



# North Valley Passenger Rail Strategic Plan

CHICO • GRIDLEY • MARYSVILLE/YUBA CITY  
PLUMAS LAKE • SACRAMENTO

## Appendix C

### Capital and Operations & Maintenance Cost Memorandum

Final Report

May 2024



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**Project name:**  
North Valley Passenger Rail Strategic Plan

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**Date:**  
May 16, 2024

# Memorandum

**Subject:** Capital and Operations & Maintenance Cost Memorandum

The Butte County Association of Governments (BCAG) is developing a strategic plan for new passenger rail service in the North Valley Region. This service is referred to as North Valley Rail. The ultimate goal of this effort is to develop a blueprint for integrating Butte County's major population centers with the state's larger rail network within the mid-term planning horizon (i.e., service start date of around 2031). This technical memorandum evaluates the capital costs associated with constructing the project.

Note: This memorandum will also be revised to include operation and maintenance (O&M) costs associated with running the service when that work is completed with San Joaquin Regional Rail Commission (SJRRC) and San Joaquin Joint Powers Authority (SJJPA).

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## Capital Costs

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### Introduction

The North Valley Rail Project (NVRP) includes an extension of passenger rail service from the currently planned terminus station in Natomas north to Chico. This route includes 34 miles on the UP Sacramento Subdivision and 42 miles on the UP Valley Subdivision. While the UP Valley Subdivision carries more freight than the UP Sacramento Subdivision, neither are as busy as the UP Fresno Subdivision. As such, it is anticipated the infrastructure improvements needed along the extension corridor would be similar to what they are asking for on the current Valley Rail Program for the UP Sacramento Subdivision in terms of new and extended sidings.

Infrastructure improvements specifically required for the passenger service would include stations, a layover facility and potentially additional sidings for passenger trains to pass each other. Caltrans worked with Deutsche Bahn Group to model the proposed North Valley Service in the Viriato Model tool, which verified that the proposed schedule had only one "meet" of trains coming from opposite directions at the Marysville-Yuba City Station. As such, no additional track infrastructure would be required to facilitate passenger train passing between Natomas and Chico. The model run was also helpful in identifying locations south of Natomas that will require passing trains for the Expanded Valley Rail Program, which envisioned 10 roundtrip passenger trains serving Natomas by around 2030 (an increase from 7 roundtrips serving Natomas in the original Valley Rail Program).

## Station and Layover Improvements

Based on field reviews with BCAG, SJRRC/SJJPA and local jurisdictions, station locations were determined for four project stations to go along with the upgrades needed at the Natomas Station. New station siding track are required at 3 of the 4 new stations

The station list is below:

- Natomas Station Expansion
- Plumas Lake Station
- Marysville-Yuba City Station
- Gridley Station
- Chico Station

While each of the stations is unique, the main improvements at each station are consistent across the project. The stations include a passenger loading platform, passenger access facilities, station area parking, kiss and ride and transit opportunities like bus stops. Each station includes track improvements at the loading platform and for stations with a center loaded platform island, the passenger access facilities include a grade separation.

The NVRP will also require a location at the northern terminus in Chico for a layover facility to store trains. The layover facility includes train storage tracks, access roads along the tracks to perform cleaning, light maintenance and potential fueling. The facility will also include a modular building to support operations staff.

## Track Improvements

In order to facilitate passenger rail operations on an existing freight rail corridor, there are improvements required in order to allow for train passing and to increase the overall capacity of the corridor to make up for the passenger trains taking up existing capacity. One option to building rail improvements along the project corridor is to provide Union Pacific Railroad (UPRR) with Capital Access Fees (CAF). UPRR can use these fees to implement capacity improvements throughout their system. The State prefers to incorporate CAFs where possible and UPRR has indicated an openness to consider them. Without CAFs, there will be a need to implement some track improvements within the project corridor. Given this, a list was developed of preliminary improvements was developed by AECOM for segments of track improvements in logical locations based on the service plan developed. However, any track improvements would need to be further analyzed in future rail network modeling to be conducted by UPRR. Therefore, the segments for potential track improvements listed below are preliminary and subject to change.

The potential segments of track improvements are listed below.

- Station Track at the expanded Natomas Station (0.3 miles)
- Pleasant Grove Siding Extension (1.7 miles)
- Mounkes Siding Extension tied to implementation of Plumas Lakes Station (2.4 miles)
- Marysville Siding Modifications (0.25 miles)
- Berg Siding Extension (1.3 miles)
- Fagan Siding Extension tied to implementation of Gridley Station (2.1 miles)
- Richvale Siding Extension (1.4 miles)
- New Durham Siding (2.9 miles)
- Chico Siding Extension (0.7 miles)

## Infrastructure Improvements Costs Summary

Based on the list of preliminary improvements discussed above, preliminary cost estimates were developed using general costs identified below (2022\$):

- New Track @ \$15 M per mile

- New Station @ \$33.6 M each
- New Layover Facility @ \$30 M

Based on the above preliminary costs for each component, a range of costs was developed for each of the infrastructure components. Below is a summary breakdown of those costs:

**Table 1. Station and Layover Project Costs**

| Item              | Improvement Costs (\$2022) | Escalation Range | Total Range YOE (\$M)    |
|-------------------|----------------------------|------------------|--------------------------|
| Stations          | \$151.2                    | \$48.0 – \$59.0  | \$199.2 – \$210.2        |
| Track at Stations | \$23.8                     | \$7.5 – \$9.3    | \$31.3 – \$33.1          |
| Layover           | \$30.0                     | \$9.5 – \$11.7   | \$39.5 – \$41.7          |
| Total             | \$205.0                    | \$65.0 - 80.0    | <b>\$270.0 - \$285.0</b> |

**Table 2. Potential Track Improvement Project Costs**

| Item                | Improvement Costs (\$2022) | Escalation Range | Total Range YOE (\$M)  |
|---------------------|----------------------------|------------------|------------------------|
| Track Improvements* | \$177.0                    | \$53.0 – \$68.0  | <b>\$230.0-\$245.0</b> |

See **Attachment A** for additional details related to capital cost estimates for improvements at each location.

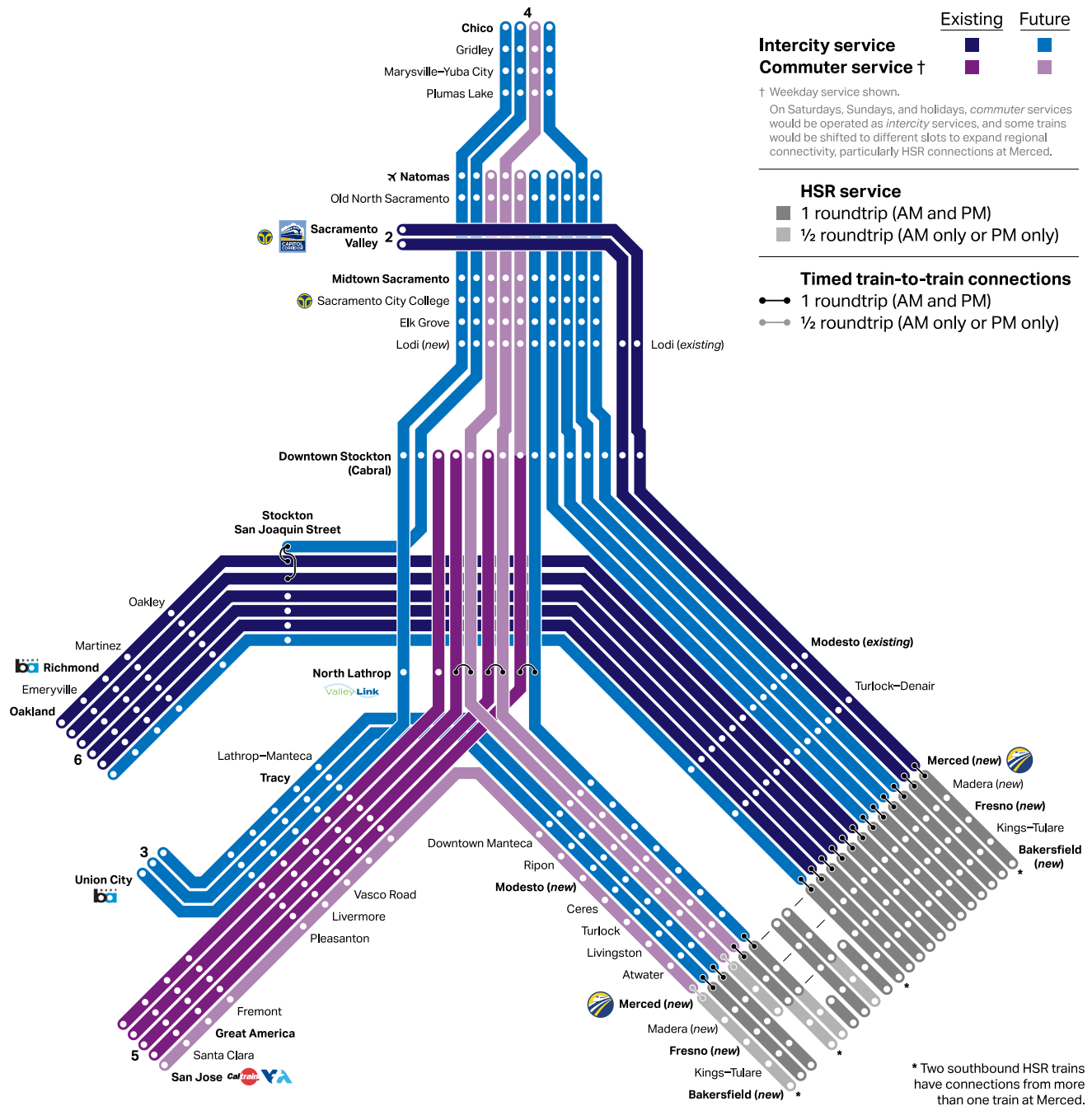
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## Operations & Maintenance Costs

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The mid-term service plan illustrated in **Figure 1** shows daily service for North Valley Rail consisting of 3 intercity roundtrips and 1 commuter roundtrip. The commuter roundtrip and 2 of the intercity roundtrips—the one between Chico and Stockton San Joaquin Street and the one between Chico and Union City—would be operated as ACE trains, while the remaining intercity roundtrip would be operated as a *San Joaquins* train. The California State Transportation Agency (CalSTA) has requested that all existing and new passenger rail service employ cost reduction strategies for operations. For planning purposes, the current O&M cost model for the ACE service was used as a baseline to establish the O&M estimates for the expansion of service from Natomas to Chico. The methodology for estimating future O&M costs does not represent a detailed financial analysis of fixed and variable costs; however, an effort has been made to develop a preliminary evaluation of fixed and variable costs that are likely to increase as a result of the service expansion to Chico.

**Figure 1. Expanded Valley Rail and North Valley Rail Mid-Term Service Plan**



Source: AECOM

### Existing ACE O&M Costs

SJRRC's 2023/2024 budget for the ACE service was used to determine the baseline O&M costs for ACE service, which included four round trips on weekdays between Stockton and San Jose. The ACE budget cited an O&M cost of \$45.5 million for the commuter rail operation generating 174,064 annual train-miles. The 2023/2024 budget is consistent with the updated Expanded Valley Rail Program O&M calculations. The figure included:

- \$5.0 million in the largely fixed costs for project management, services, and supplies;

- \$26.2 million in largely variable costs for contracted service and operations; and,
- \$1.8 million in shuttle services that ferry riders to and from the trains.
- \$3.2 million in capital access fees.
- \$1.8 million in capital maintenance fees.

### Development of the ACE O&M Cost Model

In order to project O&M costs for the service expansion scenarios, specific modifications to the fixed and variable costs elements were made. For example, most fixed costs were increased by 24 percent to reflect an expanded operation. Variable costs related to train operations and bus shuttles were increased by the increase in train-miles<sup>1</sup>. Assumptions were made with regard to new management personnel required to staff the expanded operation. Station maintenance costs were increased by the number of stations, and insurance costs were boosted in relation to ridership which reflect greater exposure to risk. Rail maintenance facility expenses were grown to account for the costs of maintaining more trainsets and to accommodate a new layover facility in Chico. In accordance with this approach, annual O&M costs that were developed for the proposed Merced Extension (from Lathrop), Sacramento Extension (from Stockton) and service to Union City were then updated to reflect the additional train service to Chico.

- **Existing Service-Levels (including 2023):** This scenario represents the existing service-levels, with the four trains (round trip) between Stockton and San Jose.
- **Future Baseline:** This scenario represents two extensions currently being implemented, with three trains (roundtrips) between Stockton and San Jose; one train (roundtrip) between Merced and San Jose; one train (roundtrip) between Natomas and San Jose; three trains (roundtrips) between Merced and Natomas (with a transfer to San Jose-bound trains at the North Lathrop Transfer Station); and one train (roundtrip) between Natomas and Stockton. This scenario also represents the service to Union City with one train (roundtrip) between Natomas and Union City; and two trains (roundtrips) between Merced and Union City.
- **Future with Project:** This scenario represents the Proposed Project operation, with three trains (roundtrips) between Stockton and San Jose; one train (roundtrip) between Merced and San Jose; one train (roundtrip) between Natomas and San Jose; two trains (roundtrips) between Merced and Natomas (with a transfer to San Jose-bound trains at the North Lathrop Transfer Station); one train (roundtrip) between Merced and Chico (with a transfer to San Jose-bound train at the North Lathrop Transfer Station); one train (roundtrip) between Chico and Stockton; one train (roundtrip) between Chico and Union City; two trains (roundtrips) between Merced and Union City; and one train (roundtrip) between Natomas and Chico, which represents the portion of the Proposed Project's *San Joaquins* roundtrip (Merced–Chico) that is specifically part of the Project and therefore included in the cost model.

### Cost Findings

The current ACE four round trips between Stockton and San Jose on weekdays generated 174,064 annual train-miles and an annual O&M cost of \$38.1 million. In the table below, incremental and total train-miles and incremental and total O&M costs are identified for the Merced, Sacramento Extensions & Union City Service (Base) and the North Valley Rail Service (Project).

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<sup>1</sup> A train-mile is generated by a train moving one mile. A train running 200 miles, for example, generates 200 train-miles.

| <b>Table 1: Train-Miles and O&amp;M Cost Totals for ACE Service Expansions (\$-million)</b> |   |   |  |
|---|---|---|--|
| <b>Metrics</b>  | <b>Stockton – San Jose<br/>(Existing)</b> | <b>With Merced,<br/>Sacramento<br/>Extensions &amp; Union<br/>City Service (Base)</b> | <b>With North Valley Rail<br/>Service (Proposed<br/>Project)</b> |
| Pre-Extensions Train-Miles  | 174,064                                   | 174,064   | 174,064  |
| Incremental Train-Miles for<br>Base   | 0   | 688,400   | 688,400  |
| Incremental Train-Miles for<br>Proposed Project   | 0   | 0   | 149,416  |
| Total Train-Miles   | 174,064                                   | 862,500   | 1,084,400  |
| Pre-Extensions O&M Cost (\$-<br>2023)   | \$38,093,656                              | \$38,093,656  | \$38,093,656   |
| Incremental O&M Cost for<br>Base (\$-2023)  | 0   | \$84,111,175  | \$84,111,175   |
| <b>Incremental O&amp;M Cost for<br/>Proposed Project (\$-2023)</b>                          | <b>0</b>                                  | <b>0</b>  | <b>\$24,004,541</b>  |
| Total O&M Cost (\$2023)   | \$38,093,656                              | \$122,204,831   | \$146,209,372  |

Note: The *San Joaquins* service south of Natomas is not included in the cost model, as this analysis is intended to capture only the incremental O&M costs associated with North Valley Rail by comparing the Future with Project scenario against the Future Baseline scenario. In that calculation for incremental (project) costs, the costs associated with the *San Joaquins* service south of Natomas would be zeroed out.

See **Attachment B** for additional details related to operations and maintenance cost estimates.

## Attachment A - Preliminary Capital Cost Estimate

### Project Specific Costs (2022\$):

|           |                  |
|-----------|------------------|
| New Track | \$15.0M per mile |
| Station   | \$33.6M each     |
| Layover   | \$30.0M each     |

### Station & Layover

| Item               | Description                  | Quantity | Unit  | Unit Cost | Subtotal (\$M) |
|--------------------|------------------------------|----------|-------|-----------|----------------|
| Stations           | Natomas Station Expansion    | 0.5      | each  | \$33.6    | \$16.8         |
| Track Improvements | Natomas Station Expansion    | 0.3      | miles | \$15.0    | \$4.5          |
| Stations           | Plumas Lake Station          | 1        | each  | \$33.6    | \$33.6         |
| Stations           | Marysville/Yuba City Station | 1        | each  | \$33.6    | \$33.6         |
| Track Improvements | Marysville/Yuba City Station | 0.25     | miles | \$15.0    | \$3.8          |
| Stations           | Gridley Station              | 1        | each  | \$33.6    | \$33.6         |
| Stations           | Chico Station                | 1        | each  | \$33.6    | \$33.6         |
| Track Improvements | Chico Siding Extension       | 0.7      | miles | \$15.0    | \$10.5         |
| Bridge             | Chico Siding Extension       | 1        | LS    | \$1.0     | \$1.0          |
| At-Grade Crossings | Chico Siding Extension       | 1        | LS    | \$4.0     | \$4.0          |
| Layover            | Chico                        | 1        | each  | \$30.0    | \$30.0         |
| Total              |                              |          |       |           | \$205.0        |

### Track Improvements

| Item               | Description                     | Quantity | Unit  | Unit Cost | Subtotal (\$M) |
|--------------------|---------------------------------|----------|-------|-----------|----------------|
| Track Improvements | Pleasant Grove Siding Extension | 1.7      | miles | \$15.0    | \$25.5         |
| Track Improvements | Mounkes Siding Extension        | 2.4      | miles | \$15.0    | \$36.0         |
| Track Improvements | Berg Siding Extension           | 1.3      | miles | \$15.0    | \$19.5         |
| Track Improvements | Fagan Siding Extension          | 2.1      | miles | \$15.0    | \$31.5         |
| Track Improvements | Richvale Siding Extension       | 1.4      | miles | \$15.0    | \$21.0         |
| Track Improvements | New Durham Siding               | 2.9      | miles | \$15.0    | \$43.5         |
| Total              |                                 |          |       |           | \$177.0        |

### Station & Layover Cost Summary Table with Escalation

| Item             | Improvement Costs (2022\$ M) | Escalation Range | Total Range YOY (\$M) |
|------------------|------------------------------|------------------|-----------------------|
| Station          | \$151.2                      | \$48.0 - \$59.0  | \$199.2 - \$210.2     |
| Track at Station | \$23.8                       | \$7.5 - \$9.3    | \$31.3 - \$33.1       |
| Track at Station | \$30.0                       | \$9.5 - \$11.7   | \$39.5 - \$41.7       |
| Total            | \$205.0                      | \$65.0 - \$80.0  | \$270.0 - \$285.0     |

### Track Improvement Cost Summary Table with Escalation

| Item               | Improvement Costs (2022\$ M) | Escalation Range | Total Range YOY (\$M) |
|--------------------|------------------------------|------------------|-----------------------|
| Track Improvements | \$177.0                      | \$53.0 - \$68.0  | \$230.0 - \$245.0     |
| Total              | \$177.0                      | \$53.0 - \$68.0  | \$230.0 - \$245.0     |



**Attachment B**  
**North Valley Passenger Rail Strategic Plan**  
**O&M Cost Estimates - (Base Year)**

|  |  | ACE Operating Budget                       |  |  |
|--|--|--|--|--|
|  |  | Existing <sup>1</sup><br>(FY23/24 Dollars) | Future Baseline <sup>2</sup><br>(FY 23/24 Dollars) | Future with Project <sup>3</sup><br>(FY 23/24 Dollars) |
| <b>Project Management, Services, and Supplies</b>          |  |  |  |  |
|  | Salaries/Benefits/Contract Help                  | \$4,327,168                                | \$4,327,168  | \$4,327,168  |
|  | Additional Office Staff (Extension)              | \$0  | \$370,900  | \$370,900  |
|  | Additional PSA Staff (Extension)                 | \$0  | \$1,112,700  | \$1,112,700  |
|  | Additional Ticket Agents (Extension)             | \$0  | \$370,900  | \$370,900  |
|  | Office Expense Postage                           | \$21,154                                   | \$25,808   | \$26,231   |
|  | Subscriptions/Periodicals/Memberships            | \$13,400                                   | \$16,348   | \$16,616   |
|  | Office Equipment/Furniture                       | \$27,700                                   | \$33,794   | \$34,348   |
|  | Computer Systems                                 | \$2,000                                    | \$2,440  | \$2,480  |
|  | Communications                                   | \$24,050                                   | \$29,341   | \$29,822   |
|  | Motor Pool                                       | \$60,612                                   | \$73,947   | \$75,159   |
|  | Transportation/Travel                            | \$42,000                                   | \$51,240   | \$52,080   |
|  | Training   | \$52,500                                   | \$64,050   | \$65,100   |
|  | Training—Security Grant Funded                   | \$0  | \$0  | \$0  |
|  | Audits Regulatory Reporting                      | \$61,085                                   | \$74,524   | \$75,745   |
|  | Professional Services Legislative                | \$0  | \$0  | \$0  |
|  | Professional Services Legal                      | \$88,086                                   | \$107,465  | \$109,227  |
|  | Professional Services General                    | \$310,952                                  | \$379,361  | \$385,580  |
|  | Publications/Legal Notices                       | \$12,363                                   | \$15,083   | \$15,330   |
|  | Taxes Assessments                                | \$0  | \$0  | \$0  |
| <b>Project Management, Services, and Supplies Subtotal</b> |  | <b>\$5,043,070</b>                         | <b>\$7,055,069</b>                                 | <b>\$7,069,387</b>                                     |
| <b>Contracted Services</b>                                 |  |  |  |  |
|  | Maintenance of San Joaquin County Facilities     | \$0  | \$0  | \$0  |
|  | Maintenance and Improve System Wide ACE Stations | \$42,420                                   | \$143,168  | \$143,168  |
|  | Maintenance of Headquarters Structures/Grounds   | \$128,647                                  | \$156,949  | \$156,949  |
|  | ACE Operations & Maintenance                     | \$8,939,361                                | \$31,948,930                                       | \$38,787,184   |
|  | Contracted Services*                             | \$0  | \$0  | \$0  |
|  | Positive Train Control                           | \$353,700                                  | \$707,400  | \$707,400  |
|  | Consumables/Repair Parts                         | \$1,500,000                                | \$7,432,215  | \$9,344,615  |
|  | Operating Leases                                 | \$88,695                                   | \$108,208  | \$108,208  |
|  | Fuel   | \$2,700,000                                | \$13,377,986                                       | \$16,820,306   |
|  | RR Maintenance, Oversight/Dispatching            | \$3,166,267                                | \$15,688,251                                       | \$19,725,030   |
|  | Insurance  | \$4,655,466                                | \$8,627,506  | \$8,902,506  |
|  | Insurance Management Fees                        | \$170,000                                  | \$207,400  | \$207,400  |
|  | Security Services/Safety Programs                | \$591,471                                  | \$2,113,894  | \$2,566,346  |
|  | FRA/FTA Drug Testing Program                     | \$5,500                                    | \$6,710  | \$6,710  |
|  | Community Engagement & Marketing                 | \$920,292                                  | \$1,122,756  | \$1,122,756  |
|  | Special Trains                                   | \$165,000                                  | \$165,000  | \$165,000  |
|  | Passenger Services                               | \$0  | \$0  | \$0  |
|  | Ticketing Services                               | \$530,331                                  | \$1,895,382  | \$2,301,064  |
|  | Professional Services Operations                 | \$328,433                                  | \$1,173,807  | \$1,425,045  |
|  | Communications, Operations                       | \$246,650                                  | \$881,518  | \$1,070,195  |
|  | Communications, Wi-Fi                            | \$406,000                                  | \$2,011,653  | \$2,529,276  |
|  | Emergency Ride Home Emergency Bus Bridges        | \$60,000                                   | \$297,289  | \$373,785  |
|  | Rail Maintenance Facility                        | \$1,198,005                                | \$1,461,566  | \$1,461,566  |
|  | Merced Layover (Extension)                       | \$0  | \$600,000  | \$600,000  |
|  | Chico Layover (Extension)                        | \$0  | \$0  | \$350,000  |
|  | Natomas Layover (Extension)                      | \$0  | \$175,000  | \$175,000  |
|  | Union City Layover (Extension)                   | \$0  | \$350,000  | \$350,000  |
| <b>Contracted Services Sub-Total</b>                       |  | <b>\$26,196,238</b>                        | <b>\$90,652,587</b>                                | <b>\$109,399,509</b>                                   |
| <b>Shuttle Services</b>                                    |  | <b>\$1,822,539</b>                         | <b>\$6,513,684</b>                                 | <b>\$7,907,853</b>                                     |

|                                 |                     |                      |                      |
|---------------------------------|---------------------|----------------------|----------------------|
| Capital Access Fees             | \$3,242,516         | \$11,588,627         | \$14,069,022         |
| Capital Maintenance Fees        | \$1,789,293         | \$6,394,864          | \$7,763,602          |
| <b>TOTAL OPERATING EXPENSES</b> | <b>\$38,093,656</b> | <b>\$122,204,831</b> | <b>\$146,209,372</b> |

- <sup>1</sup> Existing: This scenario represents the existing service-levels, with the four trains (round trip) between Stockton and San Jose.
- <sup>2</sup> Future Baseline: This scenario represents two extensions currently being implemented, with three trains (round trip) between Stockton and San Jose; one train (round trip) between Merced and San Jose; one train (round trip) between Natomas and San Jose (round trip); three trains (round trip) between Merced and Natomas (with a transfer to San Jose-bound trains at the North Lathrop Transfer Station); and one train (round trip) between Natomas and Stockton. This scenario also represents the service to Union City with one train (round trip) between Natomas and Union City; and two trains (round trip) between Merced and Union City.
- <sup>3</sup> Future with Project: This scenario represents the Proposed Project operation, with three trains (round trip) between Stockton and San Jose; one train (round trip) between Merced and San Jose; one train (round trip) between Natomas and San Jose (round trip); two trains (round trips) between Merced and Natomas (with a transfer to San Jose-bound trains at the North Lathrop Transfer Station); one train (round trip) between Merced and Chico (with a transfer to San Jose-bound train at the North Lathrop Transfer Station); one train (round trip) between Chico and Stockton; one train (round trip) between Chico and Union City; two trains (round trip) between Merced and Union City; and one train (roundtrip) between Natomas and Chico, which represents the portion of the Proposed Project's *San Joaquins* roundtrip (Merced–Chico) that is specifically part of the Project and therefore included in the cost model.