018-19	262	378	310	280	256	230	237	155	244	244	182	n/a ¹

¹ The Real McCoy II ferry was out of service for the month of June 2019.

J-Mack Average Daily Ridership Per Month - Fiscal Years 2016-17 to 2018-19

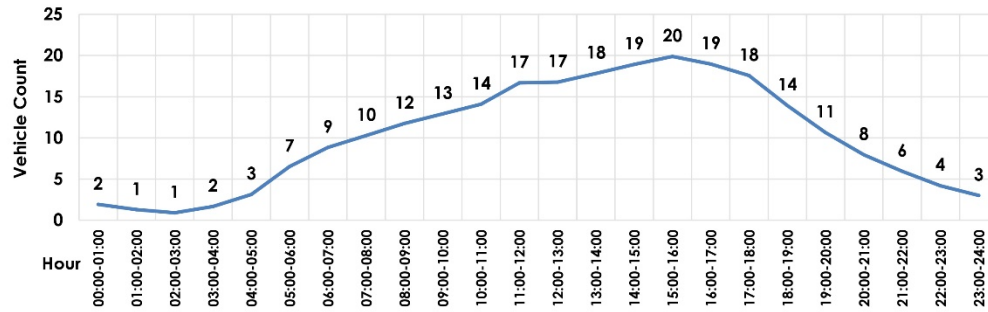
	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	April	May	June
FY 2016-17	376	345	306	278	258	222	117	44	220	171	129	318
FY 2017-18	305	317	271	259	221	229	216	262	221	151	301	292
FY 2018-19	298	447	346	282	235	216	185	146	79	251	337	365

Enclosure – Annual Cost and Usage Data

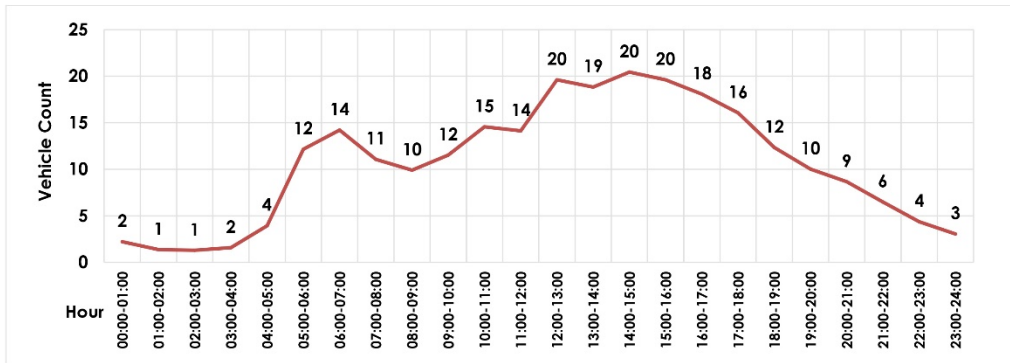


Enclosure – Annual Cost and Usage Data

Real McCoy II Average Daily Trips by Hour – Fiscal Years 2016-17 through 2018-19



J-Mack Average Daily Trips by Hour - Fiscal Years 2016-17 through 2018-19



Enclosure – Annual Cost and Usage Data

3. Frequency and length of breakdowns and/or inoperation

**Real McCoy II Days Out of Service
Fiscal Years 2011-12 to 2018-19**

Fiscal Year	Days Out of Service	% Out of Service
FY 2011-12	201	55%
FY 2012-13	31	8%
FY 2013-14	41	11%
FY 2014-15	39	11%
FY 2015-16 ¹	116	32%
FY 2016-17	47	13%
FY 2017-18	31	8%
FY 2018-19	70	19%
Total	576	
Average	72	20%

**J-Mack Days Out of Service
Fiscal Years 2011-12 to 2018-19**

Fiscal Year	Days Out of Service	% Out of Service
FY 2011-12	< 1	< 1%
FY 2012-13	5	1%
FY 2013-14	1	< 1%
FY 2014-15 ¹	99	27%
FY 2015-16	2	< 1%
FY 2016-17	62	17%
FY 2017-18	14	4%
FY 2018-19	38	10%
Total	222	
Average	28	8%

¹ Includes drydock hours for regular maintenance to meet U.S. Coast Guard requirements for inspections and repairs.

Appendix D – Incomplete Bridge Life-Cycle Cost Analyses Prepared by Caltrans, Proposing to Replace the Ferries with Bridges

BRIDGE LIFE-CYCLE COST ANALYSIS (BLCCA) REQUEST FORM					
PE / TLE : Please complete Part I and submit it to Bridge Program Advisor when requesting an estimate for anticipated maintenance work and frequency for BLCCA.					
ALT 1 : Other ▼					
PART I					
Type of BLCCA : PIR / PSR-PDS <input checked="" type="checkbox"/> APS <input type="checkbox"/>					
Date:	Design Branch	Prepared by :	Phone No :	Completion Desired Date	
2/21/2020	TLE			2/25/2020	
EA :		Project ID :	Dist - Co - Rte - PM:		
04-4H060		413000081	04-SoI-84		
Bridge No. :		Bridge Name : Real McCoy Ferry			
Project Discription : This is a proposal for a new bridge which will replace the Real McCoy Ferry system. Bridge is 3400' long, 51' wide, CIP box.					
PART II					
Date:	Bridge Asset	Prepared by :	Phone No :		
2/21/2020	Management				
II a : Remaining Service Life after Rehabilitation : 75 years					
II b : Anticipated future maintenance work and frequency					
Bridge Inspection :		▼ 2 ▼	▼	yrs &	2 ▼ yrs thereafter
Bridge Inspection (Under Bridge Ins		▼ 2 ▼	▼	yrs &	2 ▼ yrs thereafter
Methacrylate Deck Treatment :		▼ 10 ▼	▼	yrs &	NA ▼ yrs thereafter
Polyester Concrete Overlay :		▼ 40 ▼	▼	yrs &	20 ▼ yrs thereafter
Joint Seal (Max MR > 4") :		▼ 15 ▼	▼	yrs &	15 ▼ yrs thereafter
Comments : There are also other miscellaneous bridge deck work performed by the Bridge crew that is difficult to quantify.					

Note : Including future maintenance work in BLCCA is not necessary for PIR / PSR-PDS cost estimate.
 Bridge Program Advisor is only to provide remaining service life of the bridge after rehab(Part II a).

Not quantified

Not quantified

Methacrylate Assume \$50/SQFT	Area =	173400	SQ Total =	\$8,670,000.00	
Polyester Place \$4/SQFT			Total =	\$693,600.00	
Polyester Furnish \$70/CF	Volume =	29478	SQ Total =	\$2,063,460.00	twice \$4,126,920.00
Joint Seal (MR>4") 500/LF	L =	102	Total =	\$51,000.00	5 times \$255,000.00
Total maintenance work:				\$13,745,520.00	

<u>BRIDGE LIFE-CYCLE COST ANALYSIS (BLCCA) REQUEST FORM</u>				
PE / TLE : Please complete Part I and submit it to Bridge Program Advisor when requesting an estimate for anticipated maintenance work and frequency for BLCCA.				
ALT 2 : 				
PART I				
Type of BLCCA : PIR / PSR-PDS <input type="checkbox"/> APS <input type="checkbox"/>				
Date:	Design Branch	Prepared by :	Phone No :	Completion Desired Date
EA :	Project ID :	Dist - Co - Rte - PM:		
Bridge No. :	Bridge Name :			
Project Discription :				
PART II				
Date:	Bridge Asset Management	Prepared by :	Phone No :	
2/21/2020				
II a : Remaining Service Life after Rehabilitation : years				
II b : Anticipated future maintenance work and frequency				
<div style="background-color: #d4edda; width: 100%; height: 100%;"></div>				
Comments :				

Note : Including future maintenance work in BLCCA is not necessary for PIR / PSR-PDS cost estimate.
 Bridge Program Advisor is only to provide remaining service life of the bridge after rehab(Part II a).

BRIDGE LIFE-CYCLE COST ANALYSIS (BLCCA) REQUEST FORM

PE / TLE : Please complete Part I and submit it to Bridge Program Advisor when requesting an estimate for anticipated maintenance work and frequency for BLCCA.

ALT 3 : [Redacted]

PART I				
Type of BLCCA : PIR / PSR-PDS <input type="checkbox"/> APS <input type="checkbox"/>				
Date:	Design Branch	Prepared by :	Phone No :	Completion Desired Date
EA :	Project ID :	Dist - Co - Rte - PM:		
Bridge No. :	Bridge Name :			
Project Discription :				
PART II				
Date:	Bridge Asset	Prepared by :	Phone No :	
2/21/2020	Management	[Redacted]	[Redacted]	
II a : Remaining Service Life after Rehabilitation : [Redacted] years				
II b : Anticipated future maintenance work and frequency				
<div style="background-color: #d4edda; width: 100%; height: 100%;"></div>				
Comments :				

Note : Including future maintenance work in BLCCA is not necessary for PIR / PSR-PDS cost estimate.
 Bridge Program Advisor is only to provide remaining service life of the bridge after rehab(Part II a).

BRIDGE LIFE-CYCLE COST ANALYSIS (BLCCA) REQUEST FORM

PE / TLE : Please complete Part I and submit it to Bridge Program Advisor when requesting an estimate for anticipated maintenance work and frequency for BLCCA.

ALT 1 : **Other** ▼

PART I

Type of BLCCA : PIR / PSR-PDS APS

Date:	Design Branch	Prepared by :	Phone No :	Completion Desired Date
2/21/2020	TLE			2/24/2020

EA :	Project ID :	Dist - Co - Rte - PM:
04-4H060	413000081	04-Sol-220

Bridge No. : Bridge Name : J-Mack Ferry

Project Discription : This is a proposal for a **new bridge** which will replace the J-Mack Ferry system. Bridge is 3400' long, 51' wide, CIP box.

PART II

Date:	Bridge Asset	Prepared by :	Phone No :	
2/21/2020	Management			

II a : Remaining Service Life after Rehabilitation : years

II b : Anticipated future maintenance work and frequency

Bridge Inspection :	▼ 2 ▼	yrs &	2 ▼	yrs thereaft
Inspection Truck) :	▼ 2 ▼	yrs &	2 ▼	yrs thereaft
Methacrylate Deck Treatment :	▼ 10 ▼	yrs &	NA ▼	yrs thereaft
Polyester Concrete Overlay :	▼ 40 ▼	yrs &	20 ▼	yrs thereaft
Joint Seal (Max MR > 4") :	▼ 15 ▼	yrs &	15 ▼	yrs thereaft

Comments : There are also other miscellaneous bridge deck work performed by the Bridge crew that is difficult to quantify.

Note : Including future maintenance work in BLCCA is not necessary for PIR / PSR-PDS cost estimate.
 Bridge Program Advisor is only to provide remaining service life of the bridge after rehab(Part II a).

Not quantified				
Not quantified				
Methacrylate Assume \$50/SQFT	Area =	173400	SQI Total =	\$8,670,000.00
Polyester Place \$4/SQFT			Total =	\$693,600.00
Polyester Furnish \$70/CF	Volume =	29478	SQI Total =	\$2,063,460.00 twice
Joint Seal (MR>4") 500/LF	L =	102	Total =	\$51,000.00 5 times
Total maintenance work:				\$13,745,520.00

<u>BRIDGE LIFE-CYCLE COST ANALYSIS (BLCCA) REQUEST FORM</u>				
PE / TLE : Please complete Part I and submit it to Bridge Program Advisor when requesting an estimate for anticipated maintenance work and frequency for BLCCA.				
ALT 2 : [redacted]				
PART I				
Type of BLCCA : PIR / PSR-PDS <input type="checkbox"/> APS <input type="checkbox"/>				
Date:	Design Branch	Prepared by :	Phone No :	Completion Desired Date
EA :		Project ID :	Dist - Co - Rte - PM:	
Bridge No. :		Bridge Name :		
Project Discription : [redacted]				
PART II				
Date:	Bridge Asset Management	Prepared by :	Phone No :	
2/21/2020		[redacted]		
II a : Remaining Service Life after Rehabilitation : [redacted] years				
II b : Anticipated future maintenance work and frequency				
[redacted]				
Comments :				

Note : Including future maintenance work in BLCCA is not necessary for PIR / PSR-PDS cost estimate.
 Bridge Program Advisor is only to provide remaining service life of the bridge after rehab(Part II a).

BRIDGE LIFE-CYCLE COST ANALYSIS (BLCCA) REQUEST FORM				
PE / TLE : Please complete Part I and submit it to Bridge Program Advisor when requesting an estimate for anticipated maintenance work and frequency for BLCCA.				
ALT 3 : 				
PART I				
Type of BLCCA : PIR / PSR-PDS <input type="checkbox"/> APS <input type="checkbox"/>				
Date:	Design Branch	Prepared by :	Phone No :	Completion Desired Date
EA :	Project ID :	Dist - Co - Rte - PM:		
Bridge No. :	Bridge Name :			
Project Discription :				
PART II				
Date:	Bridge Asset	Prepared by :	Phone No :	
2/21/2020	Management			
II a : Remaining Service Life after Rehabilitation : years				
II b : Anticipated future maintenance work and frequency				
<div style="background-color: #d9ead3; width: 100%; height: 100%;"></div>				
Comments :				

Note : Including future maintenance work in BLCCA is not necessary for PIR / PSR-PDS cost estimate.
 Bridge Program Advisor is only to provide remaining service life of the bridge after rehab(Part II a).

██████████
4/24/20

ALTERNATIVE #1 MOVABLE BRIDGE
CACHE SLOUGH BRIDGE - MOVABLE (310' X 44')

MOVABLE SPAN COST = \$49,104,000
 VIADUCT LENGTH = 590 FT
 AREA = 590' X 44' = 25,960 ft²
 VIADUCT COST = 25,960 ft² X \$500/ft² = \$12,980,000
 FENDER COST = \$6,500,000
 ELECT COST = \$12,000,000
 SUBTOTAL = \$80,584,000

CACHE SLOUGH
MOVABLE BR.

TOTAL = SUBTOTAL X (1 + 10% TR0 + 10% MOB + 40% CONT) = \$129 MILLION

ASSUMPTIONS

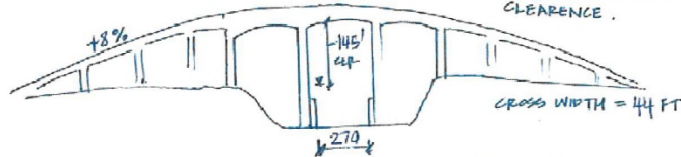
- 44' CROSS SECTION WIDTH
- 270' HORIZONTAL CLEARANCE
- 145' VERTICAL CLEARANCE

CACHE SLOUGH

4/24/20

ALTERNATIVE #2 FIXED BRIDGE

270 FT OPENING WITH 145' VERTICAL CLEARANCE.



1950 FT	1000 FT	1950 FT
CAST-IN-PLACE BOX GIRDER	CAST-IN-PLACE SEGMENTAL	CAST-IN-PLACE BOX GIRDER
AREA = 85,800 sq. ft	44,000 sq. ft	85,800 sq. ft
COST = \$500/ft ²	\$1020/ft ²	\$500/ft ²
\$ 42,900,000	\$ 44,880,000	\$ 42,900,000

THIS INCLUDES TRAFFIC, MOB & CONT. (PROVIDE BY E. PORTER / HISTORICAL PLUS COST INDEX INCREASE)

+ FENDER COST (\$6,500,000) = \$ 137,180,000

ESTIMATED COST FOR FIXED BRIDGE

ASSUMPTIONS

- 44' CROSS SECTION WIDTH
- 270' HORIZONTAL OPENING
- 145' VERTICAL CLEARANCE
- ±8% LONGITUDINAL GRADE

ALTERNATIVE #1

MOVEABLE BRIDGE

4/24/20

J-MACK 2 LANE SPAN
X 44' CROSS SECTION

$$\text{MOVEABLE SPAN} \rightarrow \$57,600,000 \times \frac{240 \text{ FT}}{305 \text{ FT}} \times \frac{44}{51} = \$39,103,500$$

↑ RIO VISTA BR.
↑ CROSS-SEC REDUCED

VIADUCT LENGTH → 190 FT

VIADUCT COST → \$4,202,000

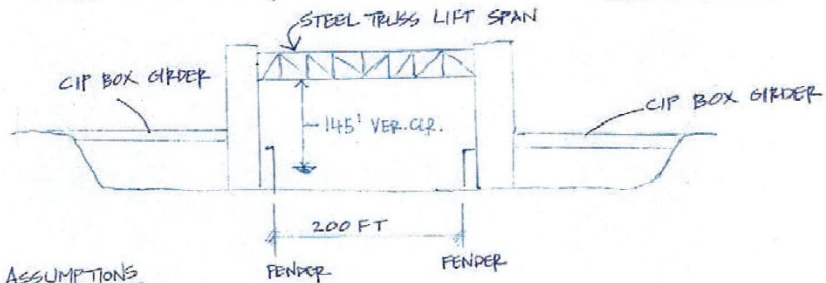
FENDER COST → \$6,500,000

ELECT COST → \$12,000,000

SUBTOTAL = \$62,474,000

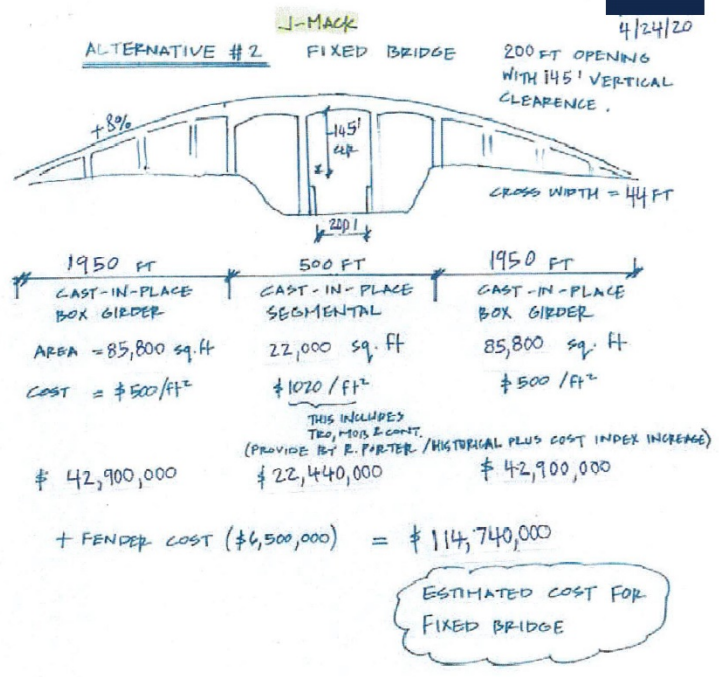
J-MACK MOVEABLE BRIDGE

$$\text{TOTAL} = \text{SUBTOTAL} \times (1 + 10\% \text{ TRO} + 10\% \text{ MATS} + 40\% \text{ CONT}) = \$100 \text{ Million}$$



ASSUMPTIONS

- 44' CROSS SECTION WIDTH
- 200' HORIZONTAL CLEARANCE
- 145' VERTICAL CLEARANCE



ASSUMPTIONS

- 44' CROSS SECTION WIDTH
- 200' HORIZONTAL OPENING
- 145' VERTICAL CLEARANCE
- ± 8% LONGITUDINAL GRADE

Appendix E – Caltrans’ Guidance for Preparing a Bridge Life-Cycle Cost Analysis

Bridge Life-Cycle Cost Analysis Guidance

INTRODUCTION

Bridge life-cycle cost analysis (BLCCA) is a process for evaluating the total investment throughout the life of the bridge. This investment includes the initial construction costs, future costs such as maintenance, rehabilitation, repair, retrofit costs, and user costs when applicable. BLCCA is a tool used to identify the most cost-effective alternative over the life of a bridge project.

The purpose of the BLCCA is to assist the Project Development Team (PDT) in the selection of the preferred project alternative. BLCCA provides a means for better decisions based on the best overall value rather than the lowest initial cost.

At a minimum, BLCCA must be performed when requested by the Districts and one of the alternatives is a replacement, or when the Structure Design team deems that the BLCCA will help determine the most cost-effective alternative over the life of a bridge project. Examples of when BLCCA applies include:

1. Alternatives with different service lives (i.e. replacement vs. rehabilitation/retrofit/widening).
2. Alternatives with different future costs (i.e. maintenance, rehabilitation, repair, retrofit).
3. Alternatives with different user impacts (i.e. Accelerated Bridge Construction vs. conventional).

When required, the BLCCA must be performed at the planning phase and a summary must be included in the Structure PIR/PSR-PDS/APS Transmittal Memorandum and Type Selection Report.

PRACTICE

BLCCA is performed by the Division of Engineering Services (DES) with assistance from Structure Maintenance & Investigations (SM&I). A BLCCA is developed for each competing alternative, taking into account only the structure costs. When District costs are considerably different between alternatives, the District should consider roadway, right-of-way, support and any user related costs in a total project life-cycle cost analysis or benefit-cost/value analysis. The level of BLCCA performed depends upon the deliverable requested by the District.

BLCCA Level	Deliverable	Considerations
1	Structure PIR Cost Estimate, Structure PSR-PDS Cost Estimate	Initial structure construction capital costs and remaining service life.
2	APS	Initial structure construction capital costs, remaining service life, and future structure costs (i.e. maintenance, rehabilitation, repair, retrofit)

Bridge Life-Cycle Cost Analysis Guidance

BLCCA – Level 1

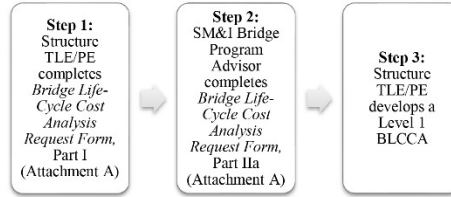


Figure 1: BLCCA – Level 1 Process

Step 1:

When it has been determined that a Level 1 BLCCA will be done, the Structure Technical Liaison Engineer (TLE) or PE completes Part I of the *Bridge Life-Cycle Cost Analysis Request Form* (Attachment A) and submits one form for each alternative to the Bridge Program Advisor within SM&I - Office of Bridge Asset Management.

The request form can be found on the BLCCA intranet site:

<https://des.onramp.dot.ca.gov/des-structure-design/bridge-life-cycle-cost-analysis>

See <https://smi.onramp.dot.ca.gov/content/bridge-asset-management-office> for a list of the responsible Bridge Program Advisors.

Step 2:

SM&I Bridge Program Advisor determines the remaining service life for the bridge after rehabilitation, completes Part IIa of the *Bridge Life-Cycle Cost Analysis Request Form* and returns it to the Structure TLE/PE.

Step 3:

The Structure TLE/PE then develops a Level 1 BLCCA, as shown below, for inclusion in the Structure Project Initiation Report (PIR) or Structure Project Study Report-Project Development Support (PSR-PDS) Cost Estimate transmittal memorandums.

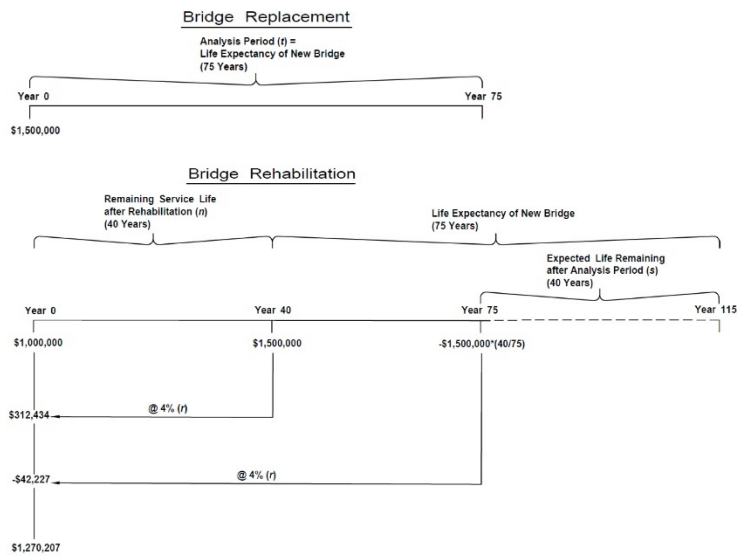
$$\text{Present Value of Bridge Rehabilitation (Level 1)} = \text{initial rehabilitation cost} + \text{future replacement cost} * (1 + r)^{-n} - \text{remaining service life value} * (1 + r)^{-t}$$

Bridge Life-Cycle Cost Analysis Guidance

Where:

- r = real discount rate per Structure Office Engineer BLCCA guidance <https://des.onramp.dot.ca.gov/des-structure-design/soe-ppi-manual-volume-2>
- n = number of years in the future when the cost of replacement will be incurred = remaining service life after rehabilitation (Level 1)
- t = analysis period (75 years life expectancy of a new bridge)
- remaining service life value* = *future replacement cost* * $(\frac{s}{t})$
- s = expected life remaining after analysis period (t).

Example:



Bridge Life-Cycle Cost Analysis Guidance

BLCCA – Level 2

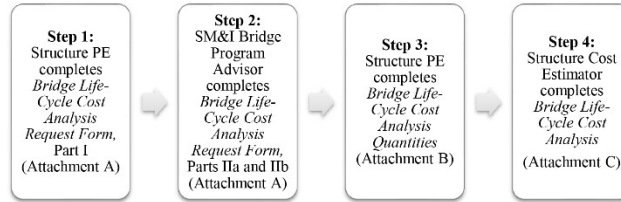


Figure 2: BLCCA – Level 2 Process

Step 1:

When it has been determined that a Level 2 BLCCA will be done, the Structure PE develops the Advance Planning Study (APS) and any necessary detail sheets per typical guidelines. The Structure PE then completes Part I of the *Bridge Life-Cycle Cost Analysis Request Form* (Attachment A) and submits the form and APS details to the Bridge Program Advisor within SM&I - Office of Bridge Asset Management.

The request form can be found on the BLCCA intranet site:

<https://des.onramp.dot.ca.gov/des-structure-design/bridge-life-cycle-cost-analysis>

See <https://smi.onramp.dot.ca.gov/content/bridge-asset-management-office> for a list of the responsible Bridge Program Advisors.

Step 2:

SM&I Bridge Program Advisor determines the remaining service life for the bridge after rehabilitation, the structure’s future maintenance and rehabilitation needs, and the probable frequency of these repairs. The SM&I Bridge Program Advisor completes Parts IIa and IIb of the *Bridge Life-Cycle Cost Analysis Request Form* and returns it to the Structure PE.

Typical maintenance and rehabilitation frequencies can be found on the BLCCA intranet site:

<https://des.onramp.dot.ca.gov/des-structure-design/bridge-life-cycle-cost-analysis>

Step 3:

The Structure PE develops the appropriate BLCCA quantities and completes the *Bridge Life-Cycle Cost Analysis Quantities* (Attachment B) spreadsheet. The Structure PE then submits the completed *Bridge Life-Cycle Cost Analysis Request Form* and *Bridge Life-Cycle Cost Analysis Quantities* spreadsheet to Structure Office Engineer (SOE) Cost

Bridge Life-Cycle Cost Analysis Guidance

nonstandard bridge width versus (2) bridge replacement to standard bridge width). In these instances, a note should be included in the transmittal memorandum like the following:

The alternatives developed have different benefits since the resulting bridge widths vary. Therefore, the PDT should consider a benefit-cost/value analysis to better evaluate and select the preferred alternative.

BLCCA is a subset of a benefit-cost/value analysis in which the costs derived in the BLCCA are compared with the benefits gained in each alternative. The PDT can use this information in the section of the preferred project alternative.

Example projects can be found on the BLCCA intranet site:

<https://des.onramp.dot.ca.gov/des-structure-design/bridge-life-cycle-cost-analysis>

A link to the BLCCA intranet site can be found within the Offices of Bridge Design's Project Engineering Resources intranet site:

<https://des.onramp.dot.ca.gov/des-structure-design/project-engineering-resources>

This guidance impacts:

- MTD 1-8: Planning Studies
- MTD 1-29: Structure Type Selection
- APS Development Requirements
- APS/GP Estimate Checklist

Bridge Life-Cycle Cost Analysis Guidance

Attachment A

Bridge Life-Cycle Cost Analysis Request Form – Example
 (Latest version available on the DES Structure Design intranet site.)

BRIDGE LIFE-CYCLE COST ANALYSIS (BLCCA) REQUEST FORM				
<small>PE / TLE : Please complete Part I and submit it to Bridge Program Advisor when requesting an estimate for anticipated maintenance work and frequency for BLCCA.</small>				
ALT 1: 				
PART I				
Type of BLCCA : PIR / PSR-PDS <input type="checkbox"/> APS <input type="checkbox"/>				
Date:	Design Branch	Prepared by :	Phone No :	Completion Desired Date
EA :	Project ID :		Dist - Co - Rte - PM:	
Bridge No. :	Bridge Name :			
Project Description :				
PART II				
Date:	Bridge Asset Management	Prepared by :	Phone No :	
II a : Remaining Service Life after Rehabilitation : years				
II b : Anticipated future maintenance work and frequency				
	Methacrylate Deck Treatment :	▼	yrs &	▼
	Polyester Concrete Overlay :	▼	yrs &	▼
	Joint Seal (Max MR =2") :	▼	yrs &	▼
	Joint Seal (Max MR > 4") :	▼	yrs &	▼
	Bridge Painting :	▼	yrs &	▼
	Bridge Inspection :	▼	yrs &	▼
	Bridge Deck Replacement :	▼	yrs &	▼
Comments :				

Note : Including future maintenance work in BLCCA is not necessary for PIR / PSR-PDS cost estimate.
 Bridge Program Advisor is only to provide remaining service life of the bridge after rehab (Part II a).

Bridge Life-Cycle Cost Analysis Guidance

Attachment B

Bridge Life-Cycle Cost Analysis Quantities – Example

BRIDGE LIFE-CYCLE COST ANALYSIS QUANTITIES		
<small>Revised June 28, 2019</small>		
BRIDGE NAME:		
BRIDGE NUMBER:		
E.A.:		
PROJECT ID:		
ALTERNATIVE:		
PRICES BY:		
QUANTITIES BY:		
FUTURE CONTRACT ITEMS	UNIT	QUANTITY
1 TREAT BRIDGE DECK		
2 PREPARE CONCRETE BRIDGE DECK SURFACE	SQFT	
3 FURNISH BRIDGE DECK TREATMENT MATERIAL	GAL	
4 TREAT BRIDGE DECK	SQFT	
5 CLEAN EXPANSION JOINT	LF	
6 JOINT SEAL	LF	
7		
8		
9 POLYESTER OVERLAY		
10 PREPARE CONCRETE BRIDGE DECK SURFACE	SQFT	
11 FURNISH POLYESTER CONCRETE OVERLAY	CF	
12 PLACE POLYESTER CONCRETE OVERLAY	SQFT	
13 CLEAN EXPANSION JOINT	LF	
14 JOINT SEAL	LF	
15		
16		
17 REPLACE APPROACH SLAB		
18 AGGREGATE BASE (APPROACH SLAB)	CY	
19 STRUCTURAL CONCRETE, APPROACH SLAB (TYPE R)	CY	
20 CLEAN EXPANSION JOINT	LF	
21 JOINT SEAL	LF	
22		
23 CLEAN AND PAINT BRIDGE		
24 CLEAN STRUCTURAL STEEL (EXISTING BRIDGE)	SQFT	
25 PAINT STRUCTURAL STEEL (EXISTING BRIDGE)	SQFT	
26 SPOT BLAST CLEAN AND PAINT UNDERCOAT	SQFT	
27		
28		
29 REPLACE BRIDGE		
30 CONSTRUCT BRIDGE	SQFT	Refer to APS estimate
31		
32		
33 OTHER		
34		
35		
36		
37		
COMMENTS:		

Bridge Life-Cycle Cost Analysis Guidance

Attachment C

Bridge Life-Cycle Cost Analysis – Example

BRIDGE LIFE-CYCLE COST ANALYSIS					SAN LORENZO RIVER BRIDGE		
Life Cycle Period (year)		75		Bridge No. 36-0052			
Real Discount Rate		2.90%					
				Option 2, WIDEN		Option 3, REPLACE	
A. INITIAL COST		PV Factor		Work Description		Amount	
0	1.00000	Widen	\$ 2,224,000	Present Value	\$ 2,224,000	New Bridge	\$ 2,945,000
INITIAL COST SAVINGS:						\$ (721,000)	
B. SUBSEQUENT ANNUAL COSTS							
Total Subsequent Annual Costs:				\$ -		\$ -	
Present Value Factor (P/A): (used for annual costs (B) above)				30.442		30.442	
PRESENT VALUE OF SUBSEQUENT ANNUAL COSTS (Rounded):				\$ -		\$ -	
C. SUBSEQUENT SINGLE COSTS							
Year	PV Factor (P/A)	Work Description	Amount	Present Value	Work Description	Amount	Present Value
1	0.97188		\$ -	\$ -		\$ -	\$ -
2	0.94443		\$ -	\$ -		\$ -	\$ -
3	0.91781		\$ -	\$ -		\$ -	\$ -
4	0.89195		\$ -	\$ -		\$ -	\$ -
5	0.86683		\$ -	\$ -		\$ -	\$ -
6	0.84233		\$ -	\$ -		\$ -	\$ -
7	0.81844		\$ -	\$ -		\$ -	\$ -
8	0.79517		\$ -	\$ -		\$ -	\$ -
9	0.77251		\$ -	\$ -		\$ -	\$ -
10	0.75046		\$ -	\$ -	Methacrylate	\$ 28,350	\$ 21,301
11	0.72901		\$ -	\$ -		\$ -	\$ -
12	0.70816		\$ -	\$ -		\$ -	\$ -
13	0.68790	Paint bridge	\$ 82,500	\$ 56,892		\$ -	\$ -
14	0.66823		\$ -	\$ -		\$ -	\$ -
15	0.64914	Joint Seals (MR 1/2")	\$ 6,370	\$ 4,149		\$ -	\$ -
16	0.63062		\$ -	\$ -		\$ -	\$ -
17	0.61266		\$ -	\$ -		\$ -	\$ -
18	0.59525		\$ -	\$ -		\$ -	\$ -
19	0.57838		\$ -	\$ -		\$ -	\$ -
20	0.56204	Polyester Concrete Overlay	\$ 75,900	\$ 42,848	Methacrylate	\$ 28,350	\$ 16,005
21	0.54622		\$ -	\$ -		\$ -	\$ -
22	0.53091		\$ -	\$ -		\$ -	\$ -
23	0.51610		\$ -	\$ -		\$ -	\$ -
24	0.50178		\$ -	\$ -		\$ -	\$ -
25	0.48794		\$ -	\$ -		\$ -	\$ -
26	0.47457		\$ -	\$ -		\$ -	\$ -
27	0.46166		\$ -	\$ -		\$ -	\$ -
28	0.44920		\$ -	\$ -		\$ -	\$ -
29	0.43718		\$ -	\$ -		\$ -	\$ -
30	0.42560	Replace Bridge	\$ 2,945,000	\$ 1,249,177	Methacrylate, Joint Seal (MR 2")	\$ 41,175	\$ 17,465
31	0.41435		\$ -	\$ -		\$ -	\$ -
32	0.40342		\$ -	\$ -		\$ -	\$ -
33	0.39280		\$ -	\$ -		\$ -	\$ -
34	0.38248		\$ -	\$ -		\$ -	\$ -
35	0.37245		\$ -	\$ -		\$ -	\$ -
36	0.36270		\$ -	\$ -		\$ -	\$ -
37	0.35322		\$ -	\$ -		\$ -	\$ -
38	0.34400		\$ -	\$ -		\$ -	\$ -
39	0.33503		\$ -	\$ -		\$ -	\$ -
40	0.32630		\$ -	\$ -		\$ -	\$ -
41	0.31781		\$ -	\$ -		\$ -	\$ -
42	0.30955		\$ -	\$ -		\$ -	\$ -
43	0.30152		\$ -	\$ -		\$ -	\$ -
44	0.29371		\$ -	\$ -		\$ -	\$ -
45	0.28611		\$ -	\$ -		\$ -	\$ -
46	0.27871		\$ -	\$ -		\$ -	\$ -
47	0.27151		\$ -	\$ -		\$ -	\$ -
48	0.26450		\$ -	\$ -		\$ -	\$ -
49	0.25768		\$ -	\$ -		\$ -	\$ -
50	0.25104		\$ -	\$ -		\$ -	\$ -
51	0.24458		\$ -	\$ -		\$ -	\$ -
52	0.23828		\$ -	\$ -		\$ -	\$ -
53	0.23214		\$ -	\$ -		\$ -	\$ -
54	0.22615		\$ -	\$ -		\$ -	\$ -
55	0.22031		\$ -	\$ -		\$ -	\$ -
56	0.21461		\$ -	\$ -		\$ -	\$ -
57	0.20905		\$ -	\$ -		\$ -	\$ -
58	0.20362		\$ -	\$ -		\$ -	\$ -
59	0.19832		\$ -	\$ -		\$ -	\$ -
60	0.19314		\$ -	\$ -		\$ -	\$ -
61	0.18808		\$ -	\$ -		\$ -	\$ -
62	0.18313		\$ -	\$ -		\$ -	\$ -
63	0.17829		\$ -	\$ -		\$ -	\$ -
64	0.17356		\$ -	\$ -		\$ -	\$ -
65	0.16893		\$ -	\$ -		\$ -	\$ -
66	0.16440		\$ -	\$ -		\$ -	\$ -
67	0.16000		\$ -	\$ -		\$ -	\$ -
68	0.15570		\$ -	\$ -		\$ -	\$ -
69	0.15150		\$ -	\$ -		\$ -	\$ -
70	0.14740		\$ -	\$ -		\$ -	\$ -
71	0.14339		\$ -	\$ -		\$ -	\$ -
72	0.13947		\$ -	\$ -		\$ -	\$ -
73	0.13564		\$ -	\$ -		\$ -	\$ -
74	0.13190		\$ -	\$ -		\$ -	\$ -
75	0.12825		\$ -	\$ -		\$ -	\$ -
Salvage (Bridge still has 30 years left of 75)		\$ (1,178,000)		\$ (138,050)		\$ -	
PRESENT VALUE OF SUBSEQUENT SINGLE COSTS (Rounded):				\$ 1,240,000		\$ 111,000	
D. TOTAL SUBSEQUENT ANNUAL AND SINGLE COSTS (B+C)				\$ 1,240,000		\$ 111,000	
E. TOTAL PRESENT VALUE COST (A+D)				\$ 3,464,000		\$ 1,129,000	
F. TOTAL PRESENT VALUE COST (A+E)				\$ 3,464,000		\$ 3,056,000	
TOTAL LIFE-CYCLE SAVINGS:						\$ 408,000	

Auditee's Response

CALIFORNIA STATE TRANSPORTATION AGENCY

GAVIN NEWSOM, GOVERNOR

California Department of Transportation

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October 14, 2022

Mr. Bryan Beyer
Inspector General
Independent Office of Audits and Investigations
P.O. Box 942874, MS-2
Sacramento, CA 94274-0001

Dear Mr. Beyer

Thank you for providing the California Department of Transportation (Caltrans) an opportunity to address the findings and recommendations provided during the Delta Ferries Program Audit.

Throughout the years Caltrans has explored various alternatives to operating the Delta ferries through multiple independent analyses, which included a life cycle cost comparison of constructing a bridge vs. replacing the ferries. Caltrans is currently developing a Request for Proposal (RFP), to study the options of retrofitting or replacing the existing ferries to meet the California Air Resources Board requirements, with zero emission ferries (battery electric and/or hydrogen powered). In addition, the study will include design recommendations for zero emission infrastructure needed to charge the ferries.

Caltrans is committed to ensuring transportation funds are efficiently and effectively being utilized within its ferry operations in the San Joaquin River Delta, therefore as recommended by the Audit, Caltrans is initiating a comprehensive feasibility study to analyze the ferry service comparing various alternatives. The study will include a life cycle cost analysis of the alternatives, including construction of bridge(s) and ferries; maintenance of ferries operations; relinquishing the ferries; alternate hours of operation; tolling and discontinuance of ferry service.

Should you have any additional questions regarding the updated status of corrections, please contact Equipment via email at <bob.myers@dot.ca.gov>.

Sincerely,

A handwritten signature in black ink, appearing to read 'Tony Tavares', is written over a horizontal line.

TONY TAVARES, Director
California Department of Transportation

"Provide a safe and reliable transportation network that serves all people and respects the environment"

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