# Stage 2 Alternatives Analysis

California Department of Technology, SIMM 19B (Rev. 2.1), Revision 5/21/2018

## 2.1 General Information

**Agency or State Entity Name:** Public Utilities Commission

**Organization Code:** 8660

**Proposal Name:** RSSIMS Bulk Record Update

**Department of Technology Project Number:** 8660-073

## 2.2 Preliminary Submittal Information

**Contact Information:**

| Contact First Name: | Contact Last Name: |
|---|---|
| Dennis | Hong |
| Contact Email: | Contact Phone: |
| dennis.hong@cpuc.ca.gov | 415-703-1724 |

**Preliminary Submission Date:** 4/27/2020

**Preliminary Project Approval Executive Transmittal**:

RSSIMS - Stage 2
Project Approval Exe

## 2.3 Stage 2 Preliminary Assessment

### 2.3.1 Impact Assessment

| | Yes | No |
|---|---|---|
| 1. Has the Agency/state entity identified and committed subject matter experts from all business sponsors and key stakeholders? | ☒ | ☐ |
| 2. Are all current baseline systems that will be impacted by this proposal documented and current (e.g., data classification and data exchange agreements, privacy impact assessments, design documents, data flow diagram, data dictionary, application code, architecture descriptions)? | ☐ | ☒ |
| 3. Does the Agency/state entity anticipate needing support from the Department of Technology's Statewide Technology Procurement Division to conduct market research for this proposal (Market Survey, Request for Information)? | ☐ | ☒ |
| 4. Does the Agency/state entity anticipate submitting a budget request to support the procurement activities of this proposal? | ☐ | ☒ |
| 5. Could this proposal involve the development and/or purchase of systems to support activities included in Financial Information System for California (FI$CAL) (e.g., financial accounting, asset management, human resources, procurement/ordering, inventory management, facilities management)? | ☐ | ☒ |
| 6. Does the Agency/state entity have a designated Chief Architect or Enterprise Architect to lead the development of baseline and alternative solutions architecture descriptions? | ☒ | ☐ |
| 7. Will the Agency/state entity's Information Security Officer be involved in the development and review of any security related requirements? | ☒ | ☐ |
| 8. Does the Agency/state anticipate performing a business-based procurement to have vendors propose a solution? | ☒ | ☐ |

### 2.3.2 Business Complexity Assessment

# Stage 2 Alternatives Analysis



| Business Complexity: | 1.8 | Business Complexity Zone: | ☐ High | ☒ Medium | ☐ Low |
|---|---|---|---|---|---|

## 2.4 Submittal Information

**Contact Information:** (Use Contact Information from Preliminary Submittal Information ☐)

| Contact First Name: | Contact Last Name: |
|---|---|
| Dennis | Hong |
| **Contact Email:** | **Contact Phone Number:** |
| dennis.hong@cpuc.ca.gov | 415-703-1724 |

**Submission Date:** 4/27/2020

**Submission Type:**

☐ New Submission
☒ Updated Submission (Pre-Approval)
☐ Updated Submission (Post-Approval)
☐ Withdraw Submission Choose an item.

If "Other," specify: Click here to enter text.

**Sections Updated** (For Updated Submissions Only) – (check all that apply)

- ☐ 2.1 General Information
- ☐ 2.2 Preliminary Submittal Information
- ☐ 2.3 Stage 2 Preliminary Assessment
  - ☐ 2.3.1 Impact Assessment
  - ☐ 2.3.2 Business Complexity Assessment
- ☐ 2.4 Submittal Information
- ☐ 2.5 Baseline Processes and Systems
  - ☐ 2.5.1 Description
  - ☐ 2.5.2 Business Process Workflow
  - ☐ 2.5.3 Current Architecture Information
  - ☐ 2.5.4 Current Architecture Diagram
  - ☐ 2.5.5 Security Categorization Impact Table
- ☐ 2.6 Mid-Level Solution Requirements
- ☐ 2.7 Assumptions and Constraints
- ☐ 2.8 Dependencies
- ☐ 2.9 Market Research
  - ☐ 2.9.1 Market Research Methodologies/Timeframes
  - ☐ 2.9.2 Results of Market Research
- ☐ 2.10 Alternative Solutions
  - ☐ 2.10.1 Solution Type
  - ☐ 2.10.2 Name
  - ☐ 2.10.3 Description
  - ☒ 2.10.4 Benefit Analysis
  - ☐ 2.10.5 Assumptions and Constraints
  - ☐ 2.10.6 Implementation Approach
  - ☐ 2.10.7 Architecture Information
- ☐ 2.11 Recommended Solution
  - ☐ 2.11.1 Rationale for Selection
  - ☐ 2.11.2 Technical/Initial CA-PMM Complexity Assessment
  - ☐ 2.11.3 Procurement and Staffing Strategy
  - ☐ 2.11.4 Enterprise Architecture Alignment
  - ☐ 2.11.5 Project Phases
  - ☐ 2.11.6 High Level Proposed Project Schedule
  - ☐ 2.11.7 Cost Summary
- ☐ 2.12 Staffing Plan
  - ☐ 2.12.1 Administrative
  - ☐ 2.12.2 Business Program
  - ☐ 2.12.3 Information Technology (IT)
  - ☐ 2.12.4 Testing
  - ☐ 2.12.5 Data Conversion/Migration
  - ☐ 2.12.6 Training and Organizational Change Management
  - ☐ 2.12.7 Resource Capacity/Skills/Knowledge for Stage 3 Solution Development
  - ☐ 2.12.8 Project Management
  - ☐ 2.12.9 Organization Charts
- ☐ 2.13 Data Conversion/Migration
- ☐ 2.14 Financial Analysis Worksheets

**Summary of Changes:**

Made the appropriate changes and updates to the Anticipated Time to "Achieve Objectives After Project Go-Live" table.

| **Project Approval Executive Transmittal:** | Attach Transmittal |
|---|---|

| Condition(s) from Previous Stage(s): | | | | | | |
|---|---|---|---|---|---|---|
| Condition # | Condition Category | Condition Sub-category | Condition | Assessment | Agency/State Entity Response | Status |
| Condition # | Select or type… | Select or type… | Click here to enter text. | Select or type... | Click here to enter text. | Select or type... |

## 2.5 Baseline Processes and Systems

### 2.5.1 Description

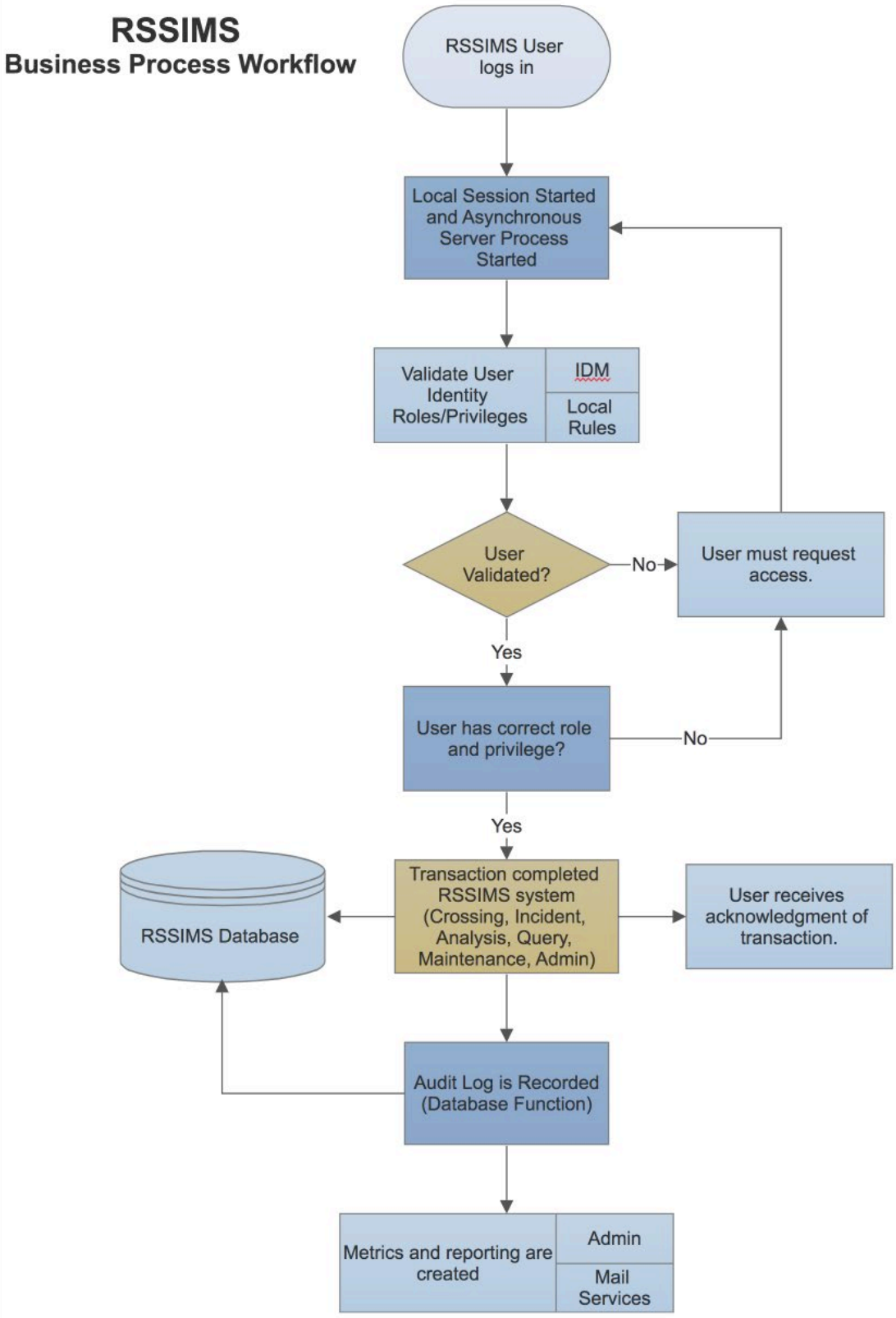
RSSIMS is used to centrally maintain CPUC's rail safety data and was successfully implemented in 2013. This database contains on the order of 10,000 highway rail crossing inventory records, each record containing about 100 core pieces of information and over 300 total data elements. Due to frequent changes in physical and operational characteristics of rail lines there is a large volume of data for each crossing that must be maintained. The initial rollout of the RSSIMS system did not include a feature to create and modify records using bulk record update processing.

Currently each record update must be individually processed in the RSSIMS database. For example, when additional trains or different railroads begin service over a particular rail line, which may include hundreds of crossings, each individual crossing record must be updated one at a time. The process of updating records individually is both labor intensive and error prone as described below.

There are 45 different types of data records stored in the RSSIMS system, all with state information related to rail safety. The largest data set in the system is the inventory of rail crossings, but the system also includes incidents, inspections, crossings, rail agencies and their contacts, among other information. There are currently approximately 125 CPUC staff that regularly use the RSSIMS system to maintain rail safety information.

### 2.5.2 Business Process Workflow

The diagram below shows one aspect of the RSSIMS high level workflow. We have since redesigned the RSSIMS business processes with new refined requirements and process flows. Please refer to the document “RSSIMS ABTR v1.1 Final” for full details.



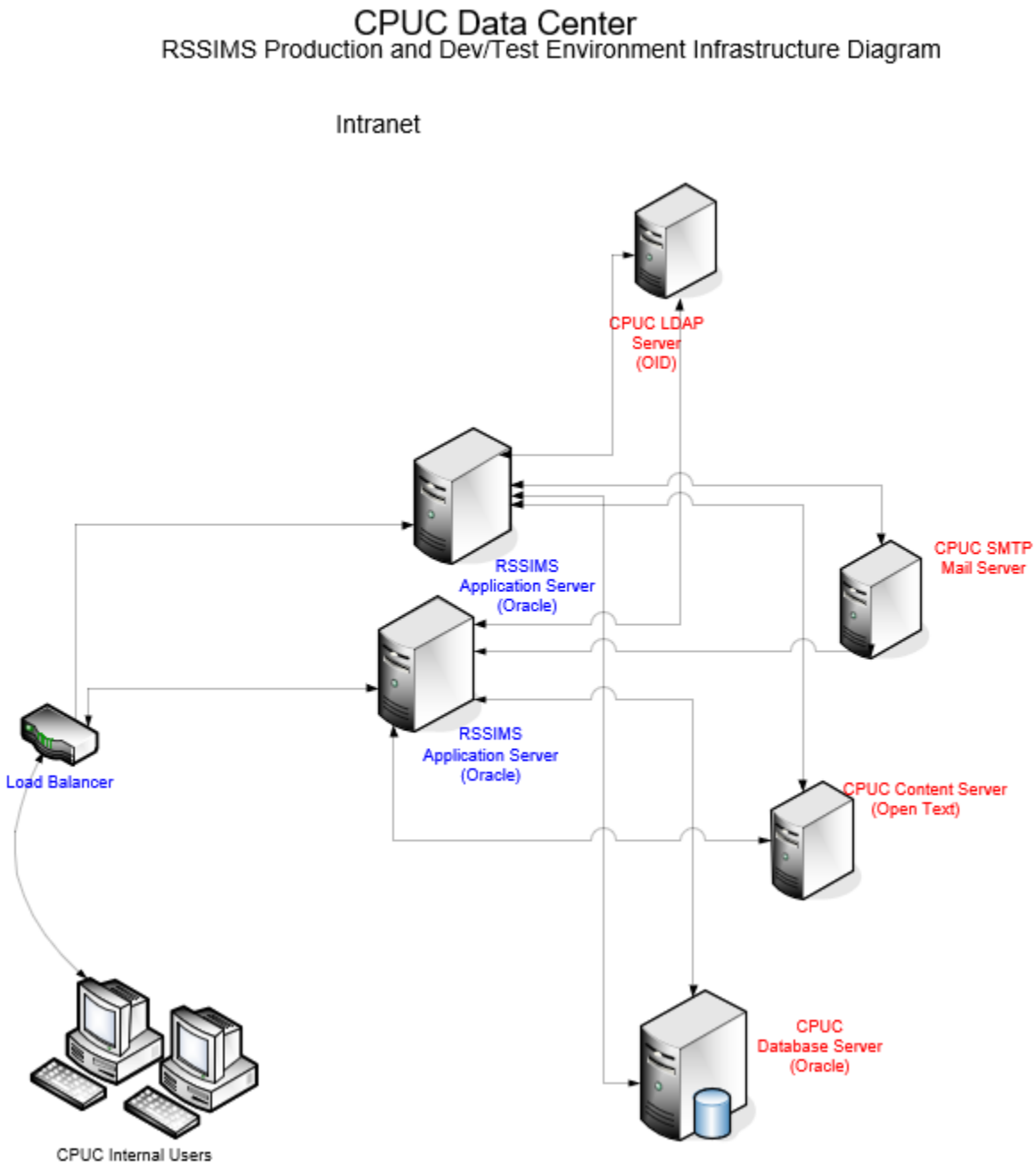

## 2.5.3 Current Architecture Information

| | |
|---|---|
| | RSSIMS is used to centrally maintain CPUC's rail safety data |
| Application, System or Component | Rail Safety and Security Information Management Systems (RSSIMS) |

| | | |
|---|---|---|
| COTS, MOTS or Custom Name/Primary Technology: | | Custom Application<br>Click here to enter text. |
| Runtime Environment | Cloud Computing Used? | ☐ Yes ☒ No \| If "Yes," specify: Choose an item. |
| | Server/Device Function | On-Premises Virtual Servers |
| | Hardware | Cisco UCS |
| | Operating System | Oracle Enterprise Linux |
| | System Software | Java |
| System Interfaces | | vSphere Web Client |
| Data Center Location | | Agency/State Data Center Operated by Agency/state entity |
| Security | Access (check all that apply) | ☐ Public ☒ Internal State Staff ☒ External State Staff<br>☐ Other, specify: Click here to enter text. |
| | Type of Information (check all that apply) | ☐ Personal ☐ Health ☐ Tax ☐ Financial ☐ Legal<br>☐ Confidential ☒ Other, specify: Rail Safety Data |
| | Protective Measures (check all that apply) | ☒ Technical Security ☒ Identity Authorization and Authentication<br>☒ Physical Security ☒Backup and Recovery<br>☐ Other, specify: Click here to enter text. |
| Data Management | Data Owner | Name: Internal CPUC Staff – Rail Safety Division<br>Title: SME Group "RSSIMS Help"<br>Business Program: Rail Safety Division |
| | Data Custodian | Name: Fredrick Gomez – CPUC IT Division<br>Title: Chief Information Officer<br>Business Program: Rail Safety Division |

## 2.5.4 Current Architecture Diagram

The diagram below shows the integration of our current system. We have since redesigned the RSSIMS processes with new refined requirements and process flows. Please refer to the document "RSSIMS ABTR v1.1 Final" for full details.




## 2.5.5 Security Categorization Impact Table

RSSIMS_Data_Classification_Worksheet_

**SECURITY CATEGORIZATION IMPACT TABLE SUMMARY**

| SECURITY OBJECTIVE | LOW | MODERATE | HIGH |
|---|---|---|---|
| Confidentiality | ☐ | ☐ | ☒ |
| Integrity | ☐ | ☐ | ☒ |
| Availability | ☐ | ☐ | ☒ |

## 2.6 Mid-Level Solution Requirements

RSSIMS RTM v5.1 Final.xlsx

## 2.7 Assumptions and Constraints

| Assumptions/Constraints | Description/Potential Impact |
|---|---|
| **Assumption:** The CPUC Project Manager and technical support staff shall have experience developing and deploying a modern web-based distributed application. | Without a technically experienced leadership and support staff there is significant risk to project success, schedule, and cost which could lead to a similar outcome as the original RSSIMS procurement. |
| **Constraint:** The vendor staff shall include recently experienced web application developers in modern frameworks and a senior relational database developer. | Web development standards change rapidly. Best practices 5 years ago are antiquated and pose risk to sustainability. Without experienced current developers that understand the correct frameworks to utilize and how to use them in order to build maintainable software there is great risk to application sustainability. Without a database developer (not the same as an administrator) that understands the critical role a database performs in managing data the software is at great risk of performance degredation and stability. |
| **Constraint:** The vendor staff shall include a technical team lead experienced with agile project management in a modern web development application. | The vendor technical team lead will act as the counterpart to the CPUC Project Manager. The team lead must act as scrum master assigning all tasks and ensuring project success. Without experience in both agile project management and the technology utilized in the application there is significant risk to project success. |
| **Assumption:** The CPUC shall have a comprehensive Identity Management service and interface, File Management service and interface, and Security framework in place with documented instructions to integrate applications such as RSSIMS before the project begins. | Identity Management, File Management, and Security are extremely broad and complex processes that need to be established and managed at higher levels in the organization than individual applications. Without established interfaces for these services and clear direction on how to utilize them, RSSIMS, which has complete dependence on them to function, would fail. |

## 2.8 Dependencies

| Element | Description |
|---|---|
| RSSIMS project is not reliant on any factors outside the control of the project team. | None |

## 2.9 Market Research

### 2.9.1 Market Research Methodologies/Timeframes

**Methodologies Used To Perform Market Research** (check all that apply):

- ☒ Request for Information (RFI)
- ☒ Internet Research
- ☐ Vendor Forums/Presentation
- ☐ Collaboration with other Agencies/state entities or governmental entities
- ☐ Trade shows
- ☒ Published Literature
- ☐ Leveraged Agreements
- ☒ Other, specify: SPJ Solutions staff combined years of experience in the IT field enables them to provide current market research on the solution type, cost and schedule.

| | |
|---|---|
| **Time spent conducting market research:** | Over 1 Year |
| **Date market research was started:** | 5/16/2016 |
| **Date all market research was completed:** | 8/15/2017 |

### 2.9.2 Results of Market Research

An external vendor (SPJ) was hired to conduct the market research. SPJ Solutions conducted an analysis of our current system, interviewed CPUC's IT staff and RSD Users/SMEs, and determined that Solution 1 (e.g The recommended solution) from the Alternate Solutions Report is the best option for us. SPJ determined that it was best to rebuild the custom application with Oracle as CPUC staff was best suited and knowledgeable for. There were no off-the-shelf applications that would accommodate the requirements that were gathered. The application would be hosted in Gold Camp and use a cloud based service for storing data to provide a low to no maintenance requirement and have the ability to expand for more capacity in the future if needed. Based on this determination, we solicited an RFI which returned five responses from vendors. Of these five responses, two were omitted due to one being way over our budget range and the other being incomplete with mix-matching numbers. We averaged the remaining three responses to determine the solution cost. Because some time has passed since the RFI was conducted, we have been monitoring other agencies in other states on their applications and have determined that the solution we selected is still comparable. We have also reached out to the vendors who replied to our RFI to provide us with updated pricing. Based on our re-inquire of prices, some responses had an increase of 2.5% per year which were used to update the cost on the FAW.

## 2.10 Alternative Solutions

### 2.10.1 Solution Type #1

☒ Recommended ☐ Alternative

### 2.10.2 Name

**Solution 1 – Redesign RSSIMS Architecture**

### 2.10.3 Description

*Overview*

Solution 1 – This solution is to totally rebuild the application with new architecture, code and platform. It will reproduce the existing functions of the current database, with modification to reflect RSD current business processes. It includes several enhancements for bulk processes functionality, improved usability and performance. The existing database wil not be used, rebuilt, or modified in any way. It will serve only as a reference of existing functionality to reproduce during the total rebuild.

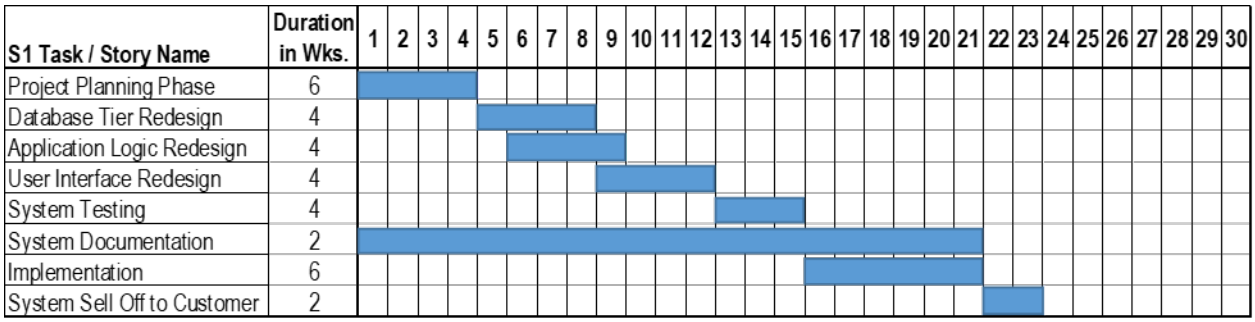
Major components include:

- Redesign of the Architecture
- Addition of Bulk Record Update Function via Spreadsheet
- Addition of Bulk File Upload Function via Screens
- Additiona of Bulk Record Creation Function via Spreadsheet
- Additiona of Bulk Formula Runs Function via Screens
- Replication of existing functionality.

In order to implement these items, the new system will require:

- Use of Modular 3-Tier Architecture
- New User Interface for Bulk Record Creation and Updates via Spreadsheet
- New User Interface to support Bulk File Upload
- New  User Interface to support Bulk Formula Runs
- Replication of existing user interfaces
- Migration of Legacy Data
- Use of a Role Based User Administration

A typical schedule for this project:



| S1 Task / Story Name | Duration in Wks. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Project Planning Phase | 6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Database Tier Redesign | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Application Logic Redesign | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| User Interface Redesign | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| System Testing | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| System Documentation | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Implementation | 6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| System Sell Off to Customer | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

For more detail, please refer to the “RSSIMS Solution Report Final”. Please note the costs included in this report were from SPJ’s assessment and are not related to the additional market research conducted for actual costs used in the S2AA.

**Approach** (Check all that apply)**:**

- ☐ Increase staff – new or existing capabilities
- ☒ Modify the existing business process or create a new business process
- ☐ Reduce the services or level of services provided
- ☒ Utilize new or increased contracted services
- ☐ Enhance the existing IT system
- ☒ Create a new IT system
- ☒ Perform a business-based procurement to have vendors propose a solution
- ☐ Other, specify: Click here to enter text.

**2.10.4 Benefit Analysis**

**Benefits/Advantages**

Recommended Solution 1 - Complete Redesign

- Provides a solution to all 4 CPUC major issues identified in the RSSIMS Bulk Update SOW
- Will Use Industry Standard Design Architecture
- Increased Performance
- No Hardware upgrade
- Allows for future growth

**Disadvantages**

Recommended Solution 1 - Complete Redesign

- Implementation costs are high
- If iterative test-driven design approach is not adhered to schedule slip and additional complexity will drive costs higher

| Anticipated Time to Achieve Objectives After Project Go-Live | | | | | |
|---|---|---|---|---|---|
| **Objective Number** | **Objective Timeframe** | | | | |
| | **Within 1 Year** | **2 Years** | **3 Years** | **4 Years** | **Over 4 Years** |
| Objective 1.1 | ☒ | ☐ | ☐ | ☐ | ☐ |
| Objective 2.1 | ☒ | ☐ | ☐ | ☐ | ☐ |
| Objective 3.1 | ☒ | ☐ | ☐ | ☐ | ☐ |
| Objective 4.1 | ☒ | ☐ | ☐ | ☐ | ☐ |

| Anticipated Time to Achieve Financial Benefits After Project Go-Live | | | | | |
|---|---|---|---|---|---|
| **Financial Benefit** | **Within 1 Year** | **2 Years** | **3 Years** | **4 Years** | **Over 4 Years** |
| **Increased Revenues** | ☐ | ☐ | ☐ | ☐ | ☐ |
| **Cost Savings** | ☒ | ☐ | ☐ | ☐ | ☐ |
| **Cost Avoidance** | ☒ | ☐ | ☐ | ☐ | ☐ |
| **Cost Recovery** | ☐ | ☐ | ☒ | ☐ | ☐ |

## 2.10.5 Assumptions and Constraints

No additional assumptions or constraints besides what is already listed.

## 2.10.6 Implementation Approach

**Identify the type of existing IT system enhancement or new system proposed** (check all that apply)**:**

- ☐ Enhance the current system
- ☒ Develop a new custom solution
- ☐ Purchase a Commercial off-the-Shelf (COTS) system
- ☐ Purchase or obtain a system from another government agency (Transfer)
- ☐ Subscribe to a Software as a Service (SaaS) system
- ☐ Other, specify: Click here to enter text.

**Identify cloud services to be leveraged** (check all that apply)**:**

- ☒ Software as a Service (SaaS) provided by OTech
- ☒ Software as a Service (SaaS) provided by commercial vendor
- ☐ Platform as a Service (PaaS) provided by OTech
- ☐ Platform as a Service (PaaS) provided by commercial vendor
- ☒ Infrastructure as a Service (IaaS) provided by OTech

☒ Infrastructure as a Service (IaaS) provided by commercial vendor

☐ No cloud services will be leveraged by this alternative. Provide a description of why cloud services are not being leveraged:
*The solution will have the platform hosted at Gold Camp and databased hosted by AWS Gov Cloud.*

**Identify who will modify the existing system or create the new system** (check all that apply)**:**

☐ Agency/state entity IT staff

☒ A vendor will be contracted

☐ Inter-agency agreement will be established with another governmental agency. Specify Agency name(s):
Click here to enter text.

☐ Other, specify: Click here to enter text.

**Identify the implementation strategy:**

☒ All requirements will be addressed in this proposed project in a single implementation.

☐ Requirements will be addressed in incremental implementations in this proposed project.

☐ Some requirements will be addressed in this proposed project. The remaining requirements will be addressed at a later date.
Specify the year when the remaining requirements will be addressed: Click here to enter text.

**Identify if the technology for the proposed project will be mission critical and public facing:**

☐ The technology implemented for this proposed project will be considered mission critical and public facing.

## 2.10.7 Architecture Information

| | | |
|---|---|---|
| Business Function/Process(es) | | R SSIMS is used to centrally maintain CPUC's rail safety data |
| Application, System or Component | | Rail Safety and Security Information Management Systems (RSSIMS) |
| COTS, MOTS or Custom | | Custom Application |
| Name/Primary Technology: | | Click here to enter text. |
| Runtime Environment | Cloud Computing Used? | ☐ Yes ☒ No If "Yes," specify: Choose an item. |
| | Server/Device Function | On-Premises Virtual Servers |
| | Hardware | Cisco UCS |
| | Operating System | Oracle Enterprise Linus |
| | System Software | Java |
| System Interfaces | | vSphere Web Client |
| Data Center Location | | Agency/State Data Center Operated by Agency/state entity |
| Security | Access (check all that apply) | ☐ Public ☒ Internal State Staff ☐ External State Staff ☐ Other, specify: Click here to enter text. |
| | Type of Information (check all that apply) | ☒ Personal ☐ Health ☐ Tax ☐ Financial ☐ Legal ☐ Confidential ☐ Other, specify: Click here to enter text. |
| | Protective Measures (check all that apply) | ☒ Technical Security ☒ Identity Authorization and Authentication ☐ Physical Security ☒Backup and Recovery ☐ Other, specify: Click here to enter text. |
| Data Management | Data Owner | Name: Internal CPUC Staff - Rail Safety Division |
| | | Title: SME Group "RSSIMS Help" |
| | | Business Program: Rail Safety Division |
| | Data Custodian | Name: Fredrick Gomez – IT Division |
| | | Title: Chief Information Officer |
| | | Business Program: IT Division |
| | | |

## 2.10.1 Solution Type #2

☐ Recommended ☒ Alternative

**2.10.2 Name**

Process Spreadsheets for Bulk Operations

**2.10.3 Description**

*Overview*

Solution 2 – The difference between Solution 1 and Solution 2 is that Solution 2 creates a mirror database in order to add bulk functionality, and works with the existing RSSIMS database to add the data. Users would use the existing RSSIMS database for existing tasks, and the new database for bulk processing needs. This solution was proposed in this manner as it was determined that the existing database could not directly be modified to add bulk process functionality under its current database architecture and coding. This would not solve the existing database performance and degradation issues, but would allow for the addition of the needed bulk process functionality.

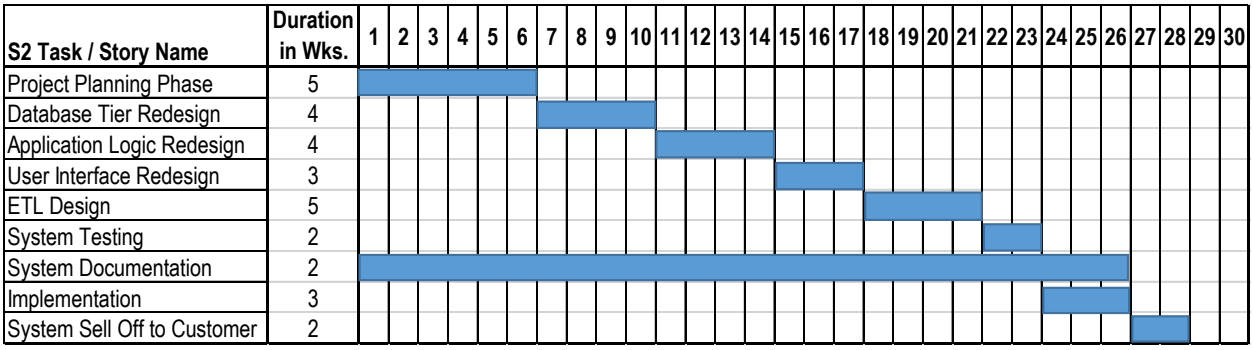
Major components include:

- Software for parsing csv/xls files

In order to implement these items, the new system will require:

- RSSIMS Architecture Integration and Addition
- User Interface for Bulk Operations via Spreadsheet

A typical schedule for this project:



| S2 Task / Story Name | Duration in Wks. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Project Planning Phase | 5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Database Tier Redesign | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Application Logic Redesign | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| User Interface Redesign | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ETL Design | 5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| System Testing | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| System Documentation | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Implementation | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| System Sell Off to Customer | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

**Approach** (Check all that apply)**:**

- ☐ Increase staff – new or existing capabilities
- ☒ Modify the existing business process or create a new business process
- ☐ Reduce the services or level of services provided
- ☐ Utilize new or increased contracted services
- ☒ Enhance the existing IT system
- ☒ Create a new IT system
- ☐ Perform a business-based procurement to have vendors propose a solution
- ☐ Other, specify: Click here to enter text.

**2.10.4 Benefit Analysis**

**Benefits/Advantages**

**Solution 2 - Bulk upload Sheet**

- ➢ Provides a solution to all 4 CPUC major issues identified in the RSSIMS Bulk Update SOW.
- ➢ Lower cost than Solution 1.

- Retains look and feel of original RSSIMS application including reporting capability.

**Disadvantages**

**Solution 2 Bulk Upload Sheet**

- Requires a duplicated data to be maintained between two systems.
- Expensive operating costs (Same as Solution 3 for legacy RSSIMS).
- Legacy RSSIMS performance will still degrade over time.

| Anticipated Time to Achieve Objectives After Project Go-Live | | | | | |
|---|---|---|---|---|---|
| **Objective Number** | **Objective Timeframe** | | | | |
| | **Within 1 Year** | **2 Years** | **3 Years** | **4 Years** | **Over 4 Years** |
| Objective 1.1 | ☐ | ☒ | ☐ | ☐ | ☐ |
| Objective 2.1 | ☒ | ☐ | ☐ | ☐ | ☐ |
| Objective 3.1 | ☒ | ☐ | ☐ | ☐ | ☐ |
| Objective 4.1 | ☒ | ☐ | ☐ | ☐ | ☐ |

| Anticipated Time to Achieve Financial Benefits After Project Go-Live | | | | | |
|---|---|---|---|---|---|
| **Financial Benefit** | **Within 1 Year** | **2 Years** | **3 Years** | **4 Years** | **Over 4 Years** |
| **Increased Revenues** | ☐ | ☐ | ☐ | ☐ | ☐ |
| **Cost Savings** | ☐ | ☒ | ☐ | ☐ | ☐ |
| **Cost Avoidance** | ☐ | ☐ | ☐ | ☐ | ☐ |
| **Cost Recovery** | ☐ | ☐ | ☐ | ☒ | ☐ |

### 2.10.5 Assumptions and Constraints

No additional assumptions or constraints besides what is already listed.

### 2.10.6 Implementation Approach

**Identify the type of existing IT system enhancement or new system proposed** (check all that apply)**:**

- ☐ Enhance the current system
- ☒ Develop a new custom solution
- ☐ Purchase a Commercial off-the-Shelf (COTS) system
- ☐ Purchase or obtain a system from another government agency (Transfer)
- ☐ Subscribe to a Software as a Service (SaaS) system
- ☐ Other, specify: Click here to enter text.

**Identify cloud services to be leveraged** (check all that apply)**:**

- ☒ Software as a Service (SaaS) provided by OTech
- ☒ Software as a Service (SaaS) provided by commercial vendor
- ☐ Platform as a Service (PaaS) provided by OTech
- ☐ Platform as a Service (PaaS) provided by commercial vendor
- ☒ Infrastructure as a Service (IaaS) provided by OTech
- ☒ Infrastructure as a Service (IaaS) provided by commercial vendor
- ☐ No cloud services will be leveraged by this alternative. Provide a description of why cloud services are not being leveraged:

**Identify who will modify the existing system or create the new system** (check all that apply)**:**

- ☐ Agency/state entity IT staff

☒ A vendor will be contracted

☐ Inter-agency agreement will be established with another governmental agency. Specify Agency name(s):
Click here to enter text.

☐ Other, specify: Click here to enter text.

**Identify the implementation strategy:**

☒ All requirements will be addressed in this proposed project in a single implementation.

☐ Requirements will be addressed in incremental implementations in this proposed project.

☐ Some requirements will be addressed in this proposed project. The remaining requirements will be addressed at a later date.
Specify the year when the remaining requirements will be addressed: Click here to enter text.

**Identify if the technology for the proposed project will be mission critical and public facing:**

☐ The technology implemented for this proposed project will be considered mission critical and public facing.

## 2.10.7 Architecture Information

| | | |
|---|---|---|
| Business Function/Process(es) | | RSSIMS is used to centrally maintain CPUC's rail safety data, Add Bulk Date functionality. |
| Application, System or Component | | RSSIMS and a New Bulk Data Parser Application |
| COTS, MOTS or Custom Name/Primary Technology: | | Custom Application |
| Runtime Environment | Cloud Computing Used? | ☒ Yes ☐ No — If "Yes," specify: Infrastructure as a Service (IaaS) |
| | Server/Device Function | Application Server, Web Server, Database Platform |
| | Hardware | AWS Infrastructure and scalable on demand Virtual Servers |
| | Operating System | Linux variation/ AMI (Amazon Machine Image) Linux |
| | System Software | |
| System Interfaces | | |
| Data Center Location | | State Data Center Operated by Department of Technology |
| Security | Access (check all that apply) | ☐ Public ☒ Internal State Staff ☐ External State Staff ☐ Other, specify: |
| | Type of Information (check all that apply) | ☐ Personal ☐ Health ☐ Tax ☐ Financial ☐ Legal ☐ Confidential ☒ Other, specify: Rail Safety Data |
| | Protective Measures (check all that apply) | ☒ Technical Security ☒ Identity Authorization and Authentication ☐ Physical Security ☒ Backup and Recovery ☐ Other, specify: |
| Data Management | Data Owner | Name: Internal CPUC Staff – Rail Safety Division<br>Title: SME Group "RSSIMS Help"<br>Business Program: Rail Safety Division |
| | Data Custodian | Name: Fredrick Gomez – IT Division<br>Title: Chief Information Officer<br>Business Program: IT Division |

## 2.10.1 Solution Type #3

☐ Recommended ☒ Alternative

## 2.10.2 Name

Solution #3 - Do Not Modify RSSIMS

## 2.10.3 Description

*Overview*

Solution 3 – This solution explored the "no build" solution. In this solution we Do Not Modify RSSIMS and do not add bulk update functionality. It generally describes the cost of keeping the existing system running and the expected lifespan of the current system.

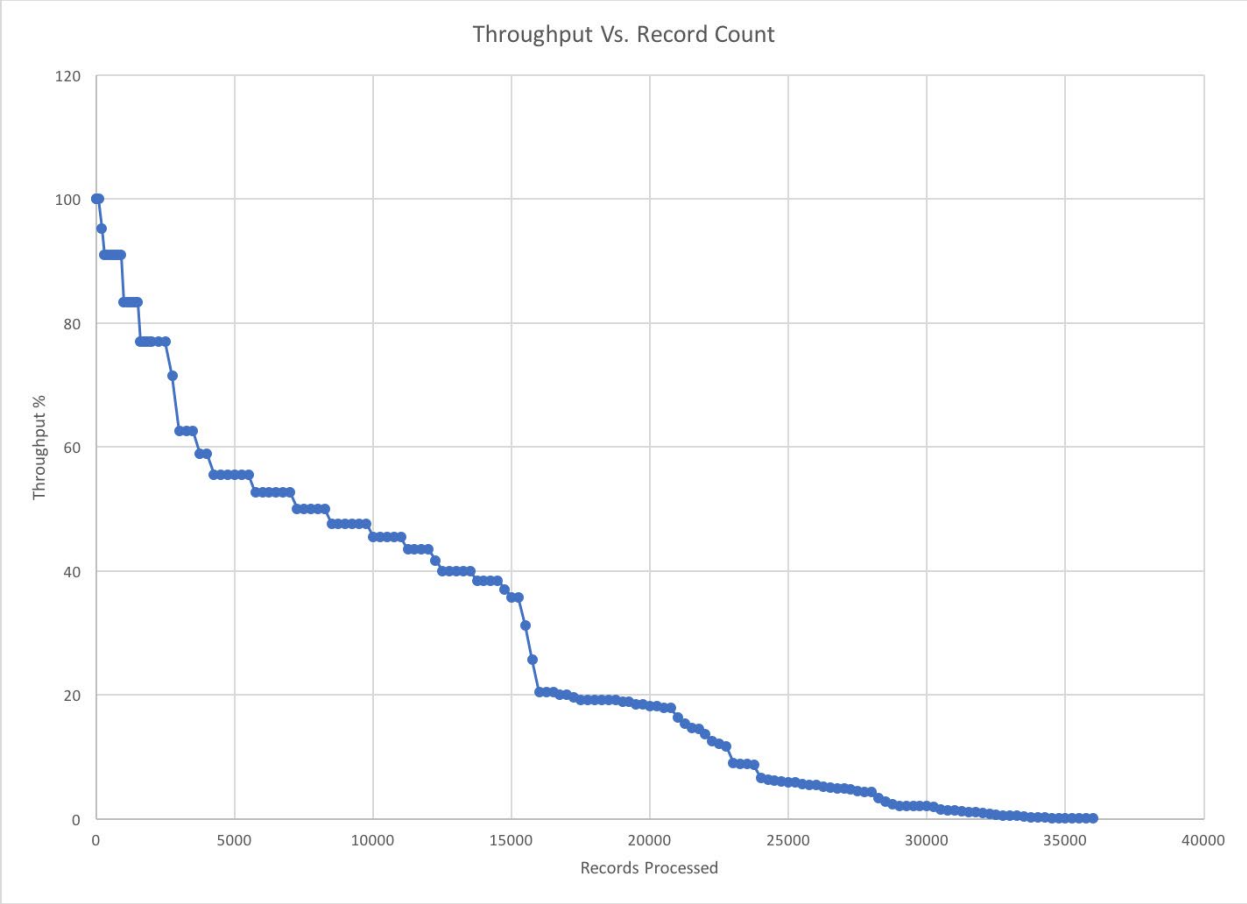
There are limited infrastructure support processes that can be implemented that will assist in RSSIMS continued operation.

1. Application bugs fixes may be applied which directly impact performance of weblogic servers.
2. User load should not be increased.
3. Only low performance tasks should be performed during peak operating times.
4. Latancy on application tasks will not be improved however close monitoring of weblogic managed services and memory utilization should help to even out planned large tasks.
5. More memory will need to be reserved for RSSIMS managed services over time to accommodate increased hash-table size.

RSSIMS application queries and writes to the Oracle Database, however it manages all associations (relationships) with hash tables. As a result over time with more records, the hash tables grow in size significantly. The hash tables utilize reserved RAM on the application managed server. With increased use of RSSIMS the less available RAM. Once all available RAM is used, the application pauses until more memory is cleared up from other processes. Regardless of what tuning is performed on the application server or the database software, RSSIMS will eventually require more memory to continue to grow. As the associations grow exponentially with each new record, the problem will accelerate as time progresses.

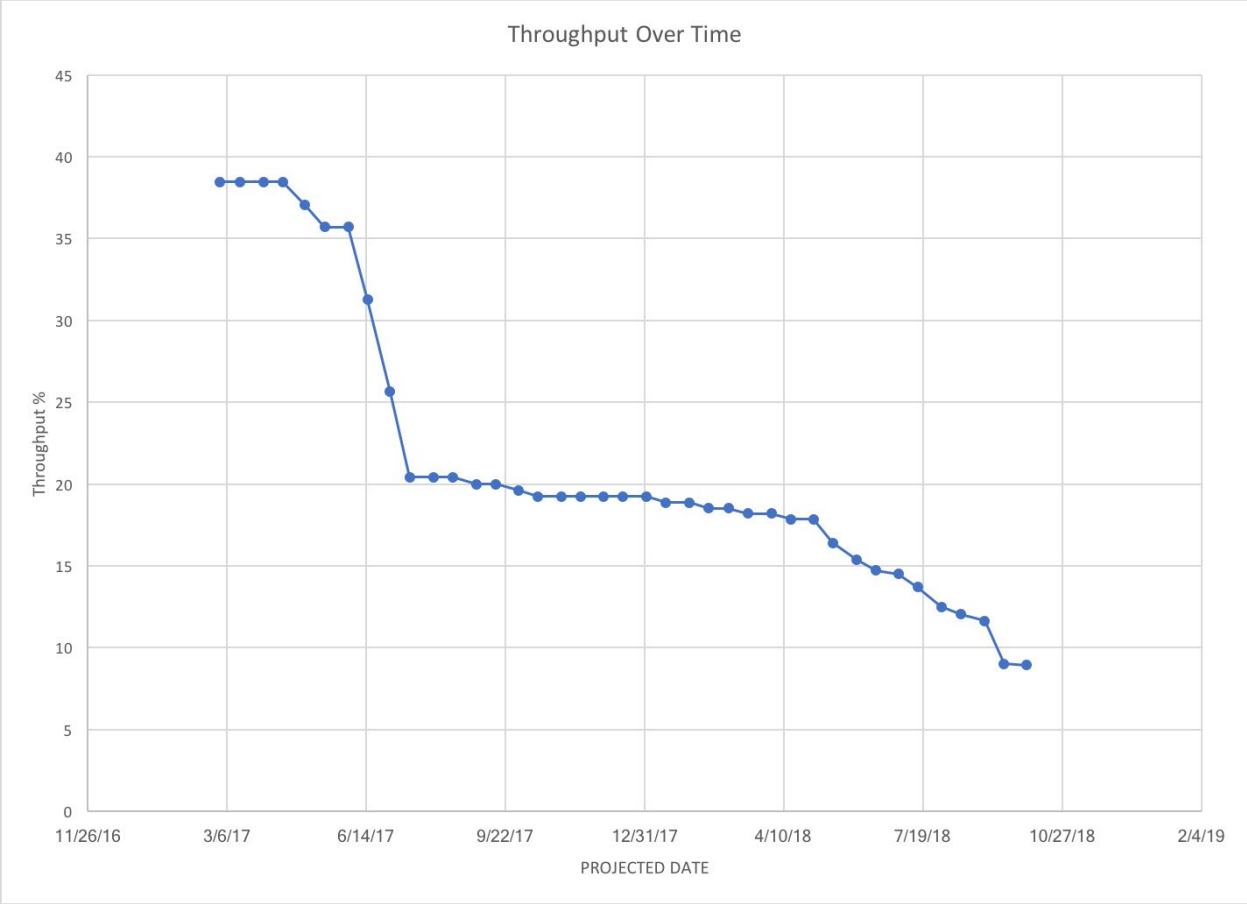
A throughput analysis was performed during the assessment phase of the project using JMeter against the RSSIMS Test environment. The test environment very closely resembles production and can be utilized as an accurate model for what will happen to the production system. It found that as the number of records increase the performance decreases until the database will reach a point where it will no longer be able to respond to most inquiries by the users. The chart below represents that decline based on the test results.

Figure 3: Throughput Vs. Record Count




Given this, the question came up as to how long did CPUC have until this was reached. The timeline graph below estimates when the throughput would be reduced to below 10%. A throughput of 10% means that 90% of all requests will be blocked until memory is available. Since RSSIMS loads all associations in memory to manage any data the system would likely not allow even a single user request at the 10% throughput range.

Figure 4: Throughput Over Time




In order to prolong the useful life of RSSIMS the following measures are recommended.

1. Migrate RSSIMS Physical Servers to Virtual Machine.
2. Upgrade to Weglogic 12C.
3. Perform load testing on the application server to determine the optimum amount of memory and number of sessions that are permitted.
4. Develop data cleansing scripts to routinely reindex data and delete duplicates.
5. Set up Oracle Enterprise Manager Monitoring Tools and create alerts for when sessions or memory limits are at 90%.

This solution accounts for minimal maintenance with minor bugs. Major bug fixes and feature enhancements are excluded.

Subsequent to the original evaluation of Solution 3 by SPJ, CPUC has implemented several recommendations which has extended the lifespan of the system. However, performance continues to degrade and no further tuning operations are available to address this.

**Approach** (Check all that apply)**:**

- ☐ Increase staff – new or existing capabilities
- ☐ Modify the existing business process or create a new business process
- ☐ Reduce the services or level of services provided
- ☐ Utilize new or increased contracted services
- ☒ Enhance the existing IT system

- ☐ Create a new IT system
- ☐ Perform a business-based procurement to have vendors propose a solution
- ☐ Other, specify: Click here to enter text.

### 2.10.4 Benefit Analysis

**Benefits/Advantages**

**Solution 3 - No Change Maintain only**

- Retains look and feel of original RSSIMS application including reporting capability.
- Lowest cost.

**Disadvantages**

**Solution 3 - No Change Maintain only**

- Does not provide a solution to all four CPUC major issues identified in the RSSIMS Bulk Update SOW.
- Expensive operating costs which will increase.
- RSSIMS performance will still degrade over time.

| Anticipated Time to Achieve Objectives After Project Go-Live | | | | | |
|---|---|---|---|---|---|
| **Objective Number** | **Objective Timeframe** | | | | |
| | **Within 1 Year** | **2 Years** | **3 Years** | **4 Years** | **Over 4 Years** |
| Objective 1.1 | ☐ | ☐ | ☐ | ☐ | ☒ |
| Objective 2.1 | ☐ | ☐ | ☐ | ☐ | ☒ |
| Objective 3.1 | ☐ | ☐ | ☐ | ☐ | ☒ |
| Objective 4.1 | ☐ | ☐ | ☐ | ☐ | ☒ |

| Anticipated Time to Achieve Financial Benefits After Project Go-Live | | | | | |
|---|---|---|---|---|---|
| **Financial Benefit** | **Within 1 Year** | **2 Years** | **3 Years** | **4 Years** | **Over 4 Years** |
| **Increased Revenues** | ☐ | ☐ | ☐ | ☐ | ☐ |
| **Cost Savings** | ☐ | ☐ | ☐ | ☐ | ☐ |
| **Cost Avoidance** | ☐ | ☐ | ☐ | ☐ | ☒ |
| **Cost Recovery** | ☐ | ☐ | ☐ | ☐ | ☐ |

### 2.10.5 Assumptions and Constraints

Assumes existing database can be supported with minor maintenance to continue operating without degrading beyond the ability to reasonably function.

### 2.10.6 Implementation Approach

**Identify the type of existing IT system enhancement or new system proposed** (check all that apply)**:**

- ☐ Enhance the current system
- ☐ Develop a new custom solution
- ☐ Purchase a Commercial off-the-Shelf (COTS) system
- ☐ Purchase or obtain a system from another government agency (Transfer)
- ☐ Subscribe to a Software as a Service (SaaS) system
- ☒ Other, specify: Minor maintenance on existing system

**Identify cloud services to be leveraged** (check all that apply)**:**

- ☐ Software as a Service (SaaS) provided by OTech
- ☐ Software as a Service (SaaS) provided by commercial vendor

☐ Platform as a Service (PaaS) provided by OTech
☐ Platform as a Service (PaaS) provided by commercial vendor
☐ Infrastructure as a Service (IaaS) provided by OTech
☐ Infrastructure as a Service (IaaS) provided by commercial vendor
☒ No cloud services will be leveraged by this alternative. Provide a description of why cloud services are not being leveraged:
*The existing system is not utilizing cloud services*.

**Identify who will modify the existing system or create the new system** (check all that apply)**:**

☒ Agency/state entity IT staff
☒ A vendor will be contracted
☐ Inter-agency agreement will be established with another governmental agency. Specify Agency name(s):
Click here to enter text.
☐ Other, specify: Click here to enter text.

**Identify the implementation strategy:**

☐ All requirements will be addressed in this proposed project in a single implementation.
☐ Requirements will be addressed in incremental implementations in this proposed project.
☒ Some requirements will be addressed in this proposed project. The remaining requirements will be addressed at a later date.
Specify the year when the remaining requirements will be addressed: Never

**Identify if the technology for the proposed project will be mission critical and public facing:**

☐ The technology implemented for this proposed project will be considered mission critical and public facing.

## 2.10.7 Architecture Information

| | | |
|---|---|---|
| Business Function/Process(es) | | RSSIMS is used to centrally maintain CPUC's rail safety data |
| Application, System or Component | | Rail Safety and Security Information Management System (RSSIMS) |
| COTS, MOTS or Custom Name/Primary Technology: | | Custom Application |
| Runtime Environment | Cloud Computing Used? | ☐ Yes ☒ No — If "Yes," specify: |
| | Server/Device Function | On-Premises Virtual Servers |
| | Hardware | Cisco UCS |
| | Operating System | Oracle Enterprise Linux |
| | System Software | Java |
| System Interfaces | | vSphere Web Client |
| Data Center Location | | Agency/State Data Center Operated by Agency/state entity |
| Security | Access (check all that apply) | ☐ Public ☒ Internal State Staff ☐ External State Staff ☐ Other, specify: |
| | Type of Information (check all that apply) | ☐ Personal ☐ Health ☐ Tax ☐ Financial ☐ Legal ☒ Confidential ☒ Other, specify: Rail Safety data |
| | Protective Measures (check all that apply) | ☒ Technical Security ☒ Identity Authorization and Authentication ☒ Physical Security ☒Backup and Recovery ☐ Other, specify: |
| Data Management | Data Owner | Name: CPUC – Rail Safety Division |
| | | Title: |
| | | Business Program: Rail Safety Division |
| | Data Custodian | Name: CPUC – IT Division |
| | | Title: |
| | | Business Program: IT Division |

## 2.11 Recommended Solution

### 2.11.1 Rationale for Selection

SPJ Solutions recommends pursuing Solution 1 as it will directly address all required improvements without duplicating data. **The requirements must be carefully defined and there must be an emphasis on design over rapid coding in order to complete the redesign.**

Rating for this solution is 9 out of 10 with 10 being the highest recommened solution and 1 being the lowest.

*Pros and Cons*

Pros

1. Modular architecture able to meet all users requirements for bulk operations.
2. Users, roles and responsibilities are flexible and do not disappear when an employee is reassigned or retires.
3. Flexible design allows for adding new roles, record types, and complex relationships without requiring additional infrastructure resources other than additional storage.
4. Low maintenance requirement.
5. Upgradeable.

Cons

1. Most expensive solution presented.
2. Can have poor performance if all design considerations are not carefully understood or the design phase is rushed.
3. Requires specialized skillsets for implementors that are generally harder to find and higher cost such as a Database developer.

**Also see RSSIMS Assesment Solutions Report Below.**

RSSIMS Solutions Report Final.docx

### 2.11.2 Technical/Initial CA-PMM Complexity Assessment

| Complexity | | Complexity Zone | |
|---|---|---|---|
| Technical Complexity Score: | 2.6 | ☐ Zone I | Low Criticality/Risk |
| | | ☒ Zone II/III | Medium Criticality/Risk |
| | | ☐ Zone IV | High Criticality/Risk |

### 2.11.3 Procurement and Staffing Strategy

**Activity**

Business Analysis

| Responsible (check all that apply) | When Needed (check all that apply) | Cost Estimate Verification (check all that apply) | Complete Only if Contractor Responsible for Activity | |
|---|---|---|---|---|
| | | | Procurement Vehicle | Contract Type |

| | | | | |
|---|---|---|---|---|
| ☒ Agency/State Entity Staff<br>☐ STPD Staff<br>☐ ITPOD Staff<br>☐ CA-PMO Staff<br>☐ DGS Staff<br>☒ Contractor<br>☐ Other, specify: enter text | ☒ Stage 3 Solution Development<br>☐ Stage 4 Project Readiness and Approval<br>☒ After project is approved (after Stage 4 Project Readiness and Approval) | ☒ Market research conducted (MR)<br>☐ Cost estimate provided (CE)<br>☐ Department of Technology CE<br>☐ DGS CE<br>☒ Request For Information conducted (RFI)<br>☒ Comparable vendor services have been used on previous contracts (CV)<br>☐ Leveraged Procurement Agreement (LPA) | Request for Offer/California Multiple Award Schedules (RFO/CMAS)<br><br>If "Other," specify:<br>Click here to enter text. | Other<br><br>If "Other," specify:<br>Deliverable Expectation Document (DED) |

Independent Verification and Validation (IV&V)

| Responsible (check all that apply) | When Needed (check all that apply) | Cost Estimate Verification (check all that apply) | Complete Only if Contractor Responsible for Activity | |
|---|---|---|---|---|
| | | | Procurement Vehicle | Contract Type |
| ☐ Agency/State Entity Staff<br>☐ STPD Staff<br>☐ ITPOD Staff<br>☐ CA-PMO Staff<br>☐ DGS Staff<br>☒ Contractor<br>☐ Other, specify: enter text | ☒ Stage 3 Solution Development<br>☒ Stage 4 Project Readiness and Approval<br>☒ After project is approved (after Stage 4 Project Readiness and Approval) | ☐ Market research conducted (MR)<br>☐ Cost estimate provided (CE)<br>☐ Department of Technology CE<br>☐ DGS CE<br>☐ Request For Information conducted (RFI)<br>☒ Comparable vendor services have been used on previous contracts (CV)<br>☐ Leveraged Procurement Agreement (LPA) | Request for Offer/California Multiple Award Schedules (RFO/CMAS)<br><br>If "Other," specify:<br>Click here to enter text. | Other<br><br>If "Other," specify:<br>Deliverable Expectation Document (DED) |

Conduct Procurement

| Responsible (check all that apply) | When Needed (check all that apply) | Cost Estimate Verification (check all that apply) | Complete Only if Contractor Responsible for Activity | |
|---|---|---|---|---|
| | | | Procurement Vehicle | Contract Type |
| ☐ Agency/State Entity Staff<br>☒ STPD Staff<br>☐ ITPOD Staff<br>☐ CA-PMO Staff<br>☐ DGS Staff<br>☐ Contractor<br>☐ Other, specify: enter text | ☒ Stage 3 Solution Development<br>☒ Stage 4 Project Readiness and Approval<br>☐ After project is approved (after Stage 4 Project Readiness and Approval) | ☐ Market research conducted (MR)<br>☐ Cost estimate provided (CE)<br>☒ Department of Technology CE<br>☐ DGS CE<br>☐ Request For Information conducted (RFI)<br>☒ Comparable vendor services have been used on previous contracts (CV)<br>☐ Leveraged Procurement Agreement (LPA) | Other<br><br>If "Other," specify:<br>Inter Agency Agreement | Other<br><br>If "Other," specify:<br>Inter-agency agreement. STPD Hourly rate. Estimated 500 hours for RFP support. |

Integration/Development

| Responsible (check all that apply) | When Needed (check all that apply) | Cost Estimate Verification (check all that apply) | Complete Only if Contractor Responsible for Activity | |
|---|---|---|---|---|
| | | | Procurement Vehicle | Contract Type |

| | | | | |
|---|---|---|---|---|
| ☐ Agency/State Entity Staff<br>☐ STPD Staff<br>☐ ITPOD Staff<br>☐ CA-PMO Staff<br>☐ DGS Staff<br>☒ Contractor<br>☐ Other, specify: enter text | ☐ Stage 3 Solution Development<br>☐ Stage 4 Project Readiness and Approval<br>☒ After project is approved (after Stage 4 Project Readiness and Approval) | ☐ Market research conducted (MR)<br>☐ Cost estimate provided (CE)<br>☐ Department of Technology CE<br>☐ DGS CE<br>☒ Request For Information conducted (RFI)<br>☐ Comparable vendor services have been used on previous contracts (CV)<br>☐ Leveraged Procurement Agreement (LPA) | Formal Solicitation (IFB/ RFP)<br>If "Other," specify:<br>Click here to enter text. | Other<br>If "Other," specify:<br>Deliverable Expectation Document (DED) |

Project Oversight

| Responsible (check all that apply) | When Needed (check all that apply) | Cost Estimate Verification (check all that apply) | Complete Only if Contractor Responsible for Activity | |
|---|---|---|---|---|
| | | | Procurement Vehicle | Contract Type |
| ☐ Agency/State Entity Staff<br>☒ STPD Staff<br>☐ ITPOD Staff<br>☐ CA-PMO Staff<br>☐ DGS Staff<br>☐ Contractor<br>☐ Other, specify: enter text | ☐ Stage 3 Solution Development<br>☐ Stage 4 Project Readiness and Approval<br>☒ After project is approved (after Stage 4 Project Readiness and Approval) | ☐ Market research conducted (MR)<br>☐ Cost estimate provided (CE)<br>☒ Department of Technology CE<br>☐ DGS CE<br>☐ Request For Information conducted (RFI)<br>☐ Comparable vendor services have been used on previous contracts (CV)<br>☐ Leveraged Procurement Agreement (LPA) | Other<br>If "Other," specify:<br>Inter Agency Agreement | Other<br>If "Other," specify:<br>Inter-agency agreement. STPD Hourly rate. |

Project Management

| Responsible (check all that apply) | When Needed (check all that apply) | Cost Estimate Verification (check all that apply) | Complete Only if Contractor Responsible for Activity | |
|---|---|---|---|---|
| | | | Procurement Vehicle | Contract Type |
| ☐ Agency/State Entity Staff<br>☐ STPD Staff<br>☐ ITPOD Staff<br>☐ CA-PMO Staff<br>☐ DGS Staff<br>☒ Contractor<br>☐ Other, specify: enter text | ☐ Stage 3 Solution Development<br>☐ Stage 4 Project Readiness and Approval<br>☒ After project is approved (after Stage 4 Project Readiness and Approval) | ☐ Market research conducted (MR)<br>☐ Cost estimate provided (CE)<br>☐ Department of Technology CE<br>☐ DGS CE<br>☐ Request For Information conducted (RFI)<br>☒ Comparable vendor services have been used on previous contracts (CV)<br>☐ Leveraged Procurement Agreement (LPA) | Request for Offer/California Multiple Award Schedules (RFO/CMAS)<br>If "Other," specify:<br>Click here to enter text. | Other<br>If "Other," specify:<br>Deliverable Expectation Document (DED) |

| DGS Delegated Purchasing Authority | Yes | No |
|---|---|---|
| Will any of the activities identified above result in a competitive or non-competitive solicitation that will be over the Agency/state entity's DGS delegated purchasing authority? | ☒ | ☐ |

## 2.11.4 Enterprise Architecture Alignment

Currently, CPUC has not defined an Enterprise Architecture yet. However, IT Management is identifying standard Enterprise products and tools based on opportunities when implementing individual projects. As the new projects adapt to available technologies that benefit CPUC by reducing custom development, faster time to market, and reducing total cost of ownership, CPUC would like to standardize on technologies based on suitability and acceptance by the Stakeholders.

The proposed solution is an independent solution to fit the needs of this specific application. However opportunities to use a potential future Enterprise standard will be considered in choosing Software products or toolsets.

| Information Technology Capability Table | | |
|---|---|---|
| **Information Technology Capability** | **Existing Enterprise Capability to be Leveraged** | **New Enterprise Capability Needed** |
| Public or Internal Portal/Website | ☒ | ☐ |
| Public or Internal Mobile Application | ☐ | ☐ |
| Enterprise Service Bus | ☒ | ☐ |
| Identity and Access Management | ☒ | ☐ |
| Enterprise Content Management (including document scanning and eForms capabilities) | ☒ | ☐ |
| Business Intelligence and Data Warehousing | ☒ | ☐ |
| Master Data Management | ☒ | ☐ |
| Big Data Analytics | ☒ | ☐ |

## 2.11.5 Project Phases

**Descripton:** **The major project phases are Design, Development , and Implementation. Each phase has major milestones that include each of the major tiers of the application.**

| Phase | Phase Deliverable |
|---|---|
| Project Design (Database tier, Application Logic tier, User Interface tier, Integration) | RSSIMS Application Design Guide<br>Report Design Guide<br>RSSIMS Interface Guide<br>RSSIMS Database Design Guide |
| Project Development (Database tier, Application Logic tier, System Administration, User Interface tier, Data processing, Integration) | RSSIMS Database Development Guide<br>RSSIMS Application Logic Guide |
| Solution Implementation | Unit Functional Tests<br>Application User Acceptance Test<br>System Turnover Presentation<br>RSSIMS Operations and Maintenance Manual |
| Project Complete | |

## 2.11.6 High Level Proposed Project Schedule

| | | | |
|---|---|---|---|
| **Project Planning Start Date:** | 9/1/2017 | **Project Planning End Date:** | 2/25/2021 |
| **Project Start Date:** | 3/1/2021 | **Project End Date:** | 6/30/2022 |

| Activity Name | Start Date | End Date |
|---|---|---|
| Stage 3 Solution Development | 7/2/2020 | 9/30/2020 |
| Solicitation Development | 7/2/2020 | 8/13/2020 |
| Solicitation Package Review | 8/14/2020 | 8/18/2020 |
| Solicitation Release | 8/19/2020 | 10/2/2020 |
| Solicitation Award | 12/3/2020 | 12/7/2020 |
| Stage 4 Project Readiness and Approval | 1/19/2021 | 2/25/2021 |
| Design | 4/28/2021 | 7/8/2021 |
| Development | 7/9/2021 | 1/17/2022 |
| Data Migration | 1/18/2022 | 2/28/2022 |
| Testing | 3/1/2022 | 5/11/2022 |
| Training | 5/12/2022 | 6/13/2022 |
| Deployment | 5/12/2022 | 6/9/2022 |
| Go Live | 6/9/2022 | 6/9/2022 |
| Maintenance and Operations | 6/10/2022 | 7/5/2022 |
| | | |
| | | |

### 2.11.7 Cost Summary

| | |
|---|---|
| **Total Proposed Planning Cost:** | **$3,287,236** |
| **Total Proposed Project Cost:** | **$5,770,055** |
| **Average Proposed Operations Cost:** | **$1,065,497** |

## 2.12 Staffing Plan

### 2.12.1 Administrative

SME and Managers' time have been calculated into the overall program effort estimated to be at four PY, but this estimate doesn't include Executive Management time.

### 2.12.2 Business Program

Subject Matter Experts from the RSD Division will provide the System requirements and Project priorities from the Business Perspective. They work with CPUC IT to provide the system requirements, to review and approve the User Interfaces, Input File formats, Data validations, Data Confidentiality rules, and report designs. Subject Matter Business Analyst participation is to document the current system functionality, processes and to document the required Business Functionality and Interfaces for the new system. They will also perform User Acceptance Testing of the System. The estimated effort by the Subject Matter Experts, Subject Matter Lead and RSSIMS Project/Program Management is two person-years (2 PY) for the Project. All the staff will work on the Project, on a part-time basis, some will spend more time than others, as they have other operational duties within the Rail afety Division.

### 2.12.3 Information Technology (IT)

An IT Business Analyst will prepare the ABTR, RTM, Process Flows, Use Cases, Wireframes, Design Documents, User Acceptance Criteria, UAT Plan and System Test Plans, coordinate the execution of test plans and prepares User documentation/manuals. Estimate is for one Person Year (1 PY) of Business Analyst work hours.

IT Project Manager (PM) will keep Project plan andstaffing plans up to date, coordinate work, ensure deliverables are of expected quality, log issues and risks, facilitate events and issue resolutions. PM will also review and approve deliverables. Estimate is for one Person Year (1 PY) of IT Project Manager work hours.

The Information Security Officer (ISO) and the Enterprise Architect (EA) will provide guidance to the Project from Security, Privacy, Technology Recovery and Architecture points of view. They will also ensure the Project complies to the State Policy and adopts industry standards and best practices. Estimate is for one person-month (22 person-days) for ISO; and two person-months (44 person-days) for Enterprise Architect Work hours. They attend Project Steering Committee meetings once a month, review and approve Project plans and deliverables in the Security, Privacy, Technology Recovery and Architecture specializations. Other IT Staff Managers from IT PMO, Contracts Management, IT Infrastructure & Operations, IT Applications Development will together consume two person-months (44 person-days) for Project reviews, support and staff alignment.

IT team will be responsible for reviewing the project requirements, creating system designs; creating development, testing and production environments; and implementing the system designs into a functional system. The estimate is 1.5 PYs for the Project in Database, Applications Development, and the Quality Assurance / Testing areas. The estimate includes design and development effort, testing effort, testing support, and deployment.

### 2.12.4 Testing

IT team will be responsible for reviewing the project requirements, system designs; development, testing and production environments; and implementing the system designs into a functional system. The estimate is 1.5 PYs for the Project in Database, Applications Development, and the Quality Assurance / Testing areas. The estimate includes design and development effort, testing effort, testing support, and deployment.

### 2.12.5 Data Conversion/Migration

Data conversion/migration will be part of the IT team's responsibility in addition to the vendor efforts and will be part of the estimated 1.5 PYs for the Project in Database, Applications Development, and the Quality Assurance / Testing areas. The estimate includes design and development effort, testing effort, testing support, and deployment.

### 2.12.6 Training and Organizational Change Management

M&O team will be responsible to know all aspects of the system – functionality, architecture, environment, system designs, code, development and deployment procedures. M&O team will gain the required knowledge per the project plan by engaging in all these approaches:

- Readiness/prep activities for technical skills building as required;
- Review system documentation – functionality and technical documents;
- Code reviews;
- Review M&O Tasks and Procedures;
- Environment builds and code deployment;
- System testing;
- Participate in Vendor provided hands on training; and
- Performing M&O tasks.

The M&O effort for the Project transition is estimated to be 1/2 person-years (0.5 PY) – two persons – (primary and backup) working for three calendar months each to learn and support the System until the Project moves into CPUC Supported M&O mode.

### 2.12.7 Resource Capacity/Skills/Knowledge for Stage 3 Solution Development

CPUC IT currently assigned an IT Business Analyst, IT Project Manager, and IT Contract Manager to the Project to work on S3SD (Stage 3 Solution Development) and Solicitation process. CPUC IT has already engaged a vendor Business Analyst to conduct detail development of the requirements and process flows. CPUC will also provide the services of Eneterprise Architect and Information Security Officer as required by the Project. CPUC Program staff comprise of a Subject Matter Lead and up to eight SMEs (Subject Matter Experts) to help with the S3SD (Stage 3 Solution Development) Process. Project Directors, Procurement/Solicitation Manager, PMO Manager services will be provided as required. CPUC IT Technical staff involvement will be provided on an as needed basis depended on the specific area of need such as Databases, Application Development, Web Development, or Infrastructure.

## 2.12.8 Project Management

### 2.12.8.1 Project Management Risk Assessment

| | |
|---|---|
| Project Management Risk Score: | 7.0 |

RSSIMS Project Management Risk A

### 2.12.8.2 Project Management Planning

Are the following project management plans or project artifacts complete, approved by the designated Agency/state entity authority, and available for Department of Technology review?

| | | |
|---|---|---|
| Project Charter | Yes | RSSIMS - Project Charter v5.3.doc |
| Scope Management Plan | Yes | RSSIMS Scope Management Plan v |
| Risk Management Plan | Yes | RSSIMS Risk Management Plan v |
| Issue Management Plan | Yes | RSSIMS Issue Managements Plan |
| Communication Management Plan | Yes | RSSIMS Risk Management Plan v |
| Schedule Management Plan | Yes | RSSIMS Schedule Management Plan v |
| HR & Staff Management Plan | Yes | RSSIMS HR and Staff Management F |
| Stakeholder Management Plan | Yes | RSSIMS Stakeholder Manag |
| Governance Plan | Yes | RSSIMS Governance Management Plan v |

## 2.12.9 Organization Charts

RSSIMS Project Organization Chart

## 2.13 Data Conversion/Migration

Identify the status of each of the following data conversion/migration activities:

| | | | |
|---|---|---|---|
| Data Conversion/Migration Planning | Completed | Data Quality Assessment | Not Started |
| Data Conversion/Migration Requirements | Not Started | Data Quality Business Rules | Not Started |
| Current Environment Analysis | Not Started | Data Dictionaries | Completed |
| Data Profiling | Not Started | Data Cleansing and Correction | Not Started |

In the current RSSIMS System, all primary data information is stored in the Oracle database, and multiple file storage servers within CPUC maintained infrastructure. The RSSIMS database is the primary repository of all validated data submitted by RSSIMS business users thru RSSIMS application. Currently, there is no defined data archival and retention/purge policy used and for the purposes of this project, it is assumed that the data will be retained per RSSIMS business requirements until a policy of data retention is established. The data retention policy will dictate the data archival followed by the data purge procedures from the active systems.

In the proposed RSSIMS System, will consist of

- Database to store both structure and un-structure data.
- Secured database support both on-line/batch transactions.
- To provide consolidated database operations.
- To support larger queries and reporting operation includes download results in different format by RSSIMS application users.
- To store different type of files in the centralized repository systems.
- Data retention and archival/purge capability.

The Project Implementation team will recommend a database software to support the business functionality, incorporate additional data objects and create new database model that accommodates both functional and non-functional requirements. All users/system data from the existing application will be cleaned, converted and migrated to the new database. Production deployment will be undertaken after successful data migration, implementation and testing of the new functionality using the new database.

RSSIMS_Data_Management_Strategy_v1.c

## 2.14 Financial Analysis Worksheets

RSSIMS Financial Analysis Worksheet

| Preliminary Assessment – Department of Technology Use Only | |
|---|---|
| Original “New Submission” Date | 5/11/2020 |
| Form Received Date | 7/16/2020 |
| Form Accepted Date | 7/16/2020 |
| Form Status | In Analysis |

| | |
|---|---|
| Form Status Date | 7/16/2020 |
| **Main Form – Department of Technology Use Only** | |
| Original “New Submission” Date | 5/11/2020 |
| Form Received Date | 7/16/2020 |
| Form Accepted Date | 7/16/2020 |
| Form Status | Completed |
| Form Status Date | 11/16/2020 |
| Form Disposition | Approved |
| Form Disposition Date | 11/16/2020 |